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**Sustainable
Regional Economic
growth:
Global challenges
and
new regional
development trajectories**



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6 Analysing the Nexus between Cluster Theory and Regional Development: A Case Study of the Bridal Industry in Izmir, Turkey

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Abstract

This research study harnesses the comprehensive clustering analysis and activities executed by the Izmir Development Agency, with a specific focus on the Izmir/Çankaya region, to investigate and evaluate the implications of the clustering phenomena within the bridal wear sector on the broader context of Izmir's regional development. The investigation aligns closely with the foundational principles of Porter's diamond model. Through an extensive and thorough exploration, the research delves into the rich theoretical contributions, delving deeply into the intricacies of both the prevailing cluster policies and the unique experiences and practices witnessed within the global, Turkish, and local Izmir frameworks. The primary thrust of this research is to unveil and dissect the underlying relationship between the fundamental tenets of cluster theory and the broader landscape of regional development, utilizing the vibrant and dynamic milieu of the bridal wear sector in Izmir as a quintessential case study. The study not only offers a nuanced and insightful analysis but also provides a compelling and nuanced perspective on the dynamic nature of clusters and their pivotal role in shaping and influencing the broader regional development policies and strategies. Moreover, the research highlights the critical significance of understanding the multifaceted interplay and interdependence of diverse factors that collectively contribute to the generation and sustenance of a distinctive and sustainable competitive advantage within a specific industry. By meticulously scrutinizing the intricate process of cluster formation and the underlying driving forces that propel and steer this phenomenon, this research effectively illuminates and sheds light on the underlying mechanisms and operational intricacies that are instrumental in defining and shaping successful clustering strategies. Furthermore, the study underscores the critical and indispensable role played by robust and resilient institutional support and the strategic formulation and implementation of well-structured and meticulously calibrated policy frameworks in fostering and nurturing sustainable clustering practices. This, in turn, facilitates and engenders a conducive environment for fostering and nurturing equitable and well-balanced regional development while simultaneously acting as a catalyst for fostering and fostering robust and sustainable economic growth at both the regional and national levels.

1. INTRODUCTION

Ensuring the welfare reaches all social classes of society and minimizing regional disparities is achieved through the region's economic development. Regional development policies are implemented in the region to achieve sustainable and balanced economic growth. The emergence of the clustering theory in the literature for the purpose of achieving regional development began with Porter's study in 1990. A cluster represents a large group of companies in related industries in a specific location (Swann & Prevezer, 1998). According to Rosenfeld (1997), a cluster represents the density of companies that can generate synergy due to geographical proximity and mutual solidarity. There are various explanations and definitions in the literature for a cluster, such as these definitions. However, this article examines the most common four concepts of Weber, Krugman, Porter, and Sölvell to explain the cluster and the clustering process.

The cluster theory, initially, is explained through the literature review of Weber's Location Theory, Krugman's Geography and Trade Concept, Porter's Competitive Diamond Model, and Sölvell, Lindquist, and Ketels' Cluster Initiatives. Subsequently, the relationship between the clustering theory and regional development is examined. In line with this information, this paper conducts an analysis from general to specific, examining the world, Turkey, and İzmir to demonstrate the connection between the clustering theory and regional development policies and to assess these policies from the past to the present. While doing so, it questions the link between the clustering theory in the literature and regional development policies in Turkey, and whether the Competitive Diamond Model of Porter and its positive impact on regional development in the wedding dress and evening wear sector in İzmir. The research method is established to analyze this cluster using the data obtained from the cluster analysis conducted by the İzmir Development Agency, aiming to reveal the strengths and weaknesses of this cluster through Porter's Competitive Diamond Model. Additionally, the success of the clustering strategies and policies implemented in İzmir is questioned in light of the impact revealed by this method.

2. CLUSTER THEORY

Alfred Marshall was the first economist to discuss industrial clusters in 1890. According to him, certain industrial clusters are more concentrated in some regions than others. Marshall (2009) attributes this concentration to physical geographical features such as climate, soil characteristics, and proximity to natural resources. Accordingly, clusters are also defined as the regional concentration of firms operating in specific areas of specialization in vertical and horizontal relationships (Hill & Brennan, 2000). According to Weber (1929), the clustering of firms results in the reduction of various operational costs such as transportation and infrastructure, gaining competitive advantage, and increasing trade relations. This article explains the clustering theory through four fundamental concepts: cluster location, geography and trade, competitive advantages of clusters, and cluster initiatives. In turn, Weber's Location Theory, Krugman's Geography and Trade, Porter's Competitive Diamond Model, and finally Sölvell, Lindquist, and Ketels' Cluster Initiatives explain these four fundamental concepts. 3

2.1. Weber's Location Theory

A model of the location theory was presented by Alfred Weber. According to Weber (1929), it is possible to determine the most favorable location by minimizing costs. Weber created a mathematical model that allows the determination of the most favorable production location. This model includes factors such as labor, raw material, and transportation costs. Along with input factors and transportation costs, he defined the "location triangle" to depict the minimization problem of firms (Weber, 1929).

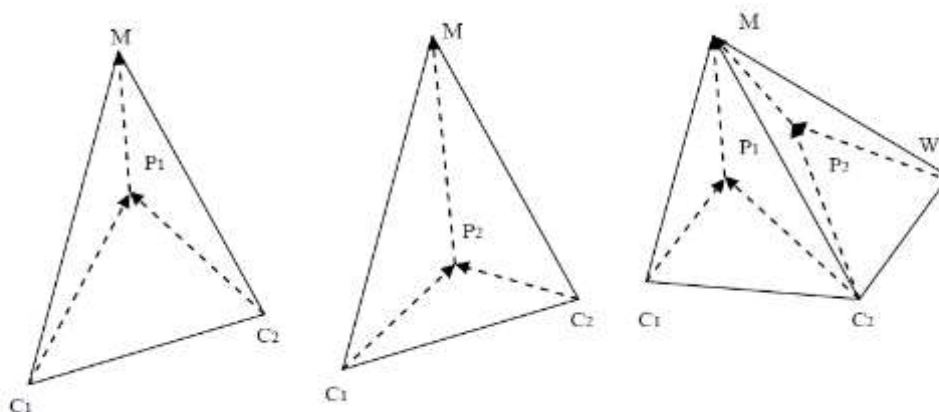


Figure 1. The Location Triangle by Weber (1929)

In Figure 1, "P" represents the production site, while "C1" and "C2" represent the raw materials transported to the production center. "M" depicts the production market. Weber assumes constant transportation costs per unit of distance in this manner. Furthermore, he assumes that labor becomes more expensive as it gets closer to the product market (M). According to Weber (1929), with these assumptions, it is possible to determine the optimal production site (P) that minimizes costs.

In the first triangle, the company selects its location decision based on entry costs, labor costs, and transportation costs, as presented in Weber's foundational model. In the second triangle, the firm faces increased labor costs caused by growing competition or the beginning of clustering. In the third triangle, the company encounters increasing prices for its raw materials.

The application of Weber's location theory explains rival firms that horizontally agglomerate and seek to minimize their costs. Firms with similar products choose the same production site (Weber, 1929). This location decision is essential for labor- and transportation-intensive industries and results in the horizontal and vertical placement of firms leading to cluster development (Weber, 1929). However, there exists a reciprocal exchange that increases production costs and counteracts clustering. Consequently, Weber's model encompasses the significant effects of cluster theory.

2.2. Krugman's Geography and Trade Concept

According to Paul Krugman (1991), economic geography is the location of production in space, and the geographical density of production is evidence of increasing returns. Krugman identifies various reasons for geographical density, such as multiple equilibria, history, accident, self-fulfilling events, and increasing returns.

Increasing returns affect economic geography on many scales and are responsible for the irregular economic development of all regions. In Krugman's model, each producer wants to serve the national market from a single location. The firm selects a location with a large regional demand to minimize transportation costs, often the place where the majority of manufacturers are located (Krugman, 1991). Multiple equilibria can occur when two distinct markets develop certain demand. Krugman illustrates the example of multiple equilibria between East and West. If production density is in the East, each firm will want to be located in the East and serve the market in the West, and conversely, the same will be true in the West. Therefore, if both markets develop strong enough demand, the firm will serve two places from two markets (Krugman, 1991). The role of history and accident in the location of production is the most important determinant in all economic agglomerations of labor or workforce (Krugman, 1991). The emergence of clusters is explained by the logic of the first come, first served advantage. These clusters are due to their history and luck. For a self-fulfilling event, movement to a region must be easy and fast, there must be increasing returns in the region, and this region should not be less developed compared to other regions (Krugman, 1991). For example, if the East had initially offered better economic conditions, geographical concentrations would have formed in the East, and if people were convinced that the West would be the future market, they would move to the West. Furthermore, Krugman also argues that a nation is not a region or a single place. He notes that national policies affect price inputs, labor mobility is much cheaper, and there are natural barriers such as language or geography (Krugman, 1991). In conclusion, Krugman generally explains geographical concentration and the concept of increasing returns.

2.3. Porter's Competitive Diamond Model

According to Michael E. Porter (1998), the success of clusters is based on competitive advantage. Therefore, it is important to understand how and why clusters develop their competitive advantages compared to other countries, regions, and industries for the theory of clustering. Porter presents the idea of competitive advantage through the concept of the competitive diamond model. According to this diamond model, clusters follow three stages in competition, namely the increase in efficiency, acceleration of the innovation process, and triggering of new business formations (Porter, 1998). Additionally, Porter has identified four components responsible for the competitive advantage of a

sector: factor conditions, demand conditions, related and supporting industries, and firm strategy, structure, and rivalry. These four components interact with each other in the form of a diamond and create a competitive advantage (Porter, 1998).

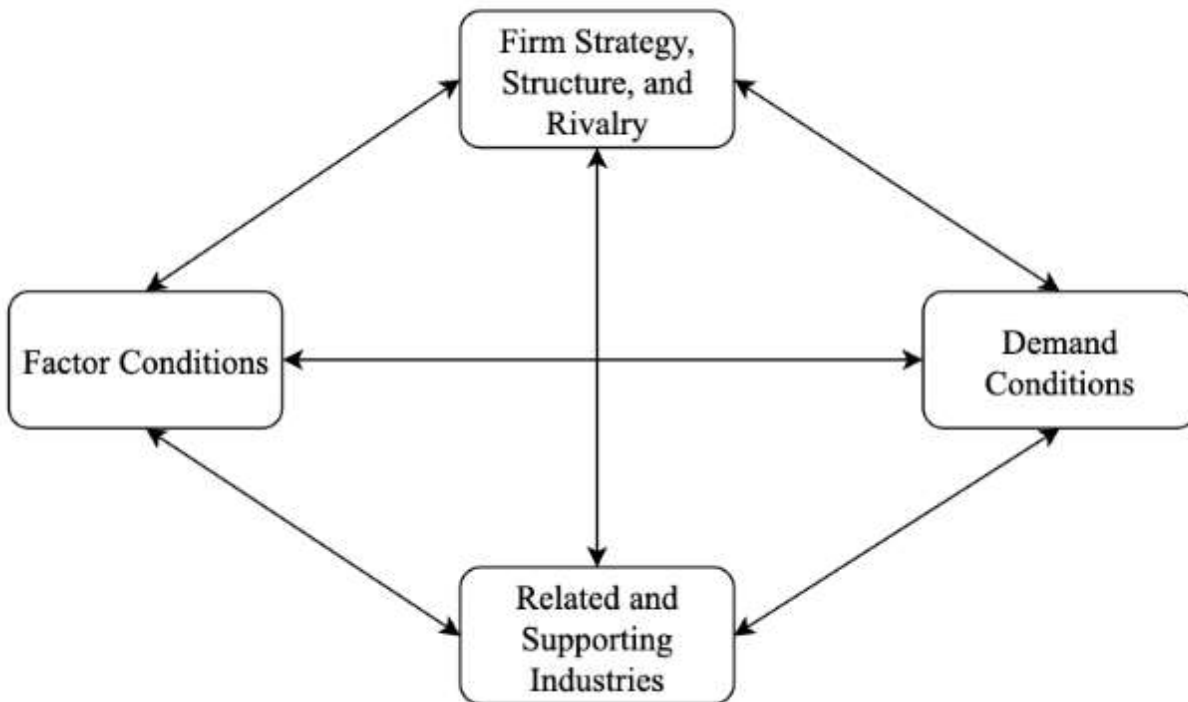


Figure 2. Porter's (1998) Competitive Diamond Model

Factor conditions explain all inputs or infrastructure used in the production process, such as human capital, physical capital, physical infrastructure, management, information technology, and research (Porter, 1998). According to Porter (1998), specialization must be developed with production factors to increase efficiency. Such specialization efforts positively impact production. If specialized factor conditions exist only in one region, it likely means that these conditions cannot be replicated elsewhere. Hence, the demand for the products provided by firms within this cluster will increase (Porter, 1998). For example, countries with limited natural resources have a greater power to achieve higher productivity and thus have a more comprehensive innovation process, providing a competitive advantage over other nations and clusters. Demand conditions are market-determined factors. There are specific requirements for a product determined by the market in both domestic and foreign markets in terms of price, quality, and innovation (Porter, 1998). The domestic market is one of the most critical markets for a cluster. According to Porter (1998), a strong domestic market is the most crucial driving force that compels firms to produce high-quality products. Related and supporting industries are all companies and industries that collaborate vertically. In the production process, it is essential for the entire industry and cluster to reduce costs and increase efficiency (Porter, 1998). This necessitates suppliers and manufacturers to be located in a common geographical area, enabling them to reduce transportation costs, improve information flow, and increase innovation (Porter, 1998). Firm strategy and rivalry, are factors that influence the decisions of firms and individuals within the cluster. It is crucial for individuals, firms, and clusters to determine their own strategies and structures according to the environment (Porter, 1998). If clustering firms choose a path of continuous investment and development, they will maintain their competitive positions (Porter, 1998). Additionally, if firms compete with other firms in the same business cluster, each will be motivated to innovate to differentiate itself from others.

In conclusion, a cluster has a competitive advantage that makes its products more valuable, superior, and globally competitive. Both firms and clusters achieve a competitive advantage against other firms and regions outside the cluster. Therefore, high regional competition leads to global competitiveness. Regional competition compels firms to go beyond basic advantages (Taşdemir, 2008).

2.4. Sölvell, Lindquist, and Ketels' Cluster Initiatives

According to Sölvell et al. (2003), national governments, local administrations, national and local industries, and academic institutions, all of whom are potential beneficiaries of a cluster, work to strengthen the competitive advantage of clustering. Therefore, all participants in a cluster should coordinate their goals together to enhance the overall cluster. Sölvell et al. (2003) define cluster initiatives and explain the types of institutions involved in them. Additionally, they measure the success of these initiatives with three criteria: competitive strength, growth, and purpose. Governments and companies implement cluster initiatives to increase the competitiveness and growth of local economies. Cluster initiatives develop six objectives to coordinate the interests of the relevant parties: human capital development, support for cluster growth, business development, innovation and technology, commercial collaboration, and improvement of the business environment (Sölvell et al., 2003). The development of human capital is one of the primary objectives of cluster initiatives. The aim of cluster initiatives is to ensure the presence of a suitable pool of skilled labor by attracting students in close collaboration with local educational institutions. Support for cluster growth can be achieved by attracting foreign companies into the cluster. Therefore, most cluster initiatives aim to attract firms that support some form of vertical diversification. To enhance business development, cluster initiatives provide access to new markets, investments, technologies, and information through international collaborations. Increased business partnerships strengthen the overall competitiveness of clusters. Commercial collaboration involves collecting the actions of firms by cluster initiatives to reduce costs and increase efficiency, creating synergy (Sölvell et al., 2003). Innovation and technology accelerate the innovation process of cluster firms through close collaboration between human resources and academic institutions. Finally, the improvement of the business environment is a factor directed towards local and national governments. Cluster initiatives provide assistance for the improvement of physical infrastructure and support the formation of legal environments and public institutions created by local or national governments in the clustering process. CIs are directed towards at least one of these six goals. Through these objectives, cluster initiatives increase the competitiveness of clusters and promote local economic growth. However, they should be shaped according to their own environments to be successful. Governments and industrial agglomerations provide an appropriate tool for improving their local economies, achieving further economic growth, and ensuring stability through clustering initiatives.

3. RELATIONSHIP BETWEEN CLUSTER THEORY AND REGIONAL DEVELOPMENT

Clusters have emerged as one of the most popular concepts for local or regional development in research and application (Swann & Prevezer, 1996). Cluster theory assumes that firms, whether complementing each other, competing, or sharing common resources such as technology and specialized workforce, generate increasing returns to scale (Bergamn & Feser, 1999). These returns result from the concentration of specialized suppliers or lower unit operating costs (Bergamn & Feser, 1999). The increased returns are produced with higher unit profits due to product innovations or intense local competition. This increasing returns to scale are also generated with higher firm formation rates compared to other locations. Individuals working in the sector and aware of market gaps can establish new firms. With the initiatives of these individuals, other entrepreneurs can more easily access finance compared to their competitors in other places. This is because local investors and lenders can better understand the risks and opportunities created by previous entrepreneurs (Olson, 1982). Thus, clustering and regional development take place.

Consistent development is observed in regions within developed economies. In the essence of these economies, cluster economies, adjusted return rates based on risk, interactions between firm strategies, and market forces exist (Olson, 1982). Industrial and product innovation is necessary for the development of any economy, and the establishment of a new sector in a specific location is essential (Eberts & Stone, 1992). Transition to the next development stage of a region means that the local industry begins to create cluster economies, resulting in the generation of divided rents among

the management, investors, and workers of the sector, which are crucial sources of increased per capita income, an important consequence of economic development (Eberts & Stone, 1992). The development of regions is determined by their industrial structures. The setup of the industry and industrial innovation is crucial for the economic development of a region. Where the industry is established and how it reaches a size large enough to manage cluster economies affects the region's economic development (Rosenfeld, 1997). With the existence of cluster economies, as more firms are drawn to a location, the prices of local production factors, especially land and labor, increase. Therefore, all firms have strategies, and a region's economic development depends on the robustness and proper execution of many strategies among the firms constituting the region's industries. These firms succeed or fail based on entry costs and production prices reflecting their products, including development, innovation, and management practices. This plays a significant role in the region's development. In the process of regional development, central administrations generally focus on cluster policies, targeting underdeveloped regions more intensively than large firms. Additionally, these policies encourage the participation of public and private sector actors, adopting a broader approach for the industry and innovation goals in regional development.

4. RESEARCH METHOD

Initially, a literature review on cluster theory was conducted for theoretical research. Through the theoretical contributions related to the cluster policies and the experience of the bridal wear cluster in the world, Turkey, and Izmir, the analysis was conducted from the general to the specific. Porter's identified factor conditions, demand conditions, related and supporting industries, and firm strategy and competition structure are the four components responsible for a sector's competitive advantage. According to Porter (1998), if one of the four components is sufficiently high, it will drive the development of the other three components. For example, if a cluster is equipped with sufficient factor conditions such as infrastructure and skilled labor, these factors will stimulate the development of the other three components. As a result, clustering enhances the overall competitive advantage. Within this scope, it is possible to identify the strengths and weaknesses of a cluster using Porter's Diamond Model. This model also attempts to identify the driving forces of cluster formation. This study questions the impact of the clustering of the bridal wear sector in Izmir on the regional development of Izmir's institutional foundations with Porter's diamond model.

5. CASE OF IZMIR BRIDAL WEAR CLUSTER

Clusters, along with competitive advantages, have been observed from Alfred Marshall to the present. When viewed globally, it is observed that clusters occur spontaneously and are supported by certain policies. Looking globally, the Hollywood Cluster in America in 1906, Silicon Valley in America in 1951, and the Aerospace Cluster in France in 2005 are seen as successful examples of clustering. In Turkey, cluster policies and academic studies on clustering were not significantly examined until the 2000s. However, with the Competitive Advantage Project of Turkey supported by the Middle East Competitiveness Strategies Center founded by Michael E. Porter and Yagil Weinberg, development studies along with clustering began to accelerate in the 2000s. Various steps have been taken as Turkey's clustering policies with the Sultanahmet Tourism Cluster in 2000 realized by CAT, the Ankara Informatics Cluster Study in 2004 realized by METU, the Konya Automotive Sub-Industry Cluster in 2005 realized by DPT, the Adıyaman Textile Cluster studies in 2006, and finally, the Development of Cluster Policy in Turkey Project realized by DTM in 2008. From 2009 to the present, it can be seen that clustering studies are supported by new incentive systems in 2009 and the SME Collaboration and Clustering Project in 2011. From 2011 to the present, development agencies, as local actors, create clustering strategies and strive to ensure sustainable industry.

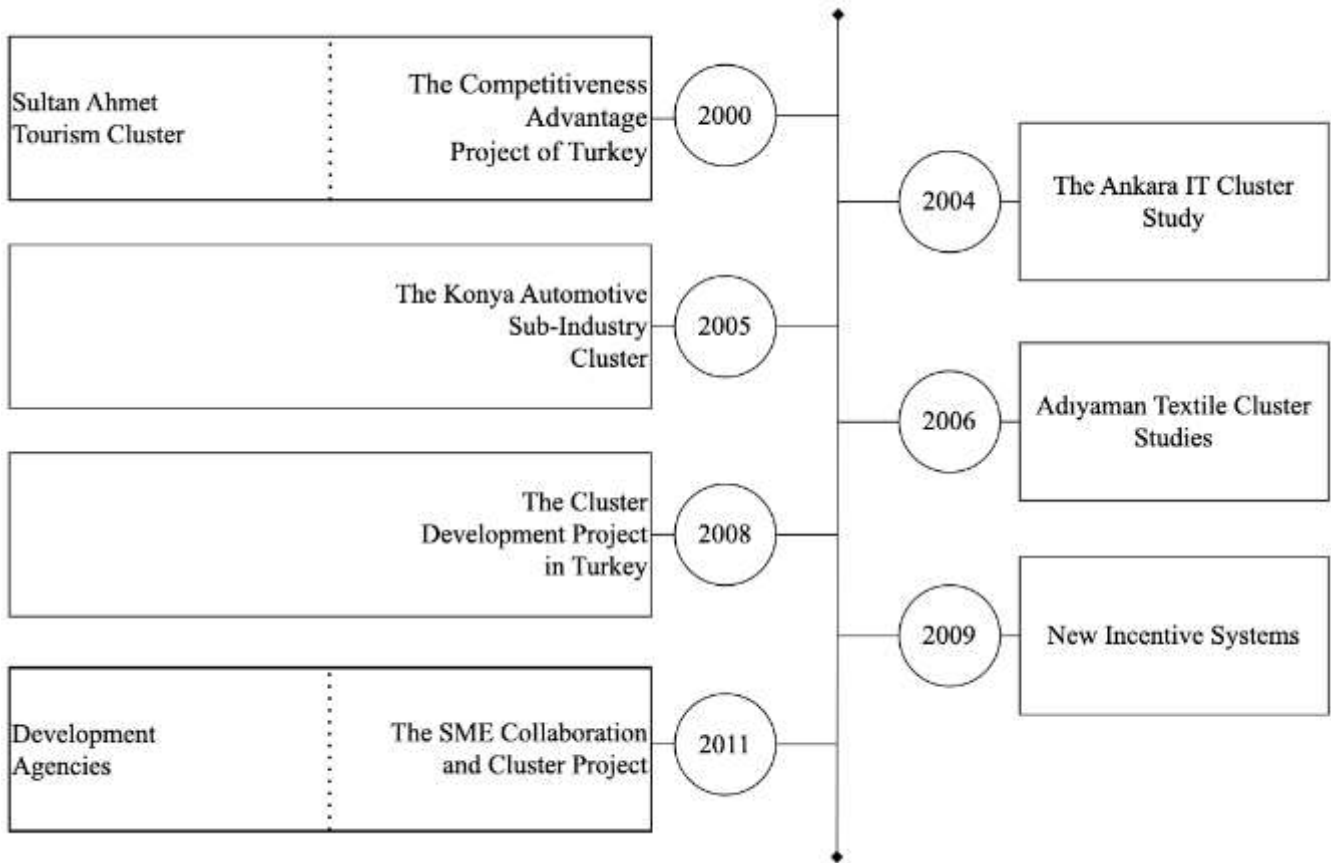


Figure 3. Cluster Policies in Turkey

The clustering policies and experiences in Izmir are based on the ABIGEM project that started within the scope of the European Union Project in 2005. Along with this, within the scope of the Development of Clustering Policy in Turkey Project in 2008, a roadmap was created for the Izmir Organic Food Business Cluster. By 2009, the Izmir Development Agency conducted Turkey's first regional clustering studies and comprehensive clustering analyses. Parallel to these accelerating clustering studies, from 2013 to 2018, Izmir Development Agency continues its Izmir Regional Cluster Strategies Determination study.

Cluster analyses conducted by Izmir Development Agency and innovative cluster approaches have identified potential cluster sectors and developed policy recommendations. These cluster sectors are determined as the Industrial Ventilation Air Conditioning and Cooling Sector, Processed Fruit and Vegetable Sector, Chemical Sector, Automotive Equipment Sector, Logistics Sector, and Bridal Wear Sector. A cluster roadmap was created for these identified sectors. International funds and local platforms are utilized while doing this. As clustering policies, 3 main priorities have been identified. These main policies are the governance of clustering for ensuring competition and sustainability, the support approach for clusters for technical support and access to finance, and the dissemination of clustering for development through increased prosperity. Based on these policies, 7 targets and 26 actions have been determined by Izmir Development Agency (IZKA, 2012).

5.1. Çankaya Bridal Wear Cluster

According to Ada et al. (2013), population movements and the number of marriages are the most crucial variables determining the demand for bridal dresses globally. Europe and the United States hold a decisive position in shaping global trends in the bridal industry due to their high purchasing power. The countries with the highest production and exports are China, Italy, and Spain, while the leading importers are the United States, Japan, and several European and South African countries (Ada et al., 2013). Turkey stands as the third-largest producer in the bridal dress sector after China and Italy and has emerged as a significant player in bridal dress production for Europe and the Middle East, holding the sixth position among the world's largest exporters (MHGF, 2016). The bridal wear

sector is predominantly clustered in the Marmara and Aegean regions, with approximately 4,000 companies operating at the boutique level (MHGF, 2016).

Table 1. Statistics on the Total Number of Marriages between 2006 and 2009 (MHGF, 2016)

Region	2006	2007	2008	2009
Africa	1.104	1.22	1.269	1.193
South America	1.405	1.197	1.445	1.225
USA	2.193	2.197	2.157	2.077
China	9.450	9.914	10.980	12.120
Japan	0.730	0.719	0.726	0.707
Spain	0.207	0.204	1.179	1.199
Italy	0.245	0.250	0.246	0.230
Turkey	0.636	0.638	0.642	0.592

According to the Istanbul Bridal Industry and Exporters Association's 2012 data, there are approximately 700,000 marriages annually in Turkey, resulting in the production of about 600,000 wedding dresses. Approximately 80,000 people are employed in the bridal industry, contributing to a production value of 600 million dollars (Ada et al., 2013). Turkey's annual bridal dress exports amount to approximately 400,000 units (Ada et al., 2013). Turkey aims to distinguish itself in the market by producing products that are cheaper than those from Italy and Spain and of better quality than those from China (MHGF, 2016). This sector in Turkey, with its textile and ready-to-wear production, employment generation, and export activities, accounts for about 10% of the gross domestic product and about 20% of overall exports, making a significant contribution to the economy and particularly to foreign trade (MHGF, 2016). Moreover, Izmir is currently experiencing a growing trend in production, fashion marketing, and branding within this system, leading it to be known as the "Bridal Capital" not only in Turkey but also globally (MHGF, 2016).

The bridal wear sector is defined as the product group that manufactures special clothes worn for special events such as weddings, engagements, graduation ceremonies, and similar ceremonies (IZKA, 2010). Within this context, one of the most important naturally integrated sectoral examples in the world in terms of bridal wear is the Marxloh district of Duisburg, which is affiliated with the Düsseldorf province in Germany. This district has gained fame throughout Germany for having a large number of bridal shops in a relatively small area, with Weseler Straße Street being dubbed the "wedding mile" (Goethe Institute, 2016). The Marxloh district is mainly characterized by a high immigrant Turkish population, with an estimated 13,500 of the 20,500 residents being of Turkish origin (Öz, 2018). This Turkish influence has continued to foster the development of bridal wear shops, hairdressers, and other shops selling wedding-related items on Weseler Straße Street from the 1980s to the present (Öz, 2018). Similarly, Turkey has its own naturally evolved and integrated bridal wear sector, which is observed in Izmir. In addition to its dominance in the Turkish market, Izmir also holds a significant position in international networks and has a considerable competitive advantage. This cluster is concentrated in the Çankaya region on Mimar Kemalettin Street in Izmir's Konak district. The historical formation process of this cluster is based on the traditional wedding activities in the Aegean region, which have been an essential social activity for the people (Ciner, 2013). The development of the bridal wear sector in Izmir began with the establishment of the first wedding wear manufacturer, Madencioğlu, in Çankaya in 1975 (Ciner, 2013). The owner of the company, by recognizing the gap and need in the sector, became the first successful bridal wear company, and over time, the employees who left the company established their own companies, leading to the development of the bridal wear sector through Madencioğlu's subsidiary companies. This development resulted in the formation of a dense group of bridal wear producers in Çankaya, which started with about 60-70 bridal wear shops and currently hosts approximately 500 bridal wear shops and 300 evening wear shops (IZKA, 2010).



Figure 6. Izmir Cankaya Region Bridal Wear Cluster (Produced by the Author)

The shopping places designated as "wedding shops" in the commercial life of the Aegean are where everything related to weddings is sold (IZKA, 2010). The increasing demand in these stores in the past has led to the development of the sector in the center of Izmir and made it possible to sell bridal wear and all related products to all of Anatolia after the Aegean (IZKA, 2010). Another reason for the development of this sector in Izmir is that it does not mainly engage in wedding dress production with haute couture (designer-tailor), which is considered the forefront of fashion in the world and is prepared only for elite customers, unlike Istanbul (MHGF, 2016). The fact that different and mainly firms capable of producing a large number of wedding dresses have increased in number in addition to haute couture is specific to this region (MHGF, 2016). New companies, like Madencioğlu, have had low entry barriers into the sector because they generally do not deal with special design production and focus on mass production of over a thousand ready-to-wear dresses annually. Therefore, they positioned themselves differently from the producers in other cities of Turkey, such as Istanbul, where companies specialized in the production of special design products are located.

According to the Aegean Clothing Manufacturers Association (EGSD) data, it was determined that Izmir is the leading city in Turkey's bridal sector with a 70% market share in 2013 (Ciner, 2013). According to the EGSD data, there are 346 registered bridal companies in Izmir (Ciner, 2013). Along with about 800 small and medium-sized workshops, there are about 1150 enterprises producing bridal, engagement, and evening wear in Izmir (Ciner, 2013). While these companies used to organize their collections with fashion shows for customers in Anatolia in the past, these activities have begun to attract attention at the international level with the IF Wedding Fashion Fair. The larger and medium-sized companies in Izmir generally have employment of 50-80, while there is an estimated workforce of 4,000-6,000 in the sector (Ciner, 2013). These companies, mostly located around the Cankaya region, manage all production, design, and sales activities in a single entity (IZKA, 2012). Therefore, the sector faces significant problems in terms of designer, qualified staff, and master shortages, as well as sales, marketing, and operational staff for foreign markets (IZKA, 2012). Additionally, the sector feels a significant need for access to operating capital. Although it does not

require high-tech investments, its relationship with the university is quite weak. However, various higher education institutions carry out the Bridal Education Project (IZKA, 2012).

In addition to the bridal wear companies in the Cankaya district, there are accessory and fabric producers producing raw materials. These companies primarily rely on the dominance of China and India in the supply of raw materials and services due to the affordability of their products (MHGF, 2016). While there are several accessory manufacturers in Cankaya, there is no single company that produces all bridal accessories (MHGF, 2016). For example, there are subsidiary companies focusing on giving shape to the petticoat accessory in Cankaya. These companies produce the petticoat according to the existing wedding dress and give it shape accordingly. In addition to these, accessory companies such as veil, fabric, thread, tulle, lace, bead craftsmen, hair accessories, crown, flower, gloves, bridal lingerie, shoes, and hoop embroidery are located on Mimar Kemalettin Street. Furthermore, fabric and tulle producing companies are also found among the ancillary producers of the bridal wear sector in Cankaya. These companies supplying raw materials and services are suppliers of suitable fabrics, accessories such as bead stones, designers, and those engaged in subcontracted handcrafts at home. These companies are mostly represented by domestic and international export agents. Institutions such as EGSD, IZKA, EBso, IZTO, M. Kemalettin Fashion Center, Izfas, and ElB are involved as supportive bodies (MHGF, 2016).

In conclusion, it is understood that there is no specialization in the functions within the companies, quality management systems are not implemented, and the company owner personally manages all functions of production, marketing, procurement, and finance. There are difficulties in the design area, and these companies have not yet met the definition of SMEs. It has been determined that no relationship has been developed with research institutions other than the Bridal Education Project, but it is apparent that companies are motivated to come together as a cluster with events such as the IF Wedding Fashion Fair. The sector has a significant advantage in the domestic market, but its effectiveness in the international markets is observed to be insufficient. However, this superiority makes a significant contribution to the economic development of the region in Izmir. In the Izmir Cluster Strategies prepared by the Izmir Development Agency, this issue has been examined, and as a result of the contribution of the bridal wear sector to the economy, this sector has been identified as a potential cluster sector for the region (IZKA, 2012). Accordingly, three policy recommendations were made, including increasing institutional capacity, popularizing the cluster approach, and developing internationalization (IZKA, 2012).

5.2. Çankaya Bridal Wear Cluster and Porter's Competitive Diamond Model

The bridal wear cluster in Izmir has been analyzed through Porter's Diamond Model, as described in the literature section and clustering theory, to identify its strengths and weaknesses as illustrated in Figure 8. Factor conditions, demand conditions, related and supporting industries, and firm strategy, structure, and rivalry interact in a diamond shape as depicted below. Additionally, the driving forces of the clustering formation process, along with the regional development impact of this cluster, have been examined. The boxes in italics in the figure represent the weaknesses, while those in regular text represent the strengths.

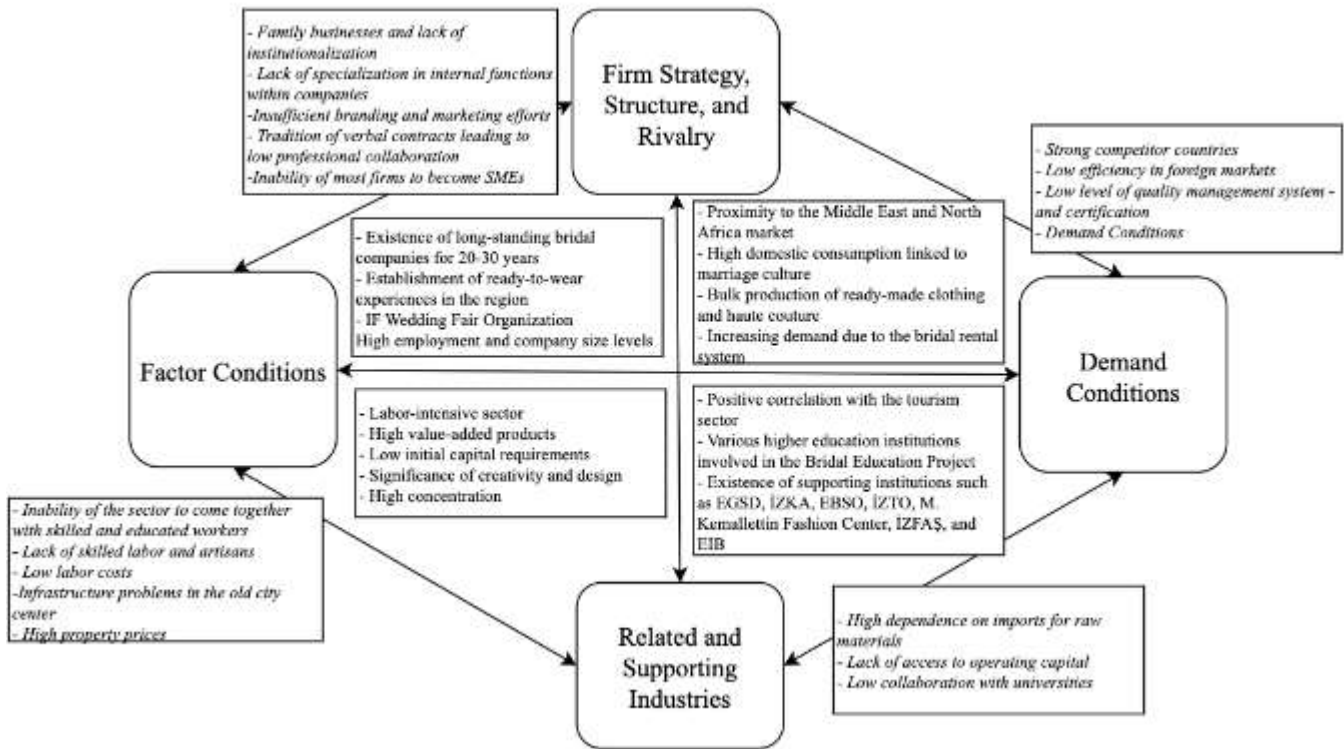


Figure 4. Porter's Diamond Model and Izmir Bridal Wear Cluster (Produced by the Author)

Upon examining the diamond model prepared for the bridal wear cluster in Figure 4, various assumptions and evaluations can be made to sustain and ensure the competitiveness of the bridal wear cluster in the future, in comparison with its strengths and weaknesses. Firstly, the low capital requirement for starting a business in the sector has led to the presence of numerous small-scale producers, hindering many firms from becoming SMEs. Reducing this weakness to a minimum and addressing the shortage of skilled workers and artisans could be a critical assumption for the future. Secondly, to ensure a skilled workforce, the development of skilled personnel and design expertise is imperative. Collaboration between chambers, organizations, and universities to establish specialized branches in vocational schools or academies for the sector is crucial. Reducing the expectation gap between the private sector and academia and enhancing the interaction between universities and companies could be seen as an essential assumption.

Furthermore, another vital assumption could involve making investments in research, forecasting, and quality production and ancillary industries, with a focus on maintaining a balance between supply and demand through proper planning. Additionally, raising awareness within the sector, attracting investors with an export culture and corporate knowledge, would be necessary. Establishing knowledgeable distributors familiar with international trade conditions could increase official export volume and reduce courier exports. The strength of design in the sector and the general focus on bulk production for export markets are crucial factors for competing in national and international markets. Moreover, to prevent family businesses from being unprofessional and having low professional collaborations, it is essential to raise sector awareness and cultivate an export culture.

Finally, updating and improving technical conditions and infrastructure in the market and manufacturing stages are crucial assumptions for enhancing organization, marketing, and sales networks. If conscious investments are made in manufacturing-sales-marketing, including the establishment of mass production and year-round production infrastructure, along with conscious investments in advertising, catalogs, branching, and store concepts, market share could increase alongside branding in the cluster. In conclusion, when the assumptions created according to Porter's competitive diamond model are transformed into robust policies by local governments, regional development is inevitable.

6. CONCLUSION

When examining successful clustering examples worldwide, we are confronted with the fact that clusters, with few exceptions, form spontaneously. The most crucial focus should be on identifying clusters that will contribute to the development of their regions and ensuring their expansion with appropriate policies. The purpose of this article is to explain, through literature and various concepts, the significant impact of clustering theory on regional development. Additionally, it describes clustering policies and examples in the world and Turkey from the past to the present, evaluating the formation and development of the Izmir bridal wear sector from the perspectives of both the world and Turkey.

This article, as mentioned at the outset, examines a hypothesis. It questions the positive impact of clustering in the Izmir bridal wear sector on regional development. To identify this effect, the formation of the clustering concept was initially researched in the literature. Furthermore, the relationship between clustering theory and regional development was explained. The importance of clustering policies for regional development can be understood from this relationship. Secondly, to better analyze this relationship, the spontaneously formed and potential cluster in Izmir, the bridal wear sector, was chosen. Within this sector, clustering policies in the world, Turkey, and Izmir were examined, systematically explaining the sector from general to specific. In doing so, how the sector formed, why it developed, and how it affected the economy were outlined.

Finally, using data obtained from the analysis of the Izmir/Cankaya bridal wear cluster conducted by Porter's Competitive Diamond Model and the Izmir Development Agency, an analysis of the cluster was performed. According to this study, it is understood that the bridal wear sector has a positive economic impact on regional and national development, considering the sector's position in domestic and international markets. However, more clustering ideas, policies, and awareness need to be generated for this sector, which has the potential to cluster in terms of Turkey and Izmir's regional development policies. Clustering analyses in Izmir and other clustering strategies and policies are still in the implementation phase. Therefore, their success will be evident in the future. However, the success of the identified policies and strategies may be negatively affected in the future due to the almost identical nature of these decisions for each potential cluster sector, insufficient recognition of sectors, and inadequate awareness about these sectors.

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12 Relations between the Central-European Trade Routes and Revenues of EU Members

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Abstract

This research highlights the shifting of the trade routes and economic geographic process. What kind of impacts are there in EU countries that a significant part of EU-China trade has been moving from vessels to freight trains or to combined, overland-maritime transportation. It has partly taken out the former China – Rotterdam/Hamburg maritime way.

This paper is analysing the role of Port of Piraeus in this process as the pretty new but very important port for the Chinese COSCO maritime transportation company and on other hand how does the new structure change the revenues for the members in this situation.

The so-called collection cost is an important revenue for the member states. It comes from the Traditional own resources, it is 20 percent of the tariffs. It remains in the budget of EU member states and only 80 percent goes to the Brussels budget. The old members especially Netherlands, Belgium and Germany want to protect their own current position and share in the integration trade with third/external partners. It means that these countries can handle the tariff administration and get the mentioned 20 percent amount.

In the meantime the new members with high potential in international trade would like to recut the “trade-cake” to receive higher benefits from it due to the mentioned collection cost or the value-added-tax related to logistics and manufacturing industries. All in all, every member state can increase the profit from the collection cost and value-added-tax and on other hand they can decrease the direct GNI-based contribution to EU’s budget due to a better position in international trade. We can expect a more intensive competition to reach this amount in the future.

1. INTRODUCTION

Paul Krugman (1991) American economist opened a debate about the importance of geography which was not relevant in the previous decades. In his opinion the economic geographical approaches could modulate the answers of economics to some questions and challenges. In the 1990s the production location points and structures determined by them or the relations between centres and peripheries are significant for the economics but in the last years due to the new research the trade routes and logistic points and capabilities are also dominant for the global trade and transportation. It is particularly true to the economic and trade blocks and customs unions. The faster and more flexible customs clearance also appeared due to customs union.

As a new phenomenon this research wants to monitor the changing of economic interests which comes from tariffs and duties. The trade does not work only among national states but trade blocks too including customs union. Otherwise, the transported quantities and the administration have been centralized more and more, it means on the level of integration that the profit of trade goes to those countries where goods and services entered the trade blocks. There are plenty of diplomatic debates and competition for these activities and revenues.

Regarding the previous technology and level of development, the trade theories weren’t engaged to the giant vessels with delivery of more thousands TEU¹ containers simultaneously which could have meant huge tariff revenue for the importer gate state of a trade block. But nowadays the geographical

¹ Twenty-foot equivalent unit, a twenty-foot-long (6,1 meter) and generally 8-foot-wide (2,59 meter) container used in international trade

location of paying the tariffs really matters due to the technological development, much bigger capacities, much faster and stable vessels etc. It is a relevant situation and expectable problem in European Union so far because the financial contribution and expenditure of EU members can be defined by it in long term. We cannot expect that the World Trade Organization or other international institution would cancel all trade barriers and obstacles², we have to calculate these tariff benefits in the future too.

One of main principles of this research does not calculate on disappearing of tariffs and duties. First of all, I analyse the economic and trade activities and results of those European ports – Rotterdam, Antwerpen and Hamburg – which have got domestic and/or overland connections called hinterlands. There are some special and relevant factors in the survey such as natural conditions of ports, chronological and spatial developments, logistic capacity of transportation of containers and other commodities. I must emphasise the three most important ports in EU: the mentioned Dutch Rotterdam³, the Belgian Antwerp and the German Hamburg have got great capacity to trade with their hinterlands and third partner out of EU. But in the last decade the Greek Port of Piraeus could close up to the European elite, it has got impressive economic results considering the trade activities. Though Hamburg could get back its classic hinterland after the EU enlargement in 2004⁴, the development of Piraeus has been so strong and powerful since 2013 that it can reshape the list of importance of ports here in Europe in the future especially in the issue of containerization. The new Chinese – European transportation project, the One Belt One Road (OBOR) can also participate in the competition among ports to strengthen the position of Port of Piraeus. OBOR (called as Belt and Road Initiative or New Silk Road too) as a huge overland-railway and maritime transportation routes system between the continents is beyond Greece and gives the role of a new gate for the EU trade to Greece.

Antwerp is out of the queue regarding the geographical expansion. This port can be developed the most difficulty because the location in the estuary of Schelde river which is a physical obstacle for the Belgian port. The further possibility of the expansion is given only for Rotterdam in natural ways. Despite the trade collaboration with Zeebrugge the second most important EU port has got limited developing regarding the hinterland connection. It is narrower than for Rotterdam or the mentioned Hamburg.

Finally, I'm making a calculation about benefits and handicaps of the position as "EU gate" regarding the collection cost which is the 20 percent of single EU tariff revenue, and it remains in that country where the importer wants to pay the duty. The conclusion is available in the last chapter of this paper. Sum up the research, the rarely mentioned trade routes as the part of the geographical economic approach will take on a bigger role in the future among the big trade blocks. Considering the different giant economic blocks, we expect that the new trade ways can contain the reorganization of regional and global trade interests plus the economic debates and competition within the blocks.

Finally here we must mentioned that the study differentiates the types of ports: gateway and transshipment.

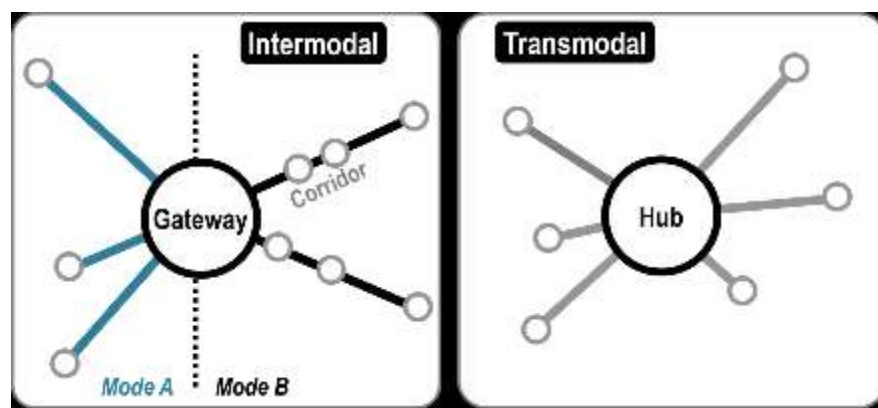
Gateway type ports have got hinterland so the imported (and exported) goods and commodities are transported to (from) overland logistical stations or centres by freight trains, trucks or inland navigation (Erdősi, 2021, pp. 110). In the case of transshipment the imported commodities and goods move from bigger ports (hub) to smaller ports by feeder ships. It also means that the transshipment ports are served by only ships and not by other traffic modes.

The gateway ports are usually more competitive because the long-term investment and development will be more profitable due to various hinterland relations. The transshipment ports can depend on economic recovery and slowdown periods and plus shifting of demand of vessel companies.

² The longer and more ineffective WTO summits promise to us that time of the tariff reducing negotiations and contracts will be over and the large trade blocks don't have new interests to change in this frozen situation.

³ Rotterdam and Antwerp were the most important ports of the global trade and economy in the first years of XX. Century. Additionally, Antwerp had the biggest business proportion on the global level (Cholnoky, 1936)

⁴ Hamburg was one of the most important port for the Austria-Hungary Monarchy due to the transportation on river Elbe. Though Wien wanted to build up lots of financial and physical barriers against it and to support Port of Trieste – at the same time Budapest wanted to lift up Port of Fiume to support the Hungarian international trade – Hamburg could remain the first gate of international trade of Austria-Hungary Monarchy (Erdősi, 2019, pp. 12-15).



Resource: Rodrigue, 2020, pp. 68.

Figure 1. Port structure of Gateway/transshipment

2. METHODOLOGY

The study is engaged to calculation of tariff revenues especially the so-called collection cost as the 20 percent of the tariff remains in the national budget. Only 80 percent goes to single EU budget until 2020. Since then, this value increased to 25 percent.

It uses the data from Eurostat between 2000 and 2019. The member states could get 10-25-20 percent of tariffs⁵ could retain to cover the so-called administrative expenditures. It should be noted that European Commission aimed to decrease the 20 percent value to 10 percent again like in the past, but the members refused this part of the Commission's reform proposals. Nowadays we know that the leader exporter-importer EU states were able to lift up the 20 percent to 25 percent between 2021-2027 budget period which is totally opposite way of Commission's willing (European Commission, 2018, 16.p.)

Period	Percent of collection cost (%)
1970-2001	10
2002-2015	25
2016-2020	20
2021-	25

Resource: Eurostat, https://ec.europa.eu/budget/graphs/revenue_expenditure.html

Figure 2. Collection cost (percent) 1970-2023

As we can see the different key of collection cost term by term, it is also worth calculating a proportional income for the member countries. The recent 20 percent key seems to be the best choice for it.

I have made a standalone calculation too. In one hand there is a ratio shows and explains the nominal number (as the retained value or as the official name: collection cost) compared to the GNI-based contribution to the budget of EU customs union. On other hand, and of course it is related to the first one, the member state can finance its own contribution to the budget partly or fully. Now needless to say the GNI-based contribution is a kind of balancing amount, it can change year by year, but it cannot transcend a max. limit of a 7-year budget period.

Period	GNI-based max limit (percent)
2000-2006	1,24*
2007-2013	1,045
2014-2020	1,29
2021-2027	1,4

* until 2002 European Commission used the GNP-based calculation

Resource: Halmai (2018, pp.10.) and European Commission (2022)

Figure 3. GNI-based max. limit of EU budget (percent)

⁵ It is the TOR, Traditional Own Resources

The formula of our calculation is quotient between the nominal collection cost and GNI-based contribution.

$$\frac{\text{Collection cost}}{\text{GNI-based contributions}} = \text{TOR-Increasing Quotient}$$

Resource: own calculation

Figure 4. Formula of TOR-Increasing Quotient (TIQ)

The bigger value of collection cost as the bigger value of retained amount is the numerator. Economically it is an increasing activity of tariffs, logistics, transportation, and manufacturing industry too. As surplus appears in the contribution to added-value amount but it means that it decreases the denominator at the same time. It is friendlier to customs clearance country because if the numerator increases the whole quotient is bigger.

The GNI-based contribution in the denominator (as a balancing factor) must be larger than the value of the retained amount has decreased. If the GNI-based contribution goes up, the quotient must go down.

The two impacts strengthen or weaken the value of quotient in the meantime. As we have a higher value of numerator as the added value-based contribution is higher too which decreases the necessary of GNI-based contribution of members. So, a higher numerator means a lower denominator if we know the fixed maximum limit of member state contributions for a 7-year period in EU.

3. TRADE ROUTES

Let's see the transportation routes. Beijing has determined six important trade routes to secure the supply and logistic chain (OECD, 2018):

1. *China – Mongolia – Russia Economic Corridor*: the partners decided about development of this infrastructure way and project in 2014 Dushanbe, Tajikistan (Tiezzi, 2014). This route uses the infrastructure of Trans-Siberia railway as well, so the trade partners have already had an operating way. Before the Russian - Ukrainian war Moscow was the third biggest trade partner of EU, but the trade intensity had changed, the Far-East region was closer to Russia as trading and logistic partner (Wolffgang, Brovka & Belozarov, 2013). I have to add some important information it is not the fastest way between the main Chinese production centres and its main consumer, EU. It is 11.100 km long even though the Trans-Siberian railway is used, and it takes 18-20 by freight train. Of course, it is much faster than the 23.000 km long maritime route between Shanghai and Rotterdam which takes 45-60 days by container vessels (Gussarova, Aminjonov & Khon, 2017).
2. *New Eurasia Land Bridge Economic Corridor*⁶: it is simply the fast railway connection between China and Europe via smaller Central-Asian countries which enjoys the advantages of nonstop, nontariff routes given by trade and economic blocks. There are some leaving, transit or important warehouse-logistic stations like Chongqing (Chóngqìng) or Yiwu (Yīwū) which is one of the Shanghai's terminals. There has been direct freight train between Yiwu and Madrid 9.977 km long route. But the most common direct cargo train relation is the China – Germany (Duisburg) delivered at least 20.000 TEU containers per a year between 2012-2014. Since than fully loaded freight trains move in both directions, and it usually takes 10 days (Smith, 2022).

The first container train arrived in Rotterdam in 2015. The vessels could take it 60 days (between Chongqing/Shanghai and Rotterdam). It decreased to 14 days by cargo train in 2015 (Lechmacher, 2015).

⁶ It is the most important overland corridor for Europe, and it will have serious impact in the future to shape the European policies.

Or let's see another example. The distance between the Chinese Zhejiang region and London-Barking was only 18 days for a directional freight train, it could go halves the former average time of transportation (Lau, Ling, Rathbone, Wijeratne, Yau & Wong, 2017). Following this strategy freight trains arrive in Latvia, France, Germany or Czech Republic from China too. This study provides the location of crossing border station, it is situated in Małaszewicze, Poland. It also means that Poland is the country in the customs union where the imported goods enter the territory of European Union. The benefits of this „belt”:

- a. This corridor can build on existing and well-maintained infrastructure like the relatively developed Kazah sections.
- b. Freight trains are faster than giant vessels.
- c. Additionally, the overland route is 40 percent shorter, the container can move 65-70 percent faster than in the maritime way.

There is only one big handicap of the railway transportation to be much more expensive than the transportation by ships therefore the bulk goods will be delivered via the maritime ways in the future too (Engelberth – Sági, 2017).

The a) point also stated this corridor is well located in terms of infrastructure as it includes there more or less independent economic entities: China, the Eurasian Customs Union and the European Union. This fact significantly simplifies the issue of transportation because the deliver companies have to focus only two customs borders.

China and the Eurasian Customs Union had a partnership agreement in May 2018. There are some relevant and practical parts of this agreement (beyond the classic nice diplomatic goals and political announcements): the states tend to minimize the physical obstacles against the transportation. Though the Chinese and European railway system use the classic 1435 mm track, the Eurasian Customs Union has the wide 1520 mm gauge track, the transloading between the different systems is relative fast⁷ due to this international contract (Hodgkinson, 2016).

3. *China – Central Asia – West Asia Economic Corridor*)⁸ (Derudder, Liu & Kunaka, 2018): Xinjiang Uygur Autonomous Region is the host area of this corridor. It takes the final station, Teheran, the capital of Iran via the relative stable „istan” countries. This corridor is used to Iranian megacity and it has decreased the 44-45 days route to 14 days between Shanghai and Teheran. This way has got more legs or alternative routes.

- a. It is the IV. TEN-T way, transporting from Bosphorus region (Istanbul) via Bulgaria, Romania, Transylvania/Banat, Hungary, Austria to Germany (Duisburg). It can have a leg to Moscow from Romania.
- b. Or creating a new route from Port of Piraeus/Athens via Skopje and Beograd to Budapest where it can meet the previous one. It is the most relevant, a probable winner because the section between Beograd – Ópazova – India – Újvidék is totally reconstructed and Újvidék – Szabadka is being been developed and it is also true the section of Hungary (Eszterhai, 2016).
- c. Though the third alternative goes via more instable regions (via Syria, Iraq, Ukraine) it is begun to plan and there are sometimes test cargo trains try to transport. A new corridor as an idea was announced on 22nd February 2021 between Black Sea and Baltics⁹ which has the most important final station are the Polish Gdansk and the Ukrainian Odessa. Before the war there were some test runs but since 2022 February it has been over (Railfreight, 2021).

There are many researchers and experts (ie.: Ferenc Erdősi dr., Viktor Eszerhai dr., Peter Frankopan, Man Hung Thomas Chan, Márton Péti dr., François de Soyres, Siobhan Murray, Nadia Rocha and others) say the sum of these routes are the New Silk Road. It follows the ancient and medieval path

⁷ The most important route is the New Eurasian Land Bridge Corridor for us. At the crossing border station between China and Kazakhstan a freight train must wait 42,4 – 59,7 hours in general. It means in the practice that a changing of train axis must be taken maximum 5-6 minutes (or less) to focus on the timetable Hodgkinson, 2016).

⁸ This is the second corridor which can shift the importance of EU's trade routes and the economic benefits of members.

⁹ <https://www.portgdansk.pl/en/events/port-of-gdansk-strikes-new-black-sea-to-the-baltic-trade-route-deal-with-ukraine/>
(Accessed: 2023.10.19)

of Silk Road. Of course, there are many parts of the former Silk Road which is reconstructed or simplified due to modern technology. That's reason why the Kamchiq-tunnel was so important for Uzbekistan in 2016. The tunnel is 19,2 km long which is the record in Central-Asia. It is the part of Angren – Pop railway, the cost was 1,9 billion USD and was financed mostly by Export-Import Bank of China and the Worldbank too (Worldbank, 2021a). The heaviest sections were built by China Railway Tunnel Group.

There were some extremely relevant Chinese foreign political initiations for creating the New Silk Road project. The so-called 16+1 Cooperation or named as Cooperation between China and Central and Eastern European Countries (China-CEEC) was established, and summits are organised annually. It helps the Chinese presence in the Central-European, Balkan or Baltic regions. The members: Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Montenegro, North Macedonia, Poland, Romania, Serbia, Slovakia, Slovenia and finally China (Richet, 2018).



New (New) Eurasia Land Bridge Economic Corridor [(N)ELBEC]
China-Central Asia-West Asia Economic Corridor [CCAWAEC]
New Maritime Silk Road

Resource: Péti, 2017, pp. 16.

Figure 5. Main routes of OBOR between EU - China

4. *China – Pakistan Economic Corridor* is situated on a prominent place within the New Silk Road. Its first and foremost pillar is Gwadar of 140.000 inhabitants as the maritime gate of the country and it has direct connection with North-West Chinese regions. The freight trains can avoid India and Strait of Malacca which is favoured area of modern piracy. Nowadays China must pass next to Malay Peninsula and sail to Sumatra Islands (avoid Singapore) and finally catch the Indian ocean and Bengal Bay.

There are dual proposes of Pakistan route:

- a. Kenya and its capital, Nairobi are available easily and safely which is important as sources of raw materials for China.
- b. The second leg of maritime route turns at Gulf of Aden to North, and the ships sail between Djibouti and Yemen then can go to the Red Sea and further to Suez Canal. Finally crossing Port Said they get out to Mediterranean Sea and dock to NAPA ports (North Adriatic Ports Association cities) or they can continue their journey

to Port of Piraeus, Greece which is the biggest and most important transshipment port now in the whole Mediterranean region.

5. *Bangladesh – China – India – Myanmar Economic Corridor*: the smaller countries and India have got similar interest in OBOR project namely they also want to avoid the South China Sea as insecurity water because it is the heart of Far-East piracy.
6. *China – Indochina Peninsula Economic Corridor*: the smaller states and economies in this region should be the economic hinterland of China and Hong Kong.

Our study called the sum of these six routes together as One Belt One Road project after lots of explanations, additions, amendments.

This paper doesn't want to give a full analysing of OBOR and doesn't mention all sub strategies because it focuses on Europe firstly and analyses the trade routes to Europe. Therefore, it is engaged to 1, 2 and 3 way and monitors the final/arriving points and their economic benefits and losses. According to our viewpoint the OBOR has been developed mostly in the Europe – China relation since 2013 (World Bank Group, 2019). Before 2012 the overland transcontinental transportation was absolutely not relevant, the ratio was only under 1 percent between Europe and Far East. After 2012 this value is much higher in 2017, 408.00 TEU (Pepe, 2019) was delivered in any overland legs of OBOR. We must see and follow the growth:

- transported TEU increased by 13.600 percent.
- overland transportation was 4-7 percent of the whole transportation between the European and Far East regions.
- overland part of OBOR is a 22-45 billion USD industry now (Pepe, 2019).

It is clear for us that more than 60 countries have had different interest in the OBOR project including the leader power of EU, Germany too. It is true for building of infrastructure not just the profit of operation.

4. COLLECTION COST

4.1 Special income for member states

The focus point of this research is the changing of collection cost. The Council Decision (EU, Euratom) 2020/2053 of 14 December 2020 on system of own resources of the European Union and repealing Decision 2014/335/EU, Euratom plus earlier, the No. 609/2014/EU's decision¹⁰ provided for the 20 percent collection cost. Before 28th February 2001 it was 10 percent, between 1st March 2001 and 28th February 2014 it was 25 percent. This value (percent key) grew to 25 percent again after 14th December 2020 and it remains until the end of 2021-2027 budget period. This financial resource as a special contribution to budget of national states goes to those members which have got great export-import activities. It concentrates on North-West region of EU, from La Havre to Hamburg but the distribution is not balanced.

The enlargement in 2004 reshaped the geopolitical and trade relations of the European customs union due to the new Central-European members in the economic block. The few physical obstacles and national borders are favourable for the international trade. That's why the new alternative routes were discovered in the Far East – Europe; practically China – Germany trade relations. Finally the China – Russia/Kazakhstan – Belarus – EU/Poland trade way was born in the past and the imported products and commodities are cleared by Poland and not by Netherlands, Belgium or Germany longer. It is no question that the 20 percent collection cost moves to the Polish budget and it enriches Warsaw and not Amsterdam or Berlin.

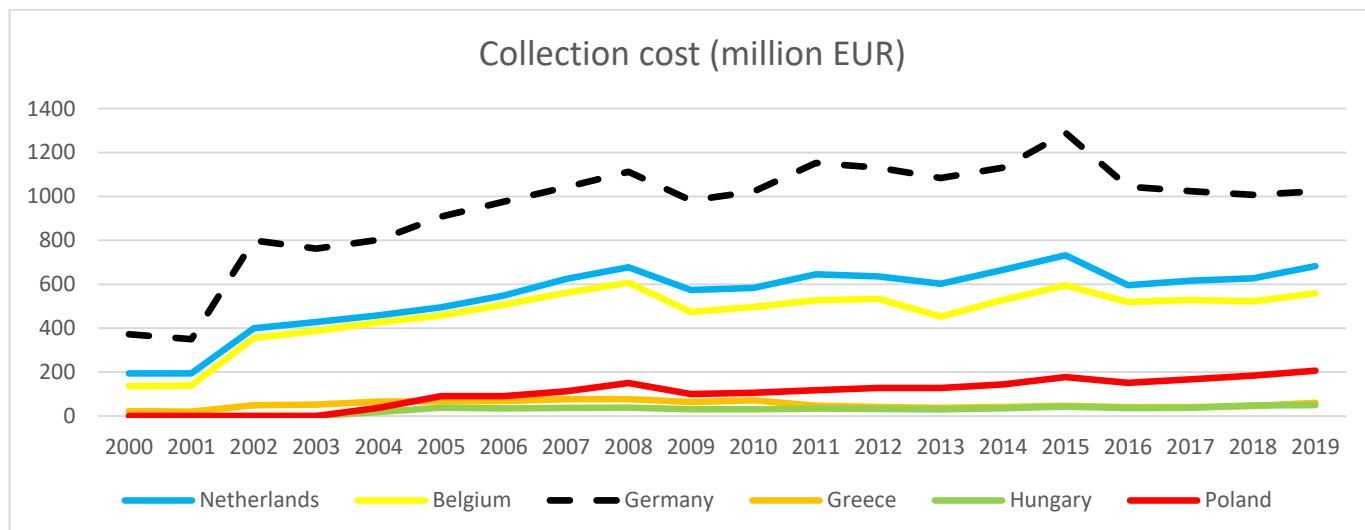
The financial data comes from the European Commission's official website, from page of the own resources (EU spending and revenue 2014-2020). I chose the following countries for analysing of 2000-2019 period:

¹⁰ Council Regulation (EU, Euratom) No 609/2014 of 26 May 2014 on the methods and procedure for making available the traditional, VAT and GNI-based own resources and on the measures to meet cash requirements

- Netherlands: Rotterdam plays the most important role which is the greatest European port. Secondly Amsterdam is also a relevant port (not as much as Rotterdam so far). Both ports are characterised as *gateway* and *transshipment* port.
- Belgium: Antwerp is the second biggest port in EU. Antwerp is a typical *gateway* port for the goods and commodities from North America and Africa.
- Germany: Hamburg and Bremen are the two main ports of Germany. In the meantime Hamburg is the third most important port of EU. Hamburg as a giant *gateway* port has got very intensive trade activities with Central-European countries too.
- Italy: Gioia Tauro as an alternative port of Malta has got strong *transshipment* position but considering the tariff revenues it is not as relevant as the mentioned three top ports. I can mention the North Italian Trieste too which is a big oil refinery port. Our paper focuses on the container transportation so it doesn't include the analysing of Trieste.
- Greece: Port of Piraeus is the fourth biggest container port in EU in 2019. Despite it doesn't have classical hinterland supply routes that's why Piraeus is a great *transshipment* port now.
- Hungary: Hungary is strongly related to Greece and the potential changing of status of Piraeus. On other hand it depends on the new and fast freight train route between Beograd and Budapest via Újvidék, Szabadka and Kiskunhalas. It determines the tariff revenues too in the future.
- Poland: It became such as overland gateway of EU due to Małaszewicze transloading railway station. Małaszewicze is located on the very Eastern border of the European customs union, it functions as the Eastern gate of EU or we can name as the crossing border point of 1. corridor of OBOR.
- Slovakia: It seems to be an alternative Eastern gate for EU for a long time. Ágcsernyő-Tiszacsernyő could have been a second Małaszewicze because it is located on the border station of Slovakia and Ukraine. Additionally, it works as dual transloading railway station for the normal European track system (1435mm) and for the Easter-European (so-called Soviet) 1520 mm gauge railway. The 1520 mm gauge tracks are used between Ungvár and Kassa. There was a chance to create a direct railway connection between Kassa and Wien until 30th May 2022. The Austrian Federal Railway, the ÖBB (Österreichische Bundesbahnen) gave up the plan for building a new wide gauge railway to Austria and wants to sell the interest in the project company, Breitspur Planungsgesellschaft mbH (Railfreight, 2022). Though there won't be robust trade expansion in this way, we used the numbers between 2000-2019.
- Slovenia: it has got only one port, Koper. It is a special rival of Port of Trieste especially in the terms of container transportation. It is significant for this paper and Hungary too as an escaping or alternative route.
- Austria: it is one of the important sharing station for freight trains with efficient and well-operation tariff-system and clearing.

Other conditions:

The collection cost as TOR (Traditional own resources) was a 10 percent tax-key levied on tariff until 28th February 2001. This key was 25 percent between 1st March 2001 and 28th February 2014 and after 1st March 2014 the mentioned value was 20 percent (EU spending and revenue 2014-2020).



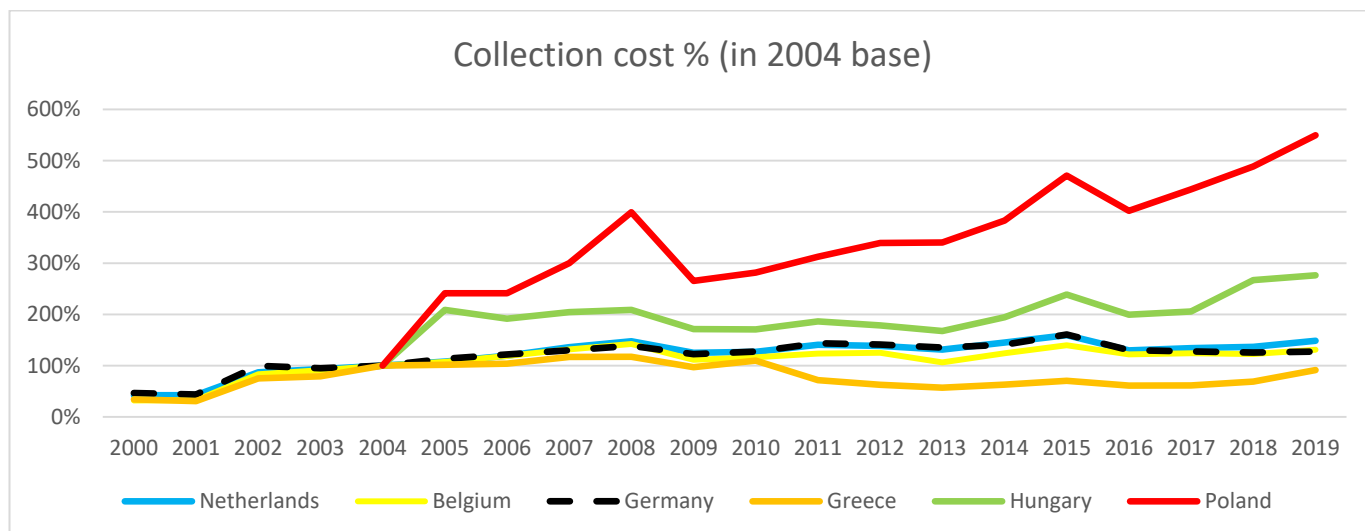
Resource: own calculation

Figure 6. Collection cost (million EUR) 2000-2019

Following the sixth figure it is not a big surprise that Germany, Netherlands and Belgium could get the biggest amount as administration cost from the TOR revenue.

The Italian and Austrian revenue were continuously less and less between 2011-2019 while the largest growth occurred in Poland relatively and Hungary, Slovenia and Slovakia have got also favourable income values.

If we get the enlargement term in 2004 as base term only Austria and Greece were those two member states which couldn't increase their own ratio in this trade revenue issue, the other countries could do it. Of course, needless to say the base value of Central-European countries was very low in 2004, but not zero.



Resource: own calculation

Figure 7. Collection cost (million EUR) 2000-2019 data based in 2004

If we analyse and calculate these incomes with solid 20 percent between 2000-2019 it can show interesting result theoretically. This way of calculation can modulate the results better regarding the capability of absorbing and presents a stronger Central-European position in this financial competition.

4.2 Tariff revenue analysis

Our paper analyses the tariff revenue between 2000-2019 periods. As we mentioned it was 10 percent based on tariffs before 2001.

Between 2002-2015 this ratio as the key of collection cost grew up to 25 percent and after 2016 it has moderated to 20 percent¹¹. The study uses two different ways:

1. we use the real percent key and
2. we use a special, theoretical 20 percent key. The 20 percent key covers and is used on the earlier periods too.

On other hand we have a fixed and chain base index numbers calculation too where the starting year is 2004.

The data come from Eurostat „Total own resources database¹².

In 2019 the record profits from collection cost were generated by ports in Germany (1023 million EUR), Netherlands (682,3 million EUR) and Belgium (558,8 million EUR) due to the biggest and busiest gates of the EU trade: the German Hamburg, the Dutch „port-couple”: Rotterdam – Amsterdam and the Belgian Antwerp.

This is followed by ports in Italy (460,8 million EUR) and France (443,5 million EUR). Ports in Spain (397,8 million EUR) and France are not part of this analyses. The reason for this is that port of Piraeus and the trading routes of OBOR are not crossing French and Spanish territories (at least not directly). Poland has got significantly larger size of territory and economic-political position in Central-Europe. Additionally due to its location Poland is the gate of the 1. Corridor of OBOR to enter European Union, so it is such an overland gate for the external trade of European integration. Warsaw's revenue was 206,7 million EUR which is about 30 percent of the Dutch collection cost and approximately 20 percent of German value.

Hungary's profit from collection cost is 50 million EUR (one quarter of Polish amount). It is equal to Greek value (59,8 million EUR) and a bit less than the Czech revenue (71,7 million EUR). We have to mention that the third route of One Belt One Road project from Piraeus has not been started to build in the decade of 2010s yet.

Otherwise, if we get the fixed base index numbers our ranking is totally different. Between 2004-2019 the average EU increasing of collection cost revenue was 130 percent – the 10-25-20 percent key proportioning is not given in this indicator.

The gain of Central-European member states has been drastically bigger. Poland is the first country in this competition it reached 550 percent growth in this period. Slovenia is the second with 480 percent growth due to Port of Koper which is a relatively small port in EU but very efficient. The Slovakian increasing value is 330 percent while the Hungarian is 276 percent. These results show a pretty prosperous position in EU trade with third partners especially we know that neither Hungary nor Slovakia has got maritime port like Slovenia or Poland. We have to emphasise that the ports are the most important gates of EU for external trade and the 20 percent collection cost can be realized much easier if a member state has a maritime port. Especially it is located on the OBOR route directly. If we monitor the fixed base index values of old member states these countries couldn't increase their own benefits from this administrative cost as much as the new member states. The German fixed base index number compared to 2004 was 128 percent (under the average of European Union value). It is really interesting to analyse the German position because Hamburg seemed to be the greatest winner of enlargement in 2004. Port of Hamburg had served the Austria-Hungary Monarchy mostly before the First World War, but after the collapse of Monarchy especially during the Cold War Port of Hamburg lost its commercial-economic hinterland like the region of river Elbe, or the Czech, Hungarian or Polish industrial supply.

The Italian value is more moderate (112 percent) but the Belgian result is equal to EU's average (131 percent). The greatest growth was the Dutch one (149 percent) between 2004-2019 but is has also lagged behind the Central-European records. This order doesn't change if we calculate value the proportional to 20 percent.

What is the connection (if there is) between the increasing revenue of Poland, Hungary or Greece and the decreasing one of Netherlands (and the other values of older member states).

¹¹ It went up to 25 percent after 2020, but this term is out of our survey.

¹² https://commission.europa.eu/strategy-and-policy/eu-budget/long-term-eu-budget/2014-2020/spending-and-revenue_en

The study made an interview with Dr. Professor Joost Hintjens who stated that the Antwerp has got another position like Port of Rotterdam or Port of Hamburg. He emphasized that the most important trade partners of Antwerp are the African and American countries while the Port of Rotterdam and of Hamburg handle the export-import between Europe and Asia. That is the reason and response why the Port of Antwerp hasn't lost the position because it is not the direct rival aim stop of EU-Asia trade competition. In other words Port of Antwerp doesn't need to share its own commercial capacities with the rival Eastern and Southern European ports.

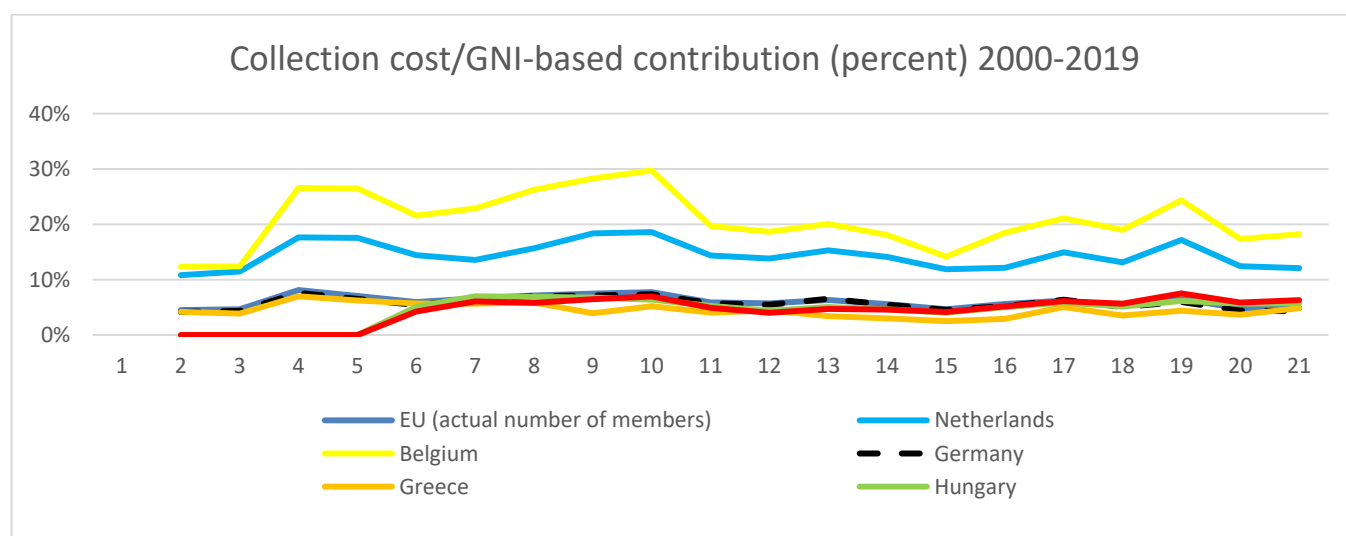
As the following, eighth figure presents to us the real Dutch value has been decreasing opposite the Polish, Hungarian or Greek benefits. Since the Greek value is rather stagnate the Polish and Hungarian results must be significantly higher. The whole EU trade "cake" can grow only in long term, in shorter period the changing of Dutch collection cost relatively is smaller than the Central-European countries results.

The new OBOR project since 2013 can explain this economic-financial situation. The First Corridor of OBOR appeared firstly through Poland between EU and Asia then a bit later the so-called Third Corridor was used from Port of Piraeus crossing the territory of Balkan countries, Hungary and Austria. The cake has been divided into more and more slices which means Port of Rotterdam could get less transportation relatively. It is particularly true if we know that the Rotterdam Port Authority developed the capacity of port due to the Maasvlakte 2 project and wanted to speed and concentrate the number of freight trains between the port and the hinterland.

There is a second calculation for the combination of the contribution of EU's budget and the analysed collection cost. The biggest contribution of a member state is the GNI-based payment country by country. If it is compensated partly with remained 20 percent collection cost it will be better and more respectable for the net donor countries first and foremost.

Our indicator: the remained 20 percent collection cost is divided by GNI-based member state's contribution. As we talk about a quotient so the country can have a better position following two different ways:

1. The tariff revenue is increasing so the nominal remained collection cost must be higher than before. The bigger collection cost shows a more important and improving trade position with third partners (out of EU) and with the partners inside the integration too. It means the country's ports as in the gateway and/or transshipment position attained more trade relations or more intensive trade achievements.
2. The GNI-based contribution can be less it means the member state must pay less complementary financial contributions to reach its own upper financial maximum.



Resource: Eurostat, https://ec.europa.eu/budget/graphs/revenue_expenditure.html, own calculation

Figure 8. Collection cost/GNI-based contribution (percent) 2000-2019

Needless to say that this ratio is higher where the gateway position is stronger and more adequate. The GNI-based contribution is the biggest payment to the EU's budget but on other hand is a special

balancing amount too. That's why an important interest of a member state is able to increase the share of other payments because it can decrease the GNI-based financial contribution.

Additionally we never forget a less visible but more important possibilities for the ports and countries. The Value Added Tax (VAT) is also the part of the member state's payment to Brussels's budget. The biggest part of manufacturing industry is concentrated in the biggest ports like in Port of Rotterdam, Antwerp or Hamburg (particularly in the first two ports). It means that a huge amount as VAT comes from these industrial sectors.

In summary the decreasing tariff revenue is bad for the net donor countries at least in two different ways:

- the country can get less revenue from VAT or payment of corporate tax
- the capacity of manufacturing industry is not used as much as before¹³
- in the meantime the GNI-based contribution is going to increase

Otherwise those member states like Greece, Poland or Hungary located in the route of OBOR can expect an opposite effect from the project like the mentioned more developed countries.

- increasing tariff revenue means higher profit for the national budget
- the activity of logistics and manufacturing industry can grow up it means the VAT will be higher as well¹⁴.

In one hand Netherlands has had relatively decreasing revenue on other hand Port of Rotterdam has relatively higher dead capacity. Additionally Netherlands as well Germany must have paid a larger contribution to the European budget during the recession because of mortgage crises and they couldn't balance it with higher VAT-revenue or collection cost¹⁵.

All in all understanding the previous explanations we can expect a growing intensity trade competition among the ports and member states to get a bigger share of the different revenues.

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¹³ We must think of logistic and trade activity in the case of Port of Piraeus and the Polish cross-border station, Małaszewicze. First and foremost they handle the container trade so they are the rivals of Port of Rotterdam and Port of Antwerp in this position because their typical character is more transshipment than gateway. Other ports like the Italian Port of Trieste or the Spanish LNG terminals can be the rival of the Dutch and Belgian port in the manufacturing industry issue.

¹⁴ We can talk logistics in the case of Serbia too. New freight railway tracks are being built in Belgrade – marshalling yard in order to serve the increasing trade demand. There will be 120 tracks after the reconstruction and development. But we can mention the town of India (Indija) in the region Szerémség (Syrmia) which is one of the biggest logistic railway junction in Serbia – Voivodina. The European corridors X/A. and X/B. is divided here: the X/A. continues to Szévaszentdemeter – Zágráb (Sremska Mitrovica – Zagreb) while the X/B. turns to North toward Újvidék – Szabadka – Budapest (Novi Sad – Subotica – Budapest).

¹⁵ During the economic crises the demand is expected to decrease and it means the tariff revenue is also lower than before the decline. But on the expenditure ad contribution to EU's budget of states are fixed for 7 years so it needs an own national proportion to the budget of integration which cannot be recovered as much as in a recovery period.

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13 Exploring strategic dimensions in the field of Hungarian wine marketing

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Abstract

The growing role in the wine market is an important economic and cultural national goal. The basic objective of our study is to identify the determining factors along which the defining strategic pillars of domestic wine marketing can be further strengthened. Our primary research was basically based on the 5-dimensional wine strategic pillar system compiled by Martinho (2021). We interviewed a total of seven key domestic wine market experts, and then analysed their answers from a content point of view. During our investigation, we found that the dimensions of the system of criteria provide a well-structured framework for mapping strategic marketing issues, but it is also important that, despite the initial logic, we examined the demand factors first, and only then did we turn to the other strategic pillars. During the interviews we detected several important strategic dimensions that cannot be directly classified among Martinho's initial dimensions. Mostly the environmental awareness and sustainability, the digital technologies and online sales, the labour supply and training, and the regulatory additional aspects were highlighted as extra dimensions. As a practical result we have outlined what aspects should be considered in connection with the development of a domestic wine strategy.

Keywords

Wine strategy, demand, supply, branding, wine tourism, innovation

JEL Classification

L79, L81, M3, Q11, Q13, R 21

1. INTRODUCTION

Wine marketing is a special field of marketing activities that focuses on the promotion of wine or wine-based products, as well as related supporting or accompanying services. The basic goal and main measure of wine marketing is the volume sold (Hall and Mitchell, 2017). Hungary is the 16th largest wine producer in the world, in 2022 we produced 2.9 thousand hectolitres. According to the KSH (Hungarian Statistical Office), Hungary exported 136,492 tons of wine to other countries in 2022, which represents a 25 percent increase compared to 2021. The most famous Hungarian wine variety „Tokaji”, has been losing popularity for years, which is, however, part of a global trend: instead of sweet wines, lighter, fruitier white wines and rosés have become more popular (portfolio.hu). Winemaking in Hungary can be traced back to many centuries: it is a proven fact that grapes were grown in Pannonia in Roman times to make wine. The 22 historic wine regions have suffered many times in the storms of history, but despite this we can say: since the foundation of the state, winemaking has always been an important activity on Hungarian soil (pannonborbolt.hu).

If we look back at the development of the EU's wine market since the beginning of the common market organized in 1962, then - even in a ten-year perspective - the change in the wine market can be clearly perceived. In 2013, the EU also introduced a comprehensive wine reform, the main objectives of which were to: (i) increase the competitiveness of European wine, (ii) simplify and make market regulation more transparent, and (iii) preserve the best traditions of European wine

production (agriculture.ec, 2023). Increasing the role of European wine may be justified, as large producers such as the USA, Argentina, Chile, Australia, or even South Africa and emerging large consumer markets such as China are bringing significant changes to the global wine trade. Another major challenge is that changing consumer demands strongly increase the innovation pressure on the sector (Jordão, 2023), just as climate change has had a significant impact on the sustainable cultivation of wine grapes (Navia-Osorio et al., 2023). Ohana-Levi and Netzer (2023) pointed out that wine production shows a significant, but at the same time, delayed connection with wine consumption, which is logically related to the evolution of wine imports and exports over time. The authors claim that the main forces driving the wine market are, on the one hand, economic growth, and wider competition, while climate change acts as a clear aggravating force the producer side. Therefore, the market is not constant, there is a continuous change in the trends of wine consumption in our country, which can be traced back to the development of the wine culture on the one hand, and on the other hand to the rapid changes in consumer needs. Accordingly, it is not easy to create an effective marketing plan for the wine industry, especially at the level of appearing on international markets (Vergamini et al., 2019). In our paper, we want to explore key ideas and fundamental strategic dimensions related to wine marketing, along the following main groups of questions:

- What foundations, values, and competencies can we build on in the wine marketing?
- What are the current challenges of domestic wine marketing when entering the international market?
- What influences the consumer's choice of wine today?
- Where and how does the consumer make their decision?
- How and according to what is the management and implementation of the domestic wine marketing strategy organized?

The basic objective of our study is to review the factors that determine the marketing strategy of the domestic wine industry, thus helping the work to identify the determining factors along which the pillars of domestic wine marketing can be further strengthened. In this paper, we rely on the content and results of their study published in Hungarian in 2023 (Tessényi – Katona, 2023). Before presenting the results of our primary research, we review the connections of the relevant literature background.

2. LITERATURE REVIEW

The research that serves as the basic framework of our strategic approach is attributed by Martinho (2021), who, based on his comprehensive investigation, identified five main dimensions to analyse the relationships of wine marketing strategies, these are the followings: "supply dimension", "demand dimension", "winery-strategic dimension", "tourism dimension" and the "innovation dimension". The basic content of the dimensions is summarized in *Table1*.

Table1: Strategic dimensions of wine marketing strategy according to Martinho

Dimension	Content of the dimension
(1) supply dimension	Decisions related to production alternatives, especially sustainability and environmental protection, which also have a prominent role in the marketing strategy affecting the stakeholders.
(2) demand dimension	<p>The following new trends can be observed in wine consumption:</p> <ul style="list-style-type: none"> • a more prominent role is given to the influence of friends and acquaintances on consumer decisions, • the role of sensory characteristics and health risks is becoming increasingly important, • the price/quality relationship is still of great importance, • in some cases, the effect of origin proves to be more decisive, • the brand has less and less of a role, at least in social media, and overall, it is typical that a special role is assigned to social medial, • generational effects are appreciated: the members of generation Z have a special bond and primarily like wines with a specific character, for them the packaging is of particular importance, while the consumption of alcoholic beverages in general is more characteristic of the members of generations Y and X in the middle of recreational and entertainment activities, however, the older generation attaches more importance to the grape variety and written information, while paying less attention to the issue of sustainability, • Chinese customers with significant consumer potential choose wine with less awareness and prefer red wines, and tend to drink wine at home, in hotels and in restaurants.
(3) winery-strategic dimension	In the case of certain markets, special attention must be paid to historical and territorial characteristics in the strategies implemented by wineries, and organic properties such as colour /type seem to be more and more important, although their significance is still mostly below the influence of price and country of origin.
(4) tourism dimension	The role of well-organized and properly promoted wine tours is emphasized in integrated winemaking strategies, where the connection of the brand's personality and the tourist region can be of great importance. In general, this strategy is more successfully followed by countries such as Australia, New Zealand and South Africa, or regions such as Bordeaux or Napa Valley (California).
(5) innovation dimension	In the case of wines, positioning opportunities based on quality differences must be considered, since the perception of quality characteristics can reduce potential concerns of consumers regarding, for example, controversial products such as genetically modified wine grapes. In this context, however, it is important to emphasize that when making wine purchase decisions, customers attach significantly more importance to the perception of quality than to the perceived quality itself, which points to one of the essential roles of wine marketing.

Source: Own editing, based on Martinho (2021).

The dimensions found in the table above, as we will see during our research, are basically suitable for properly framing the strategic dimensions of wine marketing. At the same time, we see it as important to point out that the marketing-business logic is basically based on demand considerations, and after that - in an orderly manner - the other dimensions can also appear in the following literature review, we ourselves start with the current questions of demand factors.

Key demand considerations: The examination of demand factors can now be understood primarily on a global and not merely a local, regional, or national level. When we examine demand factors on a global level, it is worth separating the consumer markets of the so-called „Old world” and the „New world”. The findings of Ohana-Levi and Netzer (2023) show that „Old World” wine consumers and producers (e.g., Spain, France, and Italy) have been experiencing gradual decreasing trends of wine consumption and production. While In „New World” countries, some of the largest wine-consuming countries were found to have strong, significant increases in wine consumption and new wine production markets show rapid growth trends. When examining domestic wine consumption, there is no significant reorganization in the amount of consumption, and the preference for domestic wines can also be said to be unbroken. At the same time, the proportion of wine consumption at home has increased, and related to this, the purpose of wine purchases has also changed (Harsányi et al, 2023a), while special attention should be paid to the consumption habits of Generation Z (Harsányi et al, 2023b).

Key supply considerations: Based on the 2023 harvest results, EU wine production decreased slightly compared to 2022. A total of slightly more than 150 million hectolitres of wine is expected, a decrease of -5.5% compared to the 5-year average. Consequences of climate change, namely dry winters, hail, floods, and rainy spring in other European producing countries such as Austria (-6%), Greece (-23%), Croatia (-31%) and Slovakia (-20%) was also a significant crop loss compared to 2022 (nak.hu). Considering the dynamics and complexity of the global market, so wine companies have had to increase their efforts to face the challenges of foreign competition for their survival, as well as the opportunities presented by global markets. Consequently, there has been a growing emphasis on the importance of value creation, since consumers are becoming increasingly interested in quality wines, and wineries have had to adapt to meet these demands (Sánchez-García et al, 2024).

Highlighted winery strategic considerations: Lekics (2023) examined the innovation strategy of domestic wineries from a sustainability point of view, in relation to all 22 historical wine regions of Hungary. The study identified 6 crucial innovation factors (two marketing, one organisational, two process and one product innovation factors) using factor analysis: the results showed that Hungarian wineries differ from each other in their adaptive, absorption, innovation, and cooperation abilities. Considering another aspect of innovation, Shi and Zhou (2024) investigated the brand reputation (BR) of wineries using in-depth interviews along dimensions such as: collective reputation (CR), wine label (WL), expert opinion (EO), social media advertising (SMA) and consumer wine knowledge (CWK). The results showed that WL, EO and SMA had positive effects on BR. CWK was found to have a moderating effect on the relationship between expert opinions/social media advertising and brand reputation.

Key tourism considerations: Comprehensive international information on the topic is given by Marco-Lajara et al. (2023), as their research offers a bibliometric analysis of more than 580 publications on wine tourism published between 1998 and 2021. The results of the research show that the academic study of wine tourism dates to the end of the 1990s, with the New World countries standing out in its study. Especially Australia shows the highest scientific production and the largest number of academics focused on this topic, so Australia is, up to date, the distinguished reference country in terms of wine tourism research, and USA, Spain, Italy, France, and New Zealand prove to be considerable drivers in this research area. The domestic significance of the integrated approach to wine tourism is also underlined by the "National Tourism Development Strategy 2030", as it designates premium-category wine and gastronomic tourism as one of the seven priority tourism products and allocates resources for its development (Dankó and Tóth, 2021). The change in concept does not merely indicate strategic and management aspects, but also suggests an innovative approach to the tourism products themselves, for example, along this line, vinotherapy appears as a new tourism product which, due to its favourable physiological effects, is also of health tourism importance (Feketéné et al., 2022).

Top innovation considerations: Járdány (2021) examined the territorial distribution of winery development subsidies in Hungary between 2014 and 2020. The investigation revealed that the resource endowment of the wine regions of Hungary's 6 wine regions shows a diverse picture, based on which it can be assumed that there are significant territorial differences in terms of development projects as well. With the help of the applied methodology, the researcher also pointed out the conditions related to the development of the wine industry. Gyarmati and Szakály (2023) investigated the transformation effect of industry 4.0 on the processes of domestic wine marketing and the wine industry. Based on the results, it can be stated that sooner or later all serious market participants should incorporate certain solutions of Industry 4.0 into their business strategy - otherwise, they will suffer a competitive disadvantage that is difficult to implement and manage.

3. MATERIAL AND METHOD

The basic objective of our study is to identify the factors and methods along which the defining foundations of domestic wine marketing can be further strengthened. We conducted our investigation with an exploratory purpose, so we constructed and implemented it along qualitative techniques. The interviews with the seven Hungarian winemakers and wine experts were based on

semi-structured questions, taking care not to influence the subjects' opinions or thoughts in any way. The interviewees are presented in *Table2*.

Table2: The interviewees and their brief introduction

Name	Company	Wine region / settlement	Experience
Szappanos, Benedek	Hungarikum Liget, Lakitelek	Kunság	wine expert
Siska, András	Felsőzsolca	Tokaj -hegyalja	Vine grower, Winemaker
Frittmann, Péter	DiVino Borbár, Kecskemét	Kunság	Frittmann Borászat & a Borbár, owner
Dabasi, Gábor	Damax Kft., Lakitelek	Kunsági	„Grand master” winemaker
Csányi, Norbert	Hotel Palota, Lilafüred	Lilafüred	Hospitality, winemaking, hotel industry
Gere, Andrea	Gere Pincészet	Villány	Gere Pincészet, co-owner
Rozsnyói, Krisztián	Moët Hennessy, Hungary	Budapest	Bortársaság, now: Moët Hennessy Magyarország, Sales Director

Source: Own editing, 2024.

Methodologically, we chose the interview technique because "the qualitative interview is a uniquely sensitive and powerful method to grow to know the subjects' experiences drawn from their everyday world and the lived meanings of this everyday world. During the interviews, you can convey the subject's situation to others in your own words." (Kvale, 2005, p. 79). We recorded the interviews continuously from January 2023 and finished in January 2024. We subjected it to a complete content analysis and categorized it sentence by sentence. The original model contains 5 categories (Demand, Supply, Winery Strategy, Innovation, Tourism), and we were curious to see if there are any substantive, professional elements that go beyond these. Therefore, we examined the insights falling into the "other" category in more detail. The sentences of the interviews were categorised based on their content based on the defined keywords. Categorization helped structure the analysis and identify the main topics discussed in each interview. We then updated the table containing the procession-results with the frequency data, in which the mentions of each category were reconciled during the analysis of the interviews. After that, we examined the "Other" category in more detail to understand the professional aspects and winemaking dimensions that did not fit into the original - Martinho's 5 categories. The use of textual analysis and categorization techniques allowed us to systematically analyse the content of the interviews and provide an overview of the focal points of each interviewee and the themes they considered important.

4. RESULTS

We present a content summary of the answers of the seven experts in the order of the interviews, along the main content elements that were said.

Benedek Szappanos has been monitoring the development of wine culture and changes in wine consumption for many years. For him, the wines with which they are emotionally attached always win the most important place in the hearts of discerning consumers. In this sense, the emotional attachment to a specific wine or type is extremely important, and this factor is often decisive during the purchase. Benedek Szappanos also emphasises that the taste and colour of the wine, the price, the attractiveness of the appearance of the bottle, as well as the type of wine and the place of origin are among the defining aspects for consumers when buying wine. After the economic system change of 90's, the managers of Villány wineries recognized the change in market demands and became open to visitors. Thanks to the "open cellars" initiative, the winemakers will personally present their cellars, provide tasting opportunities, and tell stories about the process of making the wines. During such interactions, visitors are enriched with positive experiences and memories, which can later be decisive in their purchases. According to Benedek Szappanos, the key when buying wine is to have access to a wide selection and special wines.

Our second interviewee was winemaker *András Siska*, who has been working with grapes on his family estate in the Tokaj wine region for 70 years. In his opinion, "product quality should be the starting a crucial premise". It needs to be clarified which grape varieties can be produced most profitably and what is special should be propagated. In his opinion, there is no assessment of how "the grape varieties of the 22 wine regions are in line with the international wine grape varieties, or which ones are unique." He thinks that we should base more on the Hungarian grape varieties, thus that is what we can produce in a larger quantity and in a more competitive way" You can only appear on the world market with a certain quantity and quality of wine, while the current attempts are often not even competitive at home - said Mr. Siska. According to his argument, a crucial aspect is the methods of processing the grapes produced in Hungary: standardisation in grape processing can also have a significant impact on quality - this way, greater competitiveness can be produced in the market, because the products of many small farmers could be standardised". "Quantity and uniform quality are necessary for competitiveness, because this is the only way for domestic wine marketing to be successful." The expert said that winemaking is done reductively or oxidatively: most Hungarian producers have switched to reductive winemaking, because of which e.g. the quality of Tokaj wine has become average, not a special one. "It has been a long-standing experience that Tokaj wine could only be made oxidatively, and now there is no clear answer to this." The same applies to grape varieties, previously it was stipulated by law that in Tokaj-Hegyalja you could only grow furmint, linden and muscat grapes, but now you don't hear about whether this regulation has remained or if anyone would effectively control it. According to the point of view of our interviewee, the producer should be tax-free until he reaches the appropriate quality - however, this may take several years. Of course, the producer also needs to have a suitable economic situation for this, because if he is interested in getting money as soon as possible, he will give up the traditional method. Effective domestic and international marketing work can only be done after solving the above basic problems – added Mr. Siska.

According to *Péter Frittmann*, we can really talk about „Hungarian wine marketing” only in the last 20 years. There was a time when marketing was specifically oriented towards one breed, but the results were never satisfactory. Hungary is diverse in terms of wine, but at the same time "you have to be able to communicate clearly and directly to domestic and foreign consumers". Nowadays, every wine region has reduced its marketing to 2-3 types of wine, so it is much easier to understand with foreigners that "What is Hungarian Wine". This diversity is difficult to work with, but it can also be an advantage (e.g. German Riesling, Austrian green Veltelini compared to countries that concentrate on one variety). The wine regions have their uniqueness, but what Hungary is building, a unified wine image of itself is still desperately missing. According to Péter Frittmann, "it is important that in the eyes of foreigners we appear as a traditional wine-producing country where this is an integral part of the culture as well as the country's image". An important advantage is that Hungary has a serious research and developing history in grape breeding, in which significant results have been achieved - these factors could all be strengthened.

Gábor Dabasi as our next interviewee spoke about the program initiated by the government, which has been running for 2 years. As part of this, each producer pays a certain amount, thus creating a significant amount that is managed by the National Council of Mountain Villages in the Kunság wine region and the management of the wine region. As a result, for example, Hungarian wine is advertised at foreign exhibitions, and every month they post on Instagram about artisanal wineries, presenting one winery at a time, such as the Gedeon, Szentpéteri, Frittmann wineries. According to Dabasi, it is important that 1 HUF is paid into the fund for every Litre of wine put on the market, and the government adds the same amount, so a fund of several billion HUF is created every year. This is supervised by an elected team of experts at committee level. Community marketing is of great importance in the promotion of Hungarian wines, as domestic wine consumption has decreased. Dabasi believes that the „Tokaj aszú” should be the "flagship" on the "back" of which the rest could be built. According to Dabasi, the primary task is to acquire and retain customers with the right wine quality. He considers television appearances important, which can help to arouse interest in the consumption of quality wine. Overall, Dabasi believes that it is necessary to make the wine culture interesting and arouse interest both in our country and internationally.

According to sommelier *Norbert Csányi*, the HORECA sector represents a significant market for wineries. The presence in fine dining places is primarily a matter of prestige with premium items, while in high-traffic hotels, the inclusion of a wine family representing the "everyday wine" category can mean serious sales volumes. It is important to mention that restaurants usually work with a large wine merchant, which narrows down their selection. In addition, due to efficient storage, many places are narrowing down their wine selection and prefer items that are only available by the glass. However, this pushes the quality products to a situation of competitive disadvantage. The role of wine marketing is pushed into the background in such circumstances, and guests prefer to choose from the offer on the place's wine list. According to Norbert Csányi, the "illusion" of direct marketing overrides the real wine-marketing, and it is important that, in addition to local wines, flagship wines from all Hungarian and foreign wine regions are included on the wine list of restaurants. As a professional consultant, Csányi helps in the compilation of foreign wine offerings in several places, but always prefers Hungarian wines if they represent a worthy alternative.

Andrea Gere, the owner, and manager of one of the best-known Villány wineries, shared the following thoughts about wine marketing and the challenges of entering the international market for Hungarian wines in the interview he gave: she considers wine marketing a big task, as he believes that people need to be convinced to taste wine and get to know Hungarian wines. She emphasises that the Villány wine region has a strong community brand, which makes a bit envy the representatives of many other wine regions, and that the Villány winemakers stick together and work together to promote Villányi Franc. In the interview, she explained that her wines change and refine with them, and the new labels reflect this change and give her wines a unified image. Their family winery has been operating for seven generations, always striving for quality, and organic farming also serves this purpose, to make the wines in a natural way. Regarding wine marketing, Andrea Gere also said that in their own wine marketing, they build on the nature of family winemaking, traditions, quality, reliability, winemaking spanning generations, and organic viticulture. Regarding entering the international market, Andrea Gere emphasised that Hungarian wines always must deal with the "Product of Hungary" label, which unfortunately means more of a disadvantage. The diversity of the Hungarian wine offering, with many wine regions and grape varieties, is a great challenge. For this reason, it is difficult to say what „Hungarian Wine” is in a short, easy-to-interpret and memorised message. Another difficulty is that many people abroad do not even know where Hungary is, let alone that there is wine production. "Bottom shelf" cheap Hungarian wines make it difficult to establish the prestige of Hungarian wines.

According to commercial director *Krisztián Rozsnyói*, building a successful brand depends on many components. The people behind the product play an important role, the founders, who define the brand's mission, and the winemakers, who shape the wine with their personality and expertise. The creation of wines with a unique style and the conscious use of terroir are essential to differentiate the brand. A balance of history and innovation defines the value of the brand, while consistency of concept and persistence help you find your way. Thorough knowledge of the market is also essential for success, including competition, pricing, and accurate knowledge of consumers' needs. Among the challenges of domestic wine marketing, Krisztián Rozsnyói highlights the declining demand for wine worldwide, as well as the difficulties of entering the international market for Hungarian wines. The diversity of Hungarian grape-growing areas, consisting of small areas and many wine regions, makes it difficult to communicate effectively with the world market. As a result, we can only achieve small successes as an international actor for the time being. Consumers' choice of wine is influenced by many factors, including price/value ratio, availability, and brand awareness. In the uncertain environment of recent years, consumers increasingly choose reliable brands, and their own experiences and emotional attitudes also determine their decision".

5. CONTENT ANALYSIS RESULTS

Based on the interviews, it can be concluded that there are many challenges in the field of Hungarian wine marketing, but there are also significant opportunities in terms of the promotion and marketability of Hungarian wines. During the content analysis of the above interviews, we

categorised the topics that occurred in the interviews, such as wine marketing, wine market, wine strategy, innovation, tourism, and other topics. Based on these categories, we summarised the main topics and opinions that appeared in the interviews, see *Table3*.

Table3: The appearance of Martinho's 5 dimensions in the interviews, supplemented by other factors.

Interview / Dimensions	Demand	Supply	Winery Strategy	Innovation	Tourism	Other
<i>Szappanos</i>	4	3	5	2	1	3
<i>Siska</i>	0	3	2	1	0	2
<i>Gere</i>	3	2	1	0	0	0
<i>Rozsnyói</i>	1	2	3	1	0	0
<i>Csányi</i>	5	3	4	1	3	3
<i>Dabasi</i>	3	0	2	1	1	0
<i>Frittmann</i>	3	2	4	2	1	2

Source: Own editing, 2024.

During the content analysis, the most important factors included wine marketing strategies, the importance of social branding, cooperation between wineries and the role of innovation in the wine industry. Among the factors classified in the "Other" category, several aspects were found that play a significant role in the wineries' business decisions, but do not fit closely into the other categories. These include:

- *Environmental awareness and sustainability:* More and more wineries are paying attention to environmental protection and the introduction of sustainable practices, which extend not only to production processes, but also to packaging and transportation.
- *Digital technologies and online sales:* The use of digital technologies and online sales channels has played an important role, especially after the COVID-19 pandemic. This includes online marketing, e-commerce, and the use of social media.
- *Workforce and training:* Retaining a skilled workforce and ensuring continuous training is key for wineries. This includes developing winemaking techniques, hospitality, and sales skills.
- *Regulatory environment:* Wineries' business decisions are significantly influenced by the regulatory environment, including taxes, licences, and other legislation on alcoholic beverages.

The above factors demonstrate that wineries' business decisions are influenced by many complex impacts that go beyond the immediate aspects of production and sales. The analysis of the "Other" category highlights that wineries must develop a broad strategy that considers market, technological, regulatory, and social changes, as well. Our interviewees highlighted several unique aspects of the Hungarian wine industry that do not fit directly into the categories defined in the original model of Martinho. These include the long history and significant results of grape variety research, traditional winemaking culture, diverse grape varieties, etc. These unique aspects highlight the strengths of Hungarian winemaking, such as research history, traditional winemaking culture, and diverse grape varieties, which could be better exploited in marketing. However, greater visibility at international events may be needed to overcome the impression that the Hungarian wine industry is less developed than, for example, that of Austria.

6. CONCLUSIONS, RECOMMENDATIONS

In the field of domestic wine marketing, it is felt that the focus of the strategy is increasingly shifting from a product orientation to a market-oriented approach. In our opinion, the referenced strategic dimensions compiled by Martinho (2021) provide a well-structured framework for the analysis of this changing ecosystem and the selection of its strategic directions. We consider it a clear merit of our study that each of the interviewees outlined their insights from a different professional point of view, thus contributing to the layered drawing of a more comprehensive picture.

As we see, Martinho's (2021) approach allows for a comprehensive examination of the different aspects of wine marketing and helps to understand how these dimensions are related to each other.

However, each model has limitations and there is always room for improvement or addition. We consider it important to highlight that business and marketing logic builds all other strategic dimensions on the dimensions of demand in practical life, therefore we recommend modifying the original order accordingly: the supply dimension should not be the first, but the next aspect following the demand dimension. To the top of all that, in the seven interviews we conducted, we detected a few important strategic dimensions that cannot be directly classified among Martinho's 5 dimensions. However, these omitted but very essential elements are not homogeneous. The revealed aspects were gathered under the name of "additional factors" (other), which category covers the factors that are equally important for wineries in terms of competitiveness and successful operation. In terms of further research directions, it would be practical to increase the number of in-depth interviews or to involve other experts to collect additional broad perspectives and experiences. In addition, it may be worthwhile to use methods to confirm research findings, such as triangulation, which may involve combining data, researchers, theories, or methodologies. The use of qualitative data analysis software (e.g., NVivo, Atlas.ti) can also be considered to organise, code, and analyse the data, which can help in deeper analysis of themes and patterns.

The content of the further research directions is also important to mention that the success of the Hungarian wine marketing strategy requires further analysis and research: highlights include the effects of emotional bonding and experience creation, as well as the role of digital marketing and online presence in wine marketing. It is worth considering product quality and the effectiveness of highlighting uniqueness, as well as the importance of expert support and community cooperation in the promotion of domestic wines. The challenges of the international market require further analysis, especially regarding the issues of the country's image and the competition in the low-cost category. Finally, it is worth further investigating the possibilities and effectiveness of managing as a single Hungarian wine to strengthen the international position and attractiveness of Hungarian wines.

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14 Sustainability of Indonesia Transport Loan Financed Projects: Development Outcome Attributions (DOA) on Unemployment, Growth, and Poverty

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Abstract

We analysed Indonesia's transport loan projects' sustainability through their impacts and effectiveness. These projects are funded by the Asian Development Bank (ADB) and the World Bank. A combined total of 67 projects from 1972 to 2020 with a value of \$8.85 billion. Anchoring on banking theories and practices, and applying attribution and triangulation techniques, our study revealed that while both banks' loans are effective in creating jobs, they reduced growth by 200% and increased poverty by 220%. For every \$1 loan, capital flights of more than \$42 are observed because of foreign currency borrowing and their disbursement delays of five to seven years. As evidenced by recent literature, we provide our finding that the investment-savings gap theory as the basis for foreign currency borrowings is faulty. Fixing this, in the short-term, required 100% disbursement in Rupiah currency in the same year the loan agreements are signed, and into Indonesia's banking systems. In the long term, reduce foreign currency borrowing to near zero. This is an unsustainable endeavour and cannot continue as it not only depletes Indonesia's capital resources but also gives negative yields in its economic development.

Keywords

Attribution, development loans, capital flights, unemployment, growth, poverty, foreign currency loans, banking.

JEL Classifications

B170, B41, C8, F3, R42

1. INTRODUCTION

*Poverty is a great evil; and **economic advantage is a real good, not to be sacrificed to alternative real goods** unless it is clearly of an inferior weight ... The decadent international but individualistic capitalism, in the hands of which we found ourselves after the war, **is not a success. It is not intelligent, it is not beautiful, it is not just, it is not virtuous--and it doesn't deliver the goods.** In short, we dislike it, and we are beginning to despise it.* (Emphasized) – John Maynard Keynes (1933), "National Self-Sufficiency"

Note: We shall see whether the money borrowed from the banks is "a real good" and contribute to the economic development of the borrower.

Sustainability is defined as the ability to maintain or support a process over time and is divided into three core ideas namely environmental, social, and economic. These are known as the 3Ps; planet, people, and profit. (Investopedia and Mollenkamp 2023). Achieving sustainability is part of the overarching goal of the United Nations (UN, xxx) and accordingly has encouraged businesses and governments to commit to sustainable development goals (SDGs), such as reducing their environmental footprints and conserving resources. They are promoted to actively embracing sustainability investments, or "green investments." However, this effort is without skeptics who have

accused some companies of "greenwashing," the practice of misleading the public to make a business seem more environmentally friendly than it is. Such as taking development aid in the form of a loan in which, within the loan documents we can read many carefully narrated positive economic returns and environmental impacts of such projects. Taking this in mind, we scrutinize Indonesia's transport loan-funded projects by both the ADB and World Bank since 1972.

The term "sustainable transport" covers a wide range of transportation that is or aims to be sustainable. Roads, trains, airplanes, waterways, canals, pipelines, terminals, and electricity are all included. There are two aspects involved: transit-oriented development and transportation operations and logistics. The efficiency and efficacy of the transportation system, as well as its effects on the environment, are the main metrics used to assess transportation sustainability. While long-term objectives include switching transportation from fossil fuel-based energy to other options like renewable energy and the use of other renewable resources, short-term action frequently encourages gradual improvements in fuel efficiency and vehicle emissions controls. Measurement and optimization of sustainability are applicable throughout the full life cycle of transportation systems. The environmental, social, and economic sustainability of the localities they assist. People use transportation systems to connect with others on a social and economic level, and they seize the chance that comes with greater mobility. Weighing the benefits of greater mobility against the financial, social, and environmental costs associated with transportation infrastructure is necessary. Investment in transport brings equality to all in terms of accessibility and brings outcomes such as reduced poverty, increased accessibility and standard of living and education, and improved welfare. These are all captured in the sustainable development goals (SDGs).

Fundamentally, transport infrastructure plays a critical role in regional development that affects the level of disparities among them (Baum-Snow et al. 2020; Koster et al. 2021). Mobility of economic agents such as seller and buyer, goods and services, not only opens a range of opportunities such as networks, information flows, and markets for varieties of products including wealth and welfare transfers but also for national defense systems. Thus, transport not only provides access but also functions as the main artery and nodal point for any economic development that affects all facets of human lives. Transportation has always been one of the foundations of human civilization and modern society can be measured by how advanced is their transportation systems. For example, the *World Economic Forum's 2017 Travel and Tourism Competitiveness Report*¹⁶, ranks countries based on their attractiveness to tourists in 14 categories, including ground and port infrastructure. The report appraises the quality, efficiency, and density of their ports, roads, railroads, paved roads, the total number of roads; and their ground transport.

Adam Smith (1998) in the eighteenth century emphasized the importance of transport. He argued that transport was a production unit that created value but not expendable value. In his division of labor theory, he places importance on the mobility of people and goods, and a platform for wider access to open markets. Arguably, economic development needs to be based on a national and international transport system that links economic activities and locations with favorable conditions for production.

Transport infrastructure and traffic flows or mobility of any economic agents are critically important not only for the military and defense systems, and stability of a country but also for the wellbeing and welfare of their people. A well-integrated network of transport systems achieves this and delivers isolated regions to an open economy. For this reason, as the OECD report shows¹⁷, many countries are building and maintaining their transport infrastructure by investing about one percent of their gross domestic product (GDP) or around 7.5% of their national expenditure. For comparison, the same report highlights that China spent 5.7% of its GDP on inland transport infrastructure investment in 2018. This makes them among the fastest-growing countries in terms of volume of inland transport infrastructure investment (+252% between 2008 and 2018 in constant 2015 prices).

¹⁶ World Economic Forum's 2017 Travel and Tourism Competitiveness Report. <https://www.weforum.org/reports/the-travel-tourism-competitiveness-report-2017> (3 Jan 2022)

¹⁷ stable-inland-transport-infrastructure-investment-share-gdp-oecd.pdf. <https://www.itf-oecd.org/sites/default/files/docs/stable-inland-transport-infrastructure-investment-share-gdp-oecd.pdf> (3 Jan 2022)

Indonesia is no exception. In 2015, it has invested about 3.5% of GDP compared with 8% in 1997.¹⁸ About 24% of its GDP is derived from transportation and logistics¹⁹. Bustan (2015) elaborates on the government of Indonesia (GOI) spending on land transport provinces four provinces (Maluku, North Maluku, Papua, East Nusa Tenggara, and West Papua) is about 8.93%. Central government expenditure for sea transportation is around 2.49% of GDP. This investment is intended not only for improving and maintaining the current transport infrastructure but also for developing and constructing new and integrated modern multi-modal transport systems. The main objectives, among others, are, promoting sustainable growth, creating jobs, reducing poverty, and increasing mobility. In its efforts to improve its transport infrastructure, Indonesia has borrowed from public and private partners. This includes borrowing from the Multilateral Development Banks (MDBs).

Our study is on Indonesia's borrowing for its transport investment from the Asian Development Bank (ADB) and the World Bank and their impacts on unemployment, growth, and poverty. Additionally, capital deformation or capital flights also known as the spill-over effect as a result of foreign currency loans. Both ADB and the World Bank shared a common mission, among others, to fight and alleviate poverty. Both banks have provided transport loans since the 1970s with a total of 0.16% of Indonesia's 2020 current GDP. We applied the attribution technique (expressed as % of GDP) in evaluating the effectiveness and impacts of Indonesia's borrowing. We discovered that both ADB and World Bank's loans, despite having some positive and negative impacts on both unemployment and growth, significantly worsen poverty by over 200% and cause capital flights of more than \$42 per \$1 loan. The main problem our paper tackles is the effectiveness of ADB and World Bank transport loans and their disbursement delays—and their impacts—which are generic in all MDBs. In comparison, commercial banking disburses loan funds within one day, whereas the MDBs, including the ADB and World Bank, on average are more than 5-year.

We begin with elaboration on basic theories and our hypothesis, followed by a literature review and our lucubration. We expound on our quantitative non-econometric methodology before presenting our findings and analysis. Our study implications and recommendations are presented before we reach our conclusion.

2. THEORY AND HYPOTHESIS

The 2015 Nobel Prize winner in economics, Angus Deaton reasons that foreign aid often hurts, rather than help, poor people in poor countries. Deaton studied poverty in India and South Africa and worked with the World Bank. Swanson (2015)²⁰ wrote "*Deaton argues that... **the rich world may actually be corrupting those nations' governments and slowing their growth.** ... that ... official aid in 2014 may not have ended up helping the poor. ... in which the United States gives aid 'for 'us,' not for 'them' – to support our strategic allies, our commercial interests or our moral or political beliefs, rather than the interests of the local people.*" (Emphasized)

"*That which is used - develops. That which is not used wastes away.*" ~ Hippocrates ... c. 460 - c. 370 BC). This implies that Indonesia's undisbursed loan amount from both the ADB and World Bank is wasted away.

Ibnu Khaldun, in the 14th century, warned that when the ruler (government) is not spending money, it causes a shortage of capital inducing a drop in profits for the entrepreneurs forcing them to reduce costs and cut employment. "*Now, if the ruler keeps it to himself [undisbursed], it is lost to the subjects*" (Khaldun, 1377, p.365).

Similarly, we hypothesize that when Indonesia's loan funds from the ADB and World Bank remain undisbursed or delayed, it causes a shortage of capital, demand reduction, raises unemployment, reduces growth, and increases poverty. Consequently, the loss to Indonesia.

Other theories will be revealed as we discuss the literature findings.

¹⁸ Diagnosing the Indonesian Economy: Toward Inclusive and Green Growth, edited by Hill, M.E. Khan & J. Zhuang, ADB 2012.

¹⁹ Where to Invest: Transportation & Logistic Industry in Indonesia. <https://www.cekindo.com/sectors/transportation-logistic-indonesia> (3 Jan 2022)

²⁰ Does foreign aid always help the poor? | World Economic Forum. <https://www.weforum.org/agenda/2015/10/does-foreign-aid-always-help-the-poor/> (8 Dec 2021)

3. LITERATURE

3.1 Development aid attributions

OECD (2020)²¹ categorizes development loans from the MDBs as development aid (or aid). In the aid monitoring and evaluation (M&E) area, the discussions and debates on how best to evaluate their effectiveness are unsettled. The Development Assistance Committee (DAC) Working Group on Aid Evaluation defined attribution as: *“The ascription of a causal link between observed (or expected to be observed) changes and a specific intervention. Note: Attribution refers to that which is to be credited for the observed changes or results achieved. It represents the extent to which observed development effects can be attributed to a specific intervention or to performance of one or more partners taking account of other interventions, (anticipated or unanticipated) confounding factors, or external shocks”* (OECD, 2002, p.17).

Attribution in assessing development aid impacts and effectiveness has been a long outstanding difficult issue (Bourguignon and Sundberg, 2007, p.316) that aid agencies have been struggling with. Furthermore, there is no concerted approach to tackling the attribution issue and it is more diverse than the analysis of aid effectiveness and impact (Sasaki, 2012, p.34). Rahman (2017) argues that attribution is a fundamental problem in gauging aid effectiveness apart from donors’ motivations. This has long been a subject of contention and remains a herculean task. In financial portfolio management, attribution analysis is a method for evaluating the performance of a portfolio or fund manager considering three factors namely; the investment manager’s style, stock picks, and decision timing (Investopedia, 2020)²². Despite, its attempt to provide a quantitative analysis, it is largely qualitative and hence invested with bias.

It is apparent that ‘cause’ and ‘effect’ relationships with the qualitative approach are always in correlational and ‘probabilistic’ relationships as in social sciences. Accordingly, this essentially positions attribution results on immediate unstable ground (Iverson, 2003, p.3) and is prone to skeptical inquiries. Iverson explains the ‘attribution problem’, where establishing causality is difficult and has a long history in the field of evaluation. Therefore, strengthening the foundation of attribution analysis by replacing qualitative with quantitative methods is critical in eradicating bias and providing a stable foundation for building the analysis. Sachs (2005, p.278) emphasizes that much clearer quantitative benchmarks tailored to the national conditions and needs are critical for measuring the impacts of any development projects and/or programs, particularly those of poverty reduction.

Despite Puri et al. (2015) providing stocktaking of methods for the quantification of impacts currently, at the best of our knowledge, there is no accepted quantitative or empirical standard methodology for attributing development outcomes versus the source of funding be it loans, grants, or Technical Assistance (TA). Let alone that based on banking theory and practices. Thus, we believe ours is the first one.

3.2 Attribution through triangulation

Triangulation is a technique commonly used in the geodetic and surveying area. It is the basis of satellite and geo-positioning systems (GPS). It uses at least 2 reference points to pinpoint any other points. The more reference points are used to triangulate a point, the more accurate the result. Aid M&E also uses more than one method or multiple methodological techniques and tools (Denzin, 1978). Triangulation tackles both validity and reliability (Farquhar et al, 2020, p.9 citing Beverland & Lockshin (2003); Yin (2018; Jick (1997); Miles & Huberman (1994)).

A mixed-methods or methodological triangulation was championed by Norman Denzin (1978).

“The rationale for this strategy is that the flaws of one method are often the strength of another; and by combining methods, observers can achieve the best of each while overcoming their unique deficiencies...”

²¹ Loans, grants, technical assistance (TAs) and in-kind assistance are categorized as aid (OECD, 2020). <https://data.oecd.org/oda/net-oda.htm> (Accessed 17 Dec 2020)

²² <https://www.investopedia.com/terms/a/attribution-analysis.asp> (30 Oct 2020)

*When a hypothesis can survive the confrontation of a series of complementary methods of testing it contains a degree of validity unattainable by one tested within the more constricted framework of a single method... **methodological triangulation** involves a complex process of playing each method off against the other to maximize the validity of field efforts. Assessment cannot be solely derived from principles given in research manuals - it is an emergent process, contingent on the investigator, the research setting, and the investigator's theoretical perspective."* (Denzin, 1978, pp.308-310).

Denzin (1978) suggested four distinct triangulation components namely;

- **Theoretical triangulation** involves multiple theories.
- **Investigator triangulation** is when several different researchers collectively contribute to the study to collect, analyze, and interpret data and observations.
- **Methodological triangulation** necessitates adopting multiple methods to observe and study a particular phenomenon often by combining qualitative and quantitative approaches.
- **Data analysis triangulation** applies several different methods of analyzing and interpreting data to ascertain the validity of the conclusions and the robustness of the results.

Our study applies all four triangulation components in some ways while emphasizing data analysis through attributions (% of GDP) and their triangulated results as empirical analysis.

3.3 Capital Flights: Return on \$1 investment in development aid

References in the last 50 years suggest that for every \$1 aid received by developing countries, between \$0.15 and 24 are generated elsewhere. For example, US Congress's (1968a, p.280) record relating to the 1969 budget appropriation for ADB registers "... we find that many of the members ... put in \$1 and get out \$7." This is consistent with a \$7.10 increase in export for Australia (Australian National University (ANU), 2017)) for each Australian Dollar aid, \$7 lent out by commercial banks for every \$1 investment by MDBs (Lotti and Presbitero, 2019), more than \$10 (GFI et al, 2015, p.3) and \$24 (Hickel, 2019) capital outflow from developing countries. Andrews and Wilhelm (2008, p.2) citing Kharas (2008) estimates a cost deviation of 22% whilst Jepma (1991) exhibits 15-30% measured against disbursements.

For interest payment exclusively, it depletes 0.8% of GDP, and total capital flights are 7.6% of GDP (Griffiths, 2014). Every time developing countries pay their debts in US Dollars, it is estimated repayment is between 24 (Hickel, 2017) and 25 (Powell, 2005) times the loan value. In other words, for every \$1 loan, the borrowers pay back \$25.

Our calculation, which detail is beyond the scope of this paper, using banking theories and practices gives a bigger result of over \$35 per \$1 loan after incorporating Indonesia's endogenized capitals in the form of unequal exchange of over 500% collateral including the borrowers' sovereignty. The borrower's growth is reduced or retarded by about four times (400% assuming that Indonesia's expenses are 15% of GDP) and this ends up in the developed countries' GDP. As Hickel (2017) puts it "[a]id is effectively flowing in reverse. Rich countries aren't developing poor countries; poor countries are developing rich ones."

3.4 Disbursement delays impacts

Doubling aid volatility in the form of disbursement delays leads to a drop in average GDP growth by two-thirds (67%) (Aldashev and Verardi, 2012:3-4). The World Bank staffers (Jarotschkin and Kraay, 2016, p.235) has identified currency depreciation pattern as a result of development aid disbursement delays using over 100 countries' data. They establish that "there is little evidence that aids inflows to lead to significant real exchange rate appreciations". Their results show that after 5 years of delay, for every 1% of GDP of aid, the national currency depreciates 0.5% (Jarotschkin and Kraay, 2016, p.236). Ingratubun (2021) shares his finding of 33% Indonesian currency, Rupiah depreciation for every one percent of GDP of ADB loan disbursement delay.

3.5 Return on Investment in Transport

The American Public Transportation Association (APTA) report (2020) shares that at the end of the 20-year transport investment period yields a ratio of approximately a \$5 increase in GDP for each \$1 annual investment. This includes a \$3 increase in productivity of the overall economy as a result of cost savings. This entails 49,700 new jobs for each \$1 billion investment in public transportation.

3.6 The role of capital

Loans in whatever forms and currencies are national tangible capital. Ibnu Khaldun, in the 14th century, explains why some regions are developing backward and others are forward by using water as an analogy for money or capital that is poured into the economy making everything around it green and fertilizing the soils. Remote from this, they are non-existent (Khaldun, 1377, p.465).

Similarly, ADB and World Bank's loans if they are disbursed into Indonesia, are correlative to capital, greens, and fertile soils (Khaldun, 1377) and various economic indicators of GDP growth, wealth, unemployment, poverty, credit, wages, savings, productions capital, and consumption goods (Fisher, 1896, p.534). Lanzalet et al. (2018) show Panama Canal expansion project funded by one of the Multilateral Development Banks (MDBs), with a cost of 30% of Panama's GDP has attracted an estimated almost \$10 billion in private investment or 1.8 times the project's cost (almost 60% of GDP). Moore (1983) found statistically significant evidence of the impact of credit on employment (Moore, 1983, p.542).

3.7 ADB and World Bank Disbursement Delays

ADB and the World Bank, like all MDBs, operate like traditional banks (Mazzi, 2013: xxvi). However, borrowing from a commercial bank the borrower gets the credit money disbursed in full upon the Loan Agreement (LA) signing. Both ADB and the World Bank do not work like this. It takes between 5 and 10 years for a full disbursement of the loan fund.

The ADB and World Bank link their disbursements with conditionalities and operate the borrowers' loan accounts. A former World Bank staff member lambasts that conditionality in whichever formats have failed in Africa and they were designed to fail as a systemic mode to ascertain aid keeps flowing (Kanbur, 2000, pp.413-416). Conditionality implies the real issue that is *"one of an unhealthy interaction between donor and recipient processes which propagate aid dependence but are not so simple as to be characterized as the strength of the donors and the weakness of the recipients."* (Kanbur 2000, p.414).

The ADB's President Nakao affirms that about 90% of ADB loan projects are seeing 2-year delays (Witular, 2016) from its 5-year standard loan project implementation. Thus, our empirical analysis applied 5 years with 2 years of delays (7 years).

3.8 Banking Theories and Practices

Among thousands of development aid studies and reports (Asatullaeva et al, 2021), to date, to the best of our knowledge, the first development aid study that incorporates banking theories and practices is by Fauci and Ingratubun (2020) which foundation was laid by Werner (2015, 2016b). In our view, assessing the effectiveness of loans-funded projects, particularly foreign currency loans, must be first done by understanding and applying banking theories and practices in the analysis. Therefore, we briefly share the banking practices that have been empirically tested—possibly for the first time in the 5000 years of banking history—by Werner (2014, p.16). Werner (2014, 2016a) and the IMF (Gross and Siebenbrunner, 2019) provide comprehensive literature reviews on these 3 banking theories.

1. Financial Intermediation Banking (FIB) (or Loanable Funds—LF)

First, FIB is the most dominant theory which holds that banks are merely financial intermediaries. They gather deposits (\$100), mostly in cash, from patient savers and lend them out (\$80) to customers or impatient spenders and charge interest (Figure-1). The Bank of England classifies this as a common misconception *"...that banks act simply as intermediaries, lending out the deposits that savers place with them."* (McLeay, et al., 2014: p.15).



Figure 1. Financial Intermediary Banking (FIB)

As quoted by the IMF (Gross and Siebenbrunner, 2019, p.30) *"Federal Reserve Bank of Chicago 1994: "Of course, [banks] **do not really pay out loans from the money they receive as deposits**. If they did this, no additional money would be created. **What they do when they make loans is to accept promissory notes** [Loan Agreement] **in exchange for credits** to the borrowers' transaction accounts. Loans (assets) and deposits (liabilities) both rise by [the amount of the loan]."* (Emphasized)

2. Money Multiplier Or Fractional Reserve Banking (FRB)

Second, the FRB theory adopts that banks, collectively, create money via multiple deposit expansion by using a fraction of the money in their possession as the basis for credit generation (Figure-2). A bank with a \$100 cash deposit in its entire holding can lend out \$1,000 (10 times) under the 10% reserve rule (Nichols, 1992: p.11). Indonesia adopts 10% rules per its Bank of Indonesia's law²³. Here, we already see the role of the government through banking laws. Frederick Soddy (1926), a Nobel Prize winner in chemistry, and a political ecologist, has quixotically criticized not only this FRB practice but also compounded interests as unsustainable and against the second law of thermodynamics of entropy.

The Fed nullifies this requirement on 26 March 2020²⁴ (The Fed, 2020) which means any bank can lend out money with zero reserves (See also Nichols, 1992: p. 3). Some literature classified FIB and FRB as LF. Werner (2014, 2016a), Keen (2014), and Moore (1983), and a growing number of central banks, for example, the Fed (Carpenter and Demiralp, 2010) and the Bank of England (McLeay, *et al.*, 2014), have mathematically, empirically, and practically proven that both FIB and FRB theories are untenable, factually incorrect and not reflecting reality hence are indefensible.

Notwithstanding, it was in their official publication on *Modern Money Mechanics*, since 1961 (Nichols, 1992 (1st ed., 1961)), the Fed (2021) eventually admitted the *"fact that reserve requirements have no essential role in an ample-reserves regime. So, mathematically, the money multiplier equation is literally no longer definable."* (Ihrig *et al.*, 2021)²⁵. They admitted that the bank intermediation (LF) and money multiplier (FRB) theories are not valid. They cited the Fed Chairman, Jeremy Powell for expressing the need to unlearn the *"classic relationship between monetary aggregates and economic growth and the size of the economy no longer holds"*.

²³ Adopted based on Indonesia, Article 62.b, Law No.23 (1999) on Bank Indonesia.

²⁴ Reserve Requirements. <https://www.federalreserve.gov/monetarypolicy/reservereq.htm> (8 Sep 2021)

²⁵ Teaching the Linkage Between Banks and the Fed: R.I.P. Money Multiplier. <https://research.stlouisfed.org/publications/page1-econ/2021/09/17/teaching-the-linkage-between-banks-and-the-fed-r-i-p-money-multiplier?s=09> (28 Feb 2022)

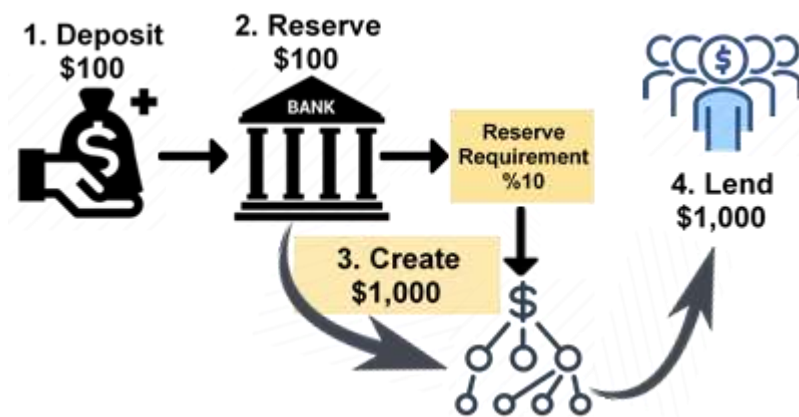


Figure 2. Fractional Reserve Banking (FRB)

Although this might seem harmless, many textbooks and universities' curricula around the world have reflected this as mainstream knowledge. This includes (almost) all central banks and their national banking act. For example, the Bank of Indonesia with Law No.23 (1999).

3. Credit Creation (CC)

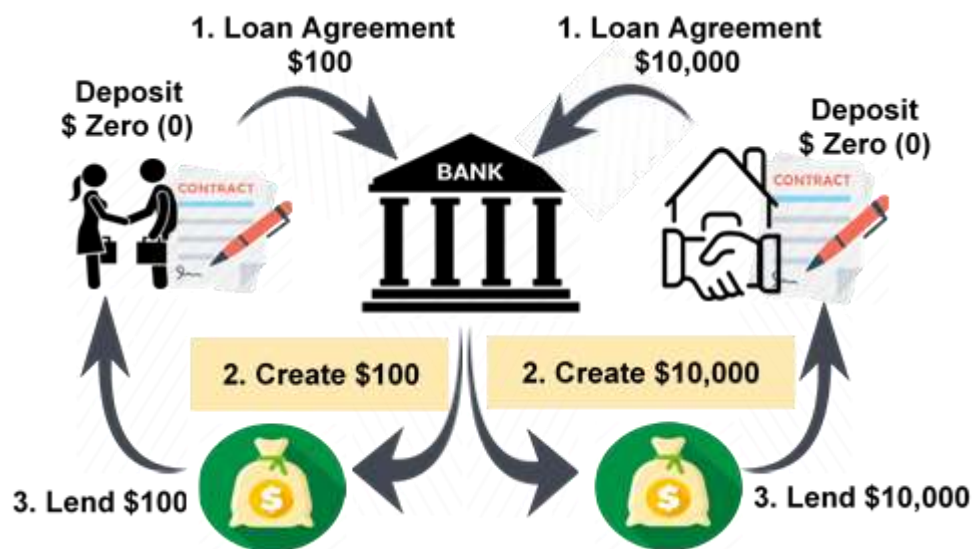
Third, the CC also known as endogenous money (EM) is the most dominant theory and is currently practiced around the world in which banks require neither deposits nor reserves (Figure-3). The Bank of England describes that money creation begins when a client signs the Loan Agreement (LA). They state that *"The bank, therefore, creates its funding deposits, in the act of lending in a transaction that involves no intermediation whatsoever."* (Jakab & Kumhof, 2015: p. ii). All the banks need for credit money creation is a signed LA or promissory note (PN). This is the oldest banking theory in modern civilization based on 5000 years of practice (Werner, 2016a; Hudson, 2018). Werner (2014: p. 14) in the first-ever practical empirical test of 5000 years of modern banking, observed in real-time and in an actual bank environment. A BBC²⁶ crew was filming the entire process from LA signing until he received the credit money into his bank account. The entire process took 35 minutes in contrast to the fund disbursement by the MDBs which takes over 5, to 10 years (Ingratubun *et al*, 2021).

Almost immediately after Werner (2014) published his study, the central bankers have come out in concert admitting the long-held suspicion that banks create money out-of-nothing or *ex-nihilo*. This includes the much-cited publication by the Bank of England (McLeay, *et al.*, 2014) of which Graeber (2014) commented, *"[i]n other words, everything we know is not just wrong—it's backward. When banks make loans, they create money."*

The IMF (Gross and Siebenbrunner, 2019, p.23) substantiates Werner's finding (2014) and concludes that their empirical results *"do not negate the fact that banks create ... money "out of nothing" upon the creation of loans."* (Emphasized)

So, what does the bank do? Hyman Minsky answers; ***"Banking is not money lending: to lend, a money lender must have money. The fundamental banking activity is accepting, that is, guaranteeing that some party is creditworthy"*** (Minsky, 1986, p. 256).

²⁶ The British Broadcasting Corporation, <https://www.bbc.com/>



Note that there is no asset or prior savings involved as mainstreamed in the development theory and academic field based on the investment-savings gap as theorized by many such as from Harrod and Domar to Solow.

Figure 3. Credit Creation (CC) or Endogenous Money (EM)

The CC/EM is irrefutable proof that invalidates the savings-investment gaps theory (from Harrod and Domar to Solow) as the basis for external borrowings and development aid works tenet. The loans are not sourced from rich countries' savings but from poor/developing countries' assets and sovereignty, most notably their Loan Agreements (LAs) or Promissory Notes/Bonds. See also Swanson (2015, on the Nobel Laureate, Angus Deaton)²⁷, and Hickel (2017) who pointedly repugns "[a]id is effectively flowing in reverse. Rich countries aren't developing poor countries; poor countries are developing rich ones."

- **Foreign Currency Borrowing – Never Enters National Economy**

Today's banking practice (CC) suggests that by borrowing money, irrespective of currencies, the borrower is relinquishing its assets, in the form of a loan agreement (LA) or Promissory Note, to the banks that purchase it and in return provide the credit or a promise to pay or 'I owe you' (IOU). In other words, the banks need the borrower more than the opposite. This explains the perpetuation of debt since our economy revolves around a debt-based money system. As a result, Werner (2016a, pp.375-376) argues that there is no need to borrow in foreign currency as the money never enters the national economy. He contends that:

*"In many, if not most cases, the countries would have been better off by **not borrowing from abroad at all. The foreign money never entered their economies:** the accounting reality of international banking shows that US dollars stay in the US banking system, and euros stay in the European banking system. Bank money stays within the respective banking system of the currency of denomination.*

*"In other words, the **dollars** that created the 'Third World Debt' problem **never even entered the borrowing countries.** (Emphasized)*

This was long confirmed by the US central bank, The Federal Reserve Bank (The Fed) since 1961:

*"The key point to remember,... **foreign-related transactions... do not affect money and credit growth in the United States**". (US Central Bank, The Fed: Nichols, 1992, p.28. 1st edition in 1961)*

Amongst researchers whose works are in agreement with Werner (2016a, p.375) that "*foreign loans were not necessary for domestic growth*" are Easterly (2013) and (Fauzi and Ingratubun (2020). The IMF too has concluded similarly. If we treat ADB and World Bank's loans as one form of Foreign Direct Investment (FDI), the IMF (Gelos, Sahay, and Sandleris, 2004)²⁸ resolves that contrary to the theory of sovereign borrowing, FDI does not increase market access (p.23) defined as positive net total flow

²⁷ See footnote 20.

²⁸ Sovereign Borrowing by Developing Countries: What Determines Market Access? -- Prepared by R. Gaston Gelos, Ratna Sahay, and Guido Sandleris -- November 1, 2004 -- IMF Working Paper No. 221.
<https://www.imf.org/external/pubs/ft/wp/2004/wp04221.pdf>

includes a loan to the public sector (p.10). Therefore, sovereign borrowing does not have a significant impact on the national development of the borrowing countries as shown by Werner (2016a).

Cato Journal (Salmon, 2021) reviewed 40 studies published between 2010 and 2020 on the impacts of external debt on borrowers' growth. Their study incorporates datasets on public debt and growth from the World Bank's *World Development Indicators*, the International Monetary Fund's *World Economic Outlook*, the European Commission's annual macroeconomic (AMECO) database and Eurostat database, and the OECD's *Economic Outlook*. Their study was limited to multiple countries (a minimum of seven) as they believed these countries provided more detailed comprehensive information on debt-growth dynamics. Thirty-three of these studies were published in peer-reviewed journals and the remaining were released by renowned financial institutions including the Federal Reserve Bank, the Bank for International Settlements, and the World Bank. They concluded that *"A notable pattern emerges from that research: high levels of public debt have a negative impact on economic growth."* (Salmon, 2021, p. 467) (Emphasized)

4. METHODS

Our analysis adopted a quantitative attribution (% of GDP) technique instead of the direct correlations between the loan nominal values versus Indonesia's development indicators. Attribution allows the oscillating nature of Indonesia's economic engine to reflect the impact of loans on Indonesia's economic development. Whereas, the direct correlations almost always show a positive trend linearly with the increase of the loan amount. This method does not reflect an accurate condition as it ignores the fluctuating nature of Indonesia's economy. Given the banking theories and practices particularly the CC or endogenous money theory, we applied the ADB and World Bank's "signed" Loan Agreement (LA)'s amounts and not the actual disbursement which is less than 10% to 30% because of the money creation (See Figure 2 and 3) and the fact that foreign currency loans never enter the national economy.

4.1 Data

We used transport loans time-series datasets from ADB²⁹ covering 35 projects from 1972 to 2020 totaling about \$3.30 billion and the World Bank transport loans³⁰ comprise 32 projects, totaling \$5.55 billion (1974-2020). We obtained these development indicators from the World Bank's database³¹;

- Expense (% of GDP) (GC.XPN.TOTL.GD.ZS as of 15/09/2021)
- GDP growth (NY.GDP.MKTP.KD.ZG as of 16/12/2021)
- GDP (current US\$) (NY.GDP.MKTP.CD as of 15/9/2021)
- Unemployment per ILO Estimate (SL.UEM.TOTL.ZS as of 16/12/2021)
- Poverty \$1.9 per day (SI.POV.DDAY) as of 16/12/2021)

Poverty data for Indonesia started in 1984 with gaps. We fill these and all other gaps by interpolating or taking them from their neighboring values. All datasets are available online on 5 April 2022.

4.2 The Philosophy of DOA

Attribution in DOA is based on Bank Outlays Growth On-development Results (BOGOR) (Ingratubun, 2020) and is defined as taking a slice, for example—from a loaf of bread (e.g., GDP)—or a drop of blood for testing, in the health sector—of economic development indicators (i.e. preferably current GDP or expenses). We examine their compositions most relevant to the project/program and then assess and understand their outcome apportionments to the source of funding. In this paper, these are the ADB and the World Bank loans (expressed as % of GDP) and the slice implies the percent of

²⁹ Source: <https://data.adb.org/dataset/statement-adbs-sovereign-loans-1968-2017> (11 Dec 2020)

³⁰ Indonesia borrowing, World Bank Group Finances. <https://finances.worldbank.org/Loans-and-Credits/indonesia-borrowing/4rwy-q4ce/data>. 5 Jan 2022.

³¹ Source: World Bank Open Data <https://data.worldbank.org> or <https://data.worldbank.org/topic/economy-and-growth> (11 Dec 2020)

loans disbursement. In the literature, the closest to our definition is provided by Link2007 (2018, p.50) as “(amount of outcome that was caused by the contribution of other organizations or people)”. Using these equations, we derive the attributes (ie., unemployment, growth, and poverty).

$$x_n = (B/p)_n \quad \dots (1)$$

$$\bar{x} = \left(\frac{\sum_1^n f(x_n)}{n} \right) / \bar{p} = \left(\frac{\sum_1^n (B/p)}{n} \right) / \bar{p} \quad \dots (2)$$

where: x_n = Annual (e.g., poverty) attribute; \bar{x} = Overall (poverty) attribute; B = Banks loans; p = poverty; \bar{p} = mean poverty; n = number of years (data)

5. METHODOLOGY

We applied a quantitative attribution method in which we treated a scenario of 100% loan disbursement upon LA signing³² in year 1 as the benchmark. Based on the project's progress S-curve³³, we compared it with progressive disbursement and integrating money creation, their compounded interests, and fees from undisbursed amounts. We triangulated the results from the pilot view, numerical, graphical, and stochastic agent-based modeling (SABM) approaches. We complement this with capital flight analysis based on prevalent banking theories and practices.

5.1 S-Curve Disbursement Profile

Since we could not locate, the World Bank's actual disbursement S-curve profile for Indonesia, we opted to apply the factual disbursement profiles derived from ADB's projects to produce a normalized S-curve profile following the implementation plan with 2-5 years delays (Table-1). We then spread the ADB and World Banks' transport loans into the succeeding 5 and 7 years according to their disbursement profiles per their projected S-curve.

Table 1. Normalized ADB Disbursement S-curve Profiles (2008-2017)

Disbursement	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
Standard (5-year)	13.07%	17.51%	21.36%	25.30%	22.76%	0.00%	0.00%	0.00%	0.00%	0.00%
2-year Delay (7-year)	7.25%	11.69%	15.54%	19.48%	16.94%	16.0%	13.1%	0.00%	0.00%	0.00%
3-year Delay (8-year)	6.08%	10.52%	14.38%	18.31%	15.78%	14.86%	11.90%	8.17%	0.00%	0.00%
5-year Delay (10-year)	5.38%	9.83%	13.68%	17.62%	15.08%	14.17%	11.20%	7.47%	3.46%	2.12%

Source: Processed.

Note: The figures are normalized, per ADB APPR 2019*, Figure 61, pg.41, adjusted with data collected since 2008 and maybe differ when additional data is added.

*ADB 2019 Annual Portfolio Performance Report (APPR) <https://www.adb.org/sites/default/files/institutional-document/603541/appr-2019.pdf> (Accessed 5 Jan 2021)

The pilot's view is part of the exploratory plot. It takes an overall picture covering over 40 years of ADB and World transport loan projects in Indonesia. It uses both simple linear and fractional polynomial regression and 3-dimensional bubble chartings. The numerical method is arranging data in a time series and, following Figure 4, calculating the impacts of delays using 100% disbursement in year-1 as the benchmark. The graphical method involves plotting and interpreting the results from the numerical exercise using equations 1 and 2. Graphical predictions based on fractional polynomial function or any other prediction tools with simple regressions. This process provides a quasi-GPS or a compass for interpreting the data and results. Fractional polynomial (FP) regression is selected as an intermediate between non-linear and polynomial regressions (Royston and Sauerbrei, 2007, p.27) as this presents more accurate results than other regressions judging from their Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC). We use STATA's Twoway graph FP function (fpfit) to plot the regression results.

³² Keeping in mind that a signed LA is a promissory note and within the same day creates new money and generates gains thereupon.

³³ We adopted the normalized S-curve per ADB APPR 2019*, Figure 61, pg.41, adjusted with data collected since 2008 and maybe differ when additional data is added. *ADB 2019 Annual Portfolio Performance Report (APPR). Alternatively, the Roger's learning S-curve profiles as the basis for constructing disbursement profiles. Adopted from *Diffusion of Innovations*, fifth edition by Everett M. Rogers (2003)

Disbursement S-Curve Profile for 5-year Implementation									
Value (\$)		Year-1	Year-2	Year-3	Year-4	Year-5	Total	Total pa - %GDP	Attributor
		13.07%	17.51%	21.36%	25.30%	22.76%			
P1	P\$	D1	D2	D3	D4	D5	Total	GDP (\$) Yx	Growth (G)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)*
Year (Y)		(2x3)	(2x4)	(2x5)	(2x6)	(2x7)	Total	(Annual GDP-\$)	(8/9)/10
Y1	P\$100%	-	-	-	-	-	P\$100%	GDP(\$Y1)	G100%
Y-1	P\$	D1 x P\$					D1P\$	GDP(\$Y1)	GY1
Y-2	P\$		D2 x P\$				D2P\$	GDP(\$Y2)	GY2
Y-3	P\$			D3 x P\$			D3P\$	GDP(\$Y3)	GY3
Y-4	P\$				D4 x P\$		D4P\$	GDP(\$Y4)	GY4
Y-5	P\$					D5 x P\$	D5P\$	GDP(\$Y5)	GY5
							Total D5yr		Average
									G5yr

Note:
 * Average (1969-2017) Growth at 100% disbursement (G100%) = 1.351%
 Applicable with 2-year delays (7-year). Please use S-curve profile for 7-year implementation
 G100% is the benchmark and will be compared with G5yr, G5yrTL2, etc.

Figure 4. Basic Mechanics of the Attribution Method (DOA-BOGOR)

In the SABM, we perform simulations under the stochastic Monte-Carlo method blended with agent-based modeling (ABM) simulation which results are cross-referencing the numerical and graphical outcomes to strengthen the translation of the findings. We applied the Ms-excel *what-if analysis data table* function and treated unemployment, growth, and poverty as three separate agents combined with disbursement on 5% increments (20 agents) and ran them each with 1000 iterations.

For statistical analysis, we perform a Multivariate time-series analysis with Vector Autoregression (VAR) to complete the Granger-Wald causality test. We analyze one- to four-year time-lag as in year five, all variables (except current GDP) become significantly (0.00) granger-causing other parameters. This tells us that in year-5 of delays those transport loans were causing negative impacts on Indonesia. We compare these results with FP regression results adopting 5- and 7-year disbursement delays.

In the financial analysis, we assess a portion of the loans that are disbursed into Indonesia's economy and estimate the capital flights after incorporating money creation based on a signed loan agreement following CC or endogenous money theory. This in-country portion and its impacts are not yet analyzed following the method we elaborate on in our paper as it is beyond our paper's reach.

5.2 Correlation vs Causation

One of the generic issues in development aid studies is the conundrum in presenting the correlation and causation of aid impacts. Although researchers commonly used the Granger causality Wald test to show causality, the results have not been convincing enough. This is an ongoing struggle due to the nature of the aid intervention cannot be separated from other funding sources and the supporting infrastructure. For example, the construction of secondary schools. Even if the funding is 100% from aid, the donors and recipient governments will struggle to claim any success in fully attributing their aid fund. This is because, successful construction cannot be separated from good roads, bridges, drainage, water supply, logistics supply chain, availability of skilled labor and building materials, safety, and security to name a few, all of which were funded by other sources. To bridge this issue, we offer our attribution quantitative-comparative triangulation methodology with clear correlation and causation relationships. We use the correlation based on 100% disbursement in year-1 after the LA is signed, as the baseline for drawing the causal connection as a result of disbursement delays while assuming that 100% of the loan amounts are outlaid in the country. Despite this, in reality, less than 10% of Indonesia's total foreign currency loans enter Indonesia's economy (Bank Indonesia, 2022, processed) or about 30% of the total aid funds (OECD, 2022, processed).

Caveat: In our presentation of the results, we show the correlations of ADB and World Bank loans in general—as if they were disbursed 100% in year-1 into Indonesia's economy as the baseline. In

reality, only about 10% of Indonesia's total foreign currency loans are disbursed into Indonesia's economy after being converted into Rupiah (Bank Indonesia, 2022, processed). On the other hand, we exhibit departure from this baseline as the causation effect because of disbursement delays between 5- and 7-years.

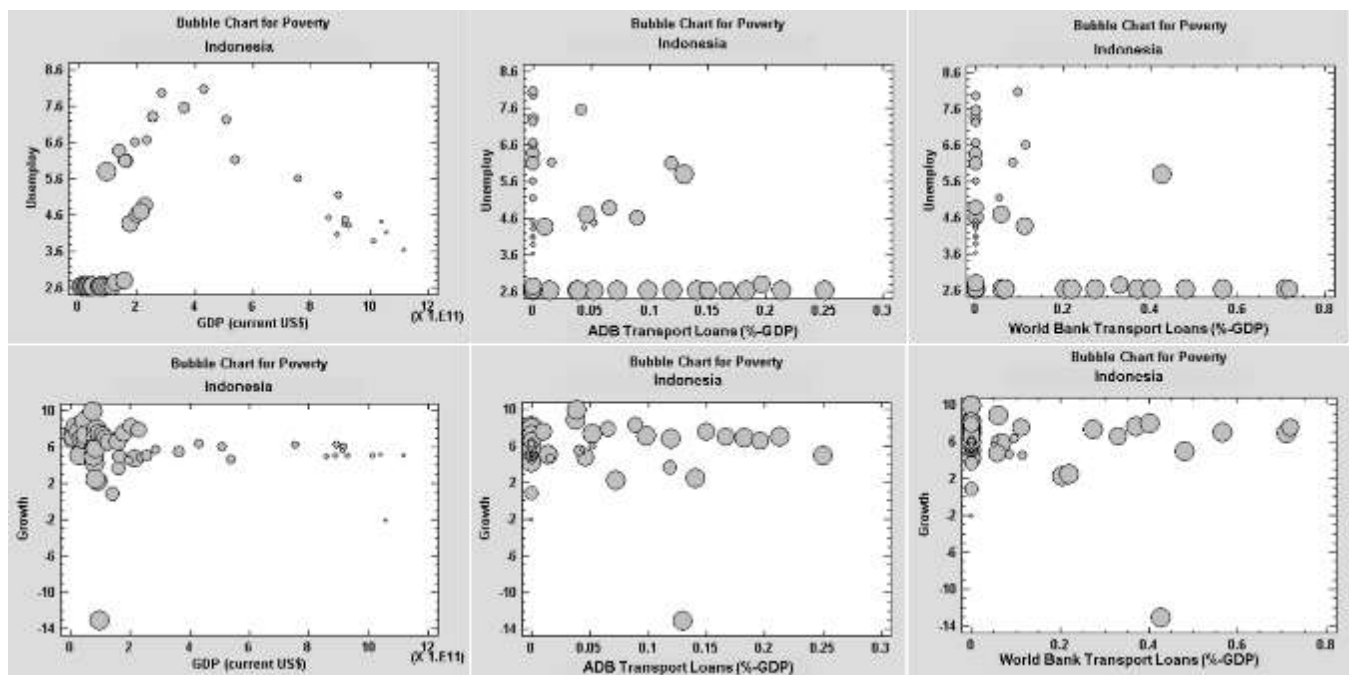
6. FINDING AND ANALYSIS

Pilot View

Figures-5 and -6, show the exploratory plots. From them, we could now anticipate the results from the other methods.

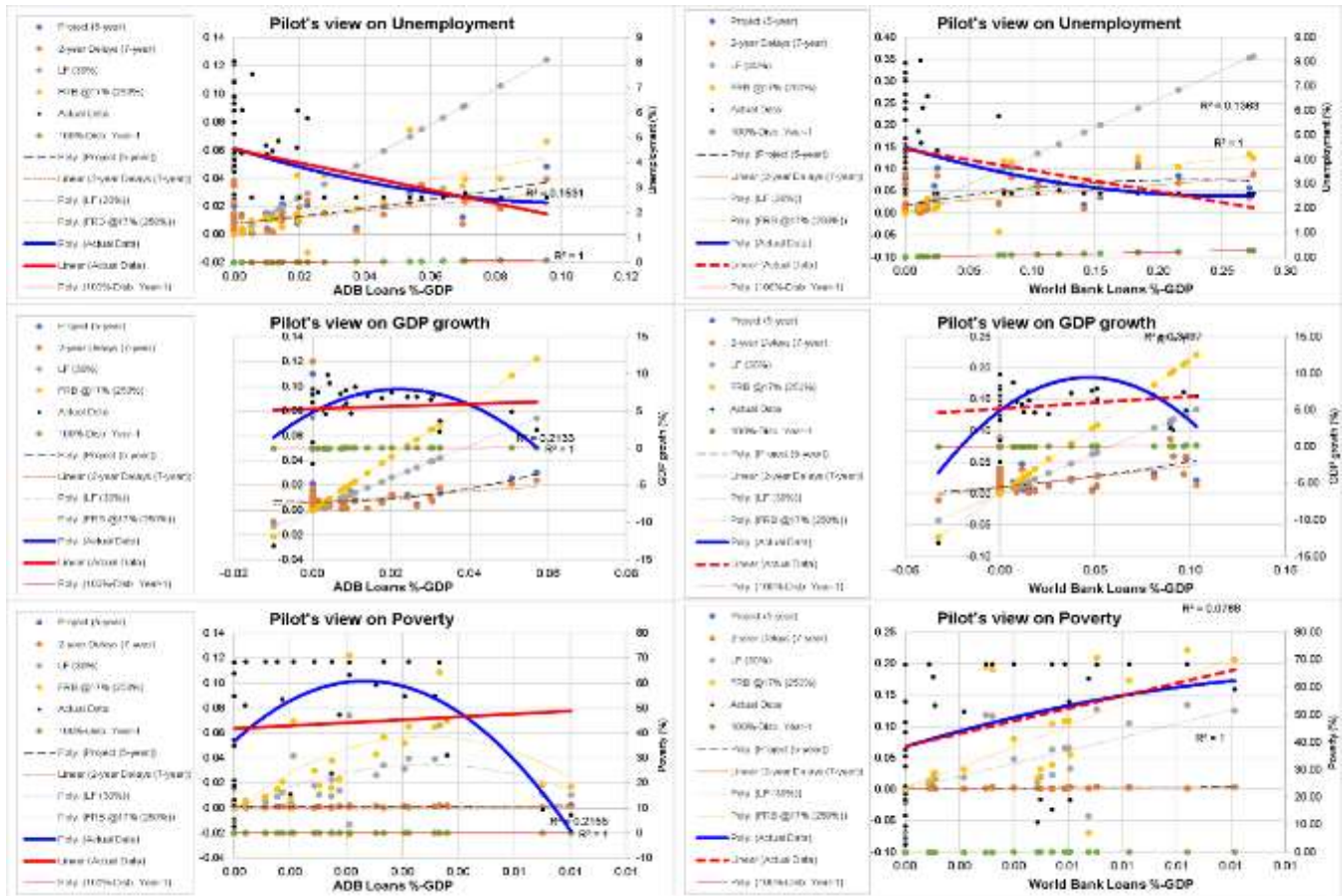
In Figure-5, the bubble size represents the level of poverty correlating with unemployment and growth. The figures display an early warning that both ADB and World Bank transport loan projects are not effective in reducing poverty irrespective of the increase in growth and reduction in unemployment. The left chart is Indonesia's national performance and the middle and right charts represent ADB and World Bank's transport loan projects performance respectively.

Figure-6, on growth and poverty, tells us that we need to be careful when selecting the regression method as two conflicting possibilities exist namely uptrend in linear regression versus up-and-downtrend following second-order polynomial regression. For unemployment, we can be sure that the ADB and World Bank transport loans project has positive impacts on creating jobs. Let us now see the FP regression results based on 100% loan fund disbursement into Indonesia's economy in the same year the loan agreement was signed.



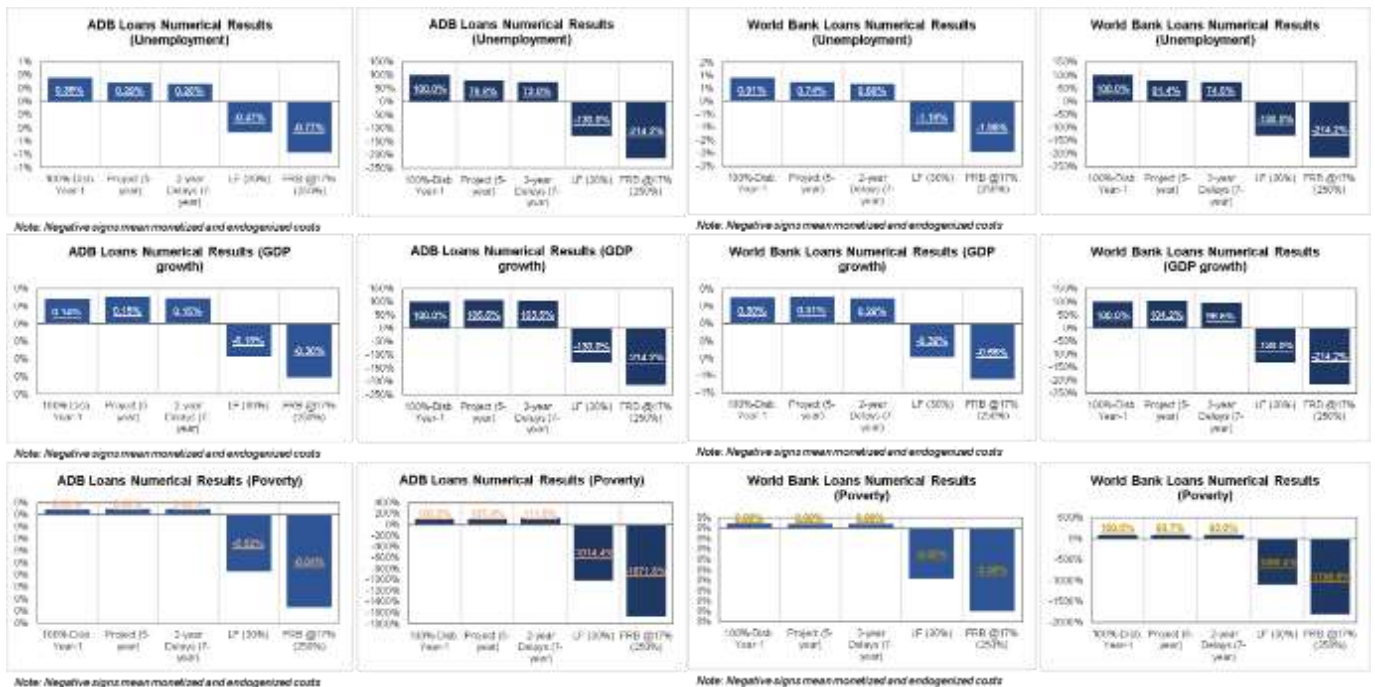
Note: These charts were plotted with the assumption that 100% disbursement in the same year the loan agreements were signed and into Indonesia's economy

Figure 5. Poverty Bubble Chart – Indonesia Transport Loans Project



Note: These charts were plotted with the assumption that 100% disbursement in the same year the loan agreements were signed and into Indonesia's economy. Likewise, 100% disbursement into Indonesia during 5- and 7-year delays.

Figure 6. Pilot View – Indonesia Transport Loans Project



Note: These charts were plotted with the assumption that 100% disbursement in the same year the loan agreements were signed and into Indonesia's economy. Likewise, 100% disbursement into Indonesia during 5- and 7-year delays.

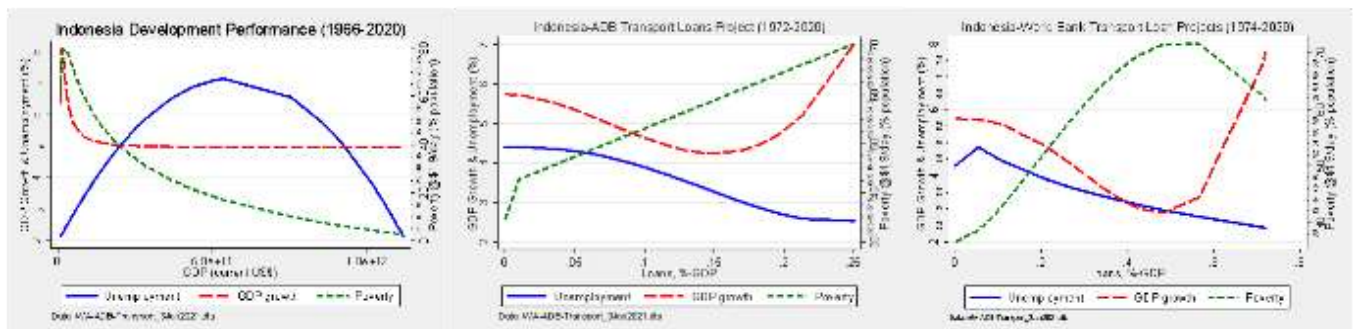
Figure 7. Numerical Results – Indonesia Transport Loans Project

Numerical

The values exhibited in Figure-7, tell us that ADB and World Bank's transport loan disbursement behave differently in affecting Indonesia's development indicators. For example, despite both loans reduced effectiveness in job creation from 100% to over 70% as a result of 5 & 7-year disbursement delays, their effectiveness in promoting growth, notwithstanding delays, is increased by about 3%. The same with poverty is elevated by 1.4%. After cross-checking this with the graphical results, we assumed that the positive values correlated with the early dips and peaks represented 5- & 7-year delays. These values, together with the Pilot View's chart, serve as an early warning to be careful when analyzing disbursement delays.

Graphical

In Figure-8, we observe that both ADB and World Bank (middle and right figures) transport loan projects have no impact on reducing poverty. As the loan size increases so does poverty despite at the national level (left figure) is constantly declining. In other words, Indonesia is better off without ADB and World Bank transport loans if poverty reduction is the target. This evidence raises a question about the ADB and World Bank's genuine mission for poverty reduction. For job creation thus reducing unemployment, both ADB and World Bank projects demonstrate positive results. This means, more loans correlate with job creation.



Note: These charts were plotted with the assumption that 100% disbursement in the same year the loan agreements were signed and into Indonesia's economy. Likewise, 100% disbursement into Indonesia during 5- and 7-year delays.

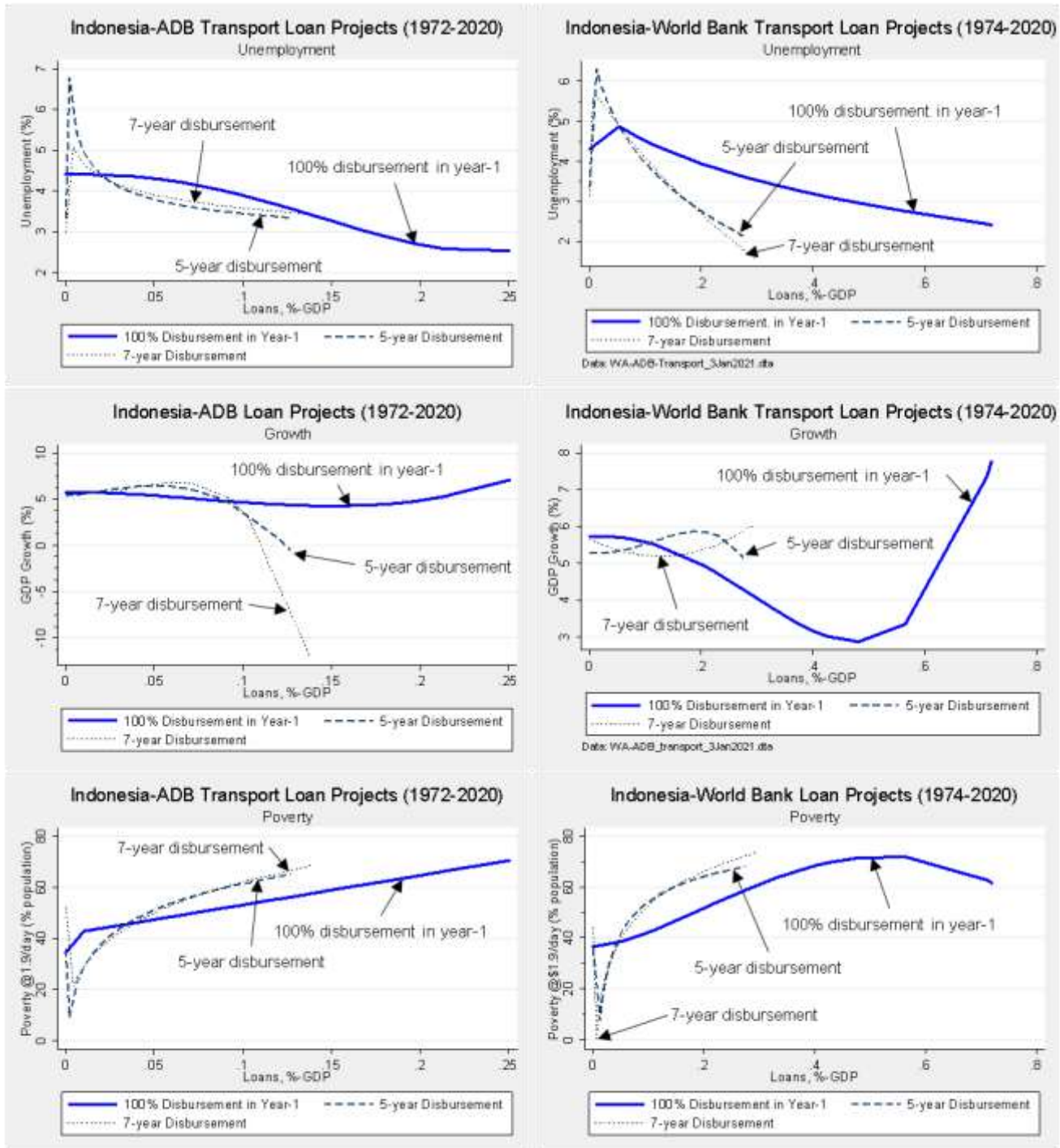
Figure 8. Indonesia National Development and Transport Loans Project

From the same Figure-8, we discover that both ADB and World Bank transport loan projects have the potential to promote growth starting at 0.15%-GDP and 0.5%-GDP respectively. However, before reaching these points, both pull growth from around 6% down to 4.5% and 4% correspondingly. Keeping the caveat in mind, the question is, at which point (%-GDP) these loans are maintained on an annual level? The answer to this might open another dimension that is beyond the spectrum of our paper. For example, is the ceiling of Indonesia's transport loans borrowing from ADB and World Bank maintained at below 0.15%- and 0.5%-GDP respectively, or above? If below, then the impact is negative as they both pull growth down. On the contrary, if beyond, growth is induced by both banks' loans. This raises a tickling question; **who truly maintains or influences Indonesia's borrowing policy ceiling?**

On a positive note, keeping the caveat in mind, both ADB and WB transport loan projects exhibit constant positive results in creating jobs thus reducing unemployment. But, strangely significantly increasing poverty.

Figure-9, tells a holistic story about the effectiveness of ADB and World Bank transport loan projects and their progressive disbursement delays impacts. Both banks' loans appear effective in creating jobs, thus reducing unemployment. The growth is significantly affected by disbursement delays. The ADB loans pull growth into negative while the World Bank's loans juggle growth up and down. Combined, they show a reduction in growth by about 200% which is more than 67% (Aldashev and Verardi, 2012:3-4).

Correlations can be seen from the 100% disbursement in year-1 as the benchmark and causation from the departure from this point because of 5- and 7-year disbursement delays. In Figure-9, we resolve the enigma in aid M&E relating to correlations versus causation.



Note: These figures were charted using the STATA Fractional Polynomial Chart function. These charts were plotted with the assumption that 100% disbursement in the same year the loan agreements were signed and into Indonesia's economy. Likewise, 100% disbursement into Indonesia during 5- and 7-year delays. In reality, only about 10% enter Indonesia's economy.

Figure 9. Graphical Results – Indonesia Transport Loans Project

Stochastic Agent-Based Modeling and Monte Carlo Simulation (SABM)

Spearman Correlation

Spearman's correlation test result (Table-2) suggests that unemployment is negatively correlated significantly with Growth, Poverty, WTr_5yr, WTr_7yr, and positively significant with GDP (cur.US\$). This means unemployment is reduced by 42% as growth progresses but poverty is increased by 73%, and by about 40% as World Bank's and 30% by ADB's transport loan disbursement are being five and seven-year delayed. Strangely, as GDP increases, so does unemployment by 72%. Growth is negatively significantly correlated with unemployment, and positively with poverty and GDP. This signifies, that as growth advances, both unemployment and GDP (cur.US\$) decline by about 42% however, poverty elevates by 45%. Poverty is over 70% significantly negative correlated with unemployment and GDP (cur.US\$) and about 35% positively with both ADB and World Bank 100% disbursement in year-1, 5-year delays, and World Bank's 7-year delays. So, Spearman's correlation shows that both ADB and World Bank's loan disbursement have a significantly positive correlation with Indonesia's fight for poverty reduction. This means, that more loans correlate with more poverty. As the loan fund is being delayed by ADB and World Bank, poverty increases by 35%. The longer the delays, the more poverty increases.

Table 2. Spearman Correlation Test Result

Spearman's Correlations with P-values below 0.05 (95% confidence level)

Indicator	Correlators									
	Unemploy	Growth	Poverty	WTr100%	WTr_5yr	WTr_7yr	ATr100%	ATr_5yr	ATr_7yr	GDP (cur.US\$)
Unemploy		-0.4244	-0.734	-0.2268	-0.3856	-0.3469	-0.2507	-0.2226	-0.1095	0.717
		0.0024	0	0.1053	0.0059	0.0132	0.0734	0.1119	0.4343	0
Growth	-0.4244		0.4465	0.0643	0.0763	0.0464	0.0964	-0.0019	-0.096	-0.4165
	0.0024		0.0014	0.646	0.5858	0.7401	0.4911	0.989	0.4929	0.0029
Poverty	-0.734	0.4465		0.3411	0.4668	0.415	0.3377	0.3133	0.2076	-0.9624
	0	0.0014		0.0149	0.0009	0.003	0.0159	0.0253	0.1382	0

Note:

wtr100 = World Bank total transport loans at 100% disbursement
wtr_5yr = World Bank total transport loans with 5-year disbursement
wtr_7yr = World Bank total transport loans with 7-year disbursement
atr100 = ADB total transport loans at 100% disbursement
atr_5yr = ADB total transport loans with 5-year disbursement
GDP (current US\$) = Indonesia GDP (current) in US Dollar

Granger Causality Test

The test result is presented in Table-3 from which we learned that starting at a time lag (TL) of 1 year, both unemployment and poverty are significantly Granger caused by other parameters, most importantly disbursement delays of both ADB at 100% disbursement in year-1 and Word Bank's 5-year disbursement. The pattern continues as TL progresses from 2- to 4-year with more parameters that are granger causing unemployment, growth, poverty, and current GDP. When TL reaches 5-year, all parameters, except for current GDP, are granger causing the three development indicators. This evidences that the longer the disbursement delays, the more they cause unemployment, growth, and poverty.

Table 3. Granger Causality Test Results

Granger Causality Wald Tests (@5% significant level)

Development Indicator	Time Lag											
	1-year			2-year					3-year			
unemploy	poverty	wtr_5yr	atr100	growth	poverty	wtr_5yr			growth	poverty	atr100	atr_5yr
growth				unemploy	poverty	wtr_5yr	wtr_7yr	atr_5yr	unemploy	poverty	wtr_5yr	wtr_7yr
poverty	growth			atr_7yr					growth	wtr_5yr	wtr_7yr	atr_7yr
gdpcurrentus				poverty	atr_7yr				unemploy	poverty	atr_7yr	

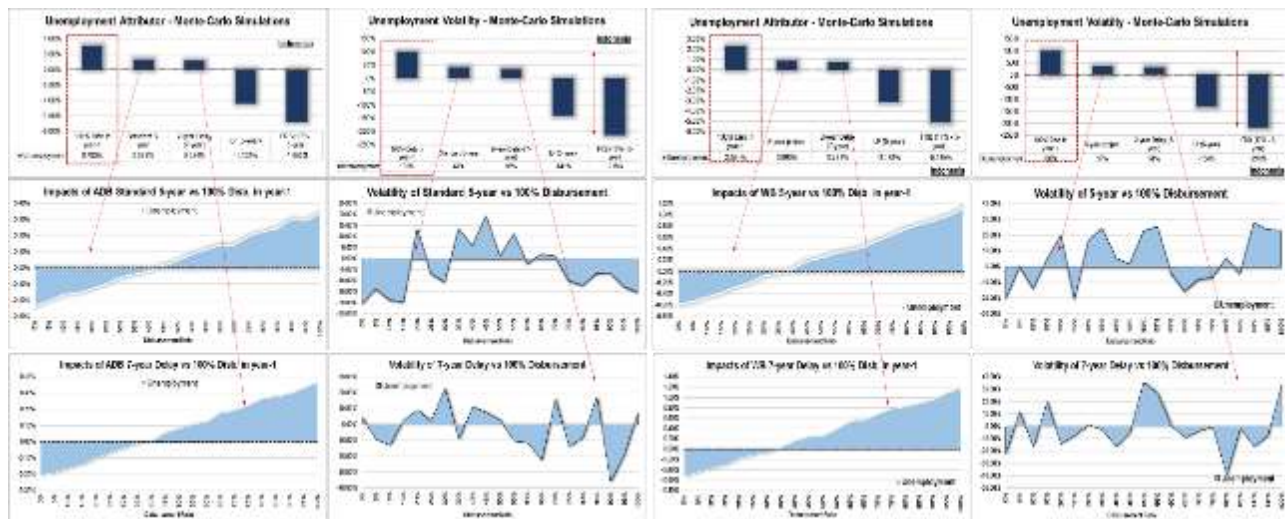
Development Indicator	Time Lag							
	4-year							
unemploy	growth	poverty	atr100	atr_5yr	atr_7yr			
growth	unemploy	poverty	wtr_5yr	wtr_7yr	atr100	atr_5yr	atr_7yr	
poverty	unemploy	growth	wtr100	wtr_5yr	wtr_7yr	atr100	atr_5yr	atr_7yr
gdpcurrentus	unemploy	poverty	atr_5yr					

Note:

wtr100 = World Bank total transport loans at 100% disbursement
wtr_5yr = World Bank total transport loans with 5-year disbursement
wtr_7yr = World Bank total transport loans with 7-year disbursement
atr100 = ADB total transport loans at 100% disbursement
atr_5yr = ADB total transport loans with 5-year disbursement
atr_7yr = ADB total transport loans with 7-year disbursement

From Figure-10, we understand three important messages namely;

1. Assuming 100% disbursement into Indonesia's economy, both ADB and World Bank transport loan projects because of disbursement delays are only approximately 40% effective in creating jobs, promoting growth, and reducing poverty. With only 10% disbursed into Indonesia, this yields, only 4% effectiveness.
2. Because of the fluctuating nature of Indonesia's economic engine, disbursement delays have oscillating effects per their disbursement amount. For example. At close to 100% disbursement, unemployment under 5- and 7-year delays exhibit a negative impact for ADB loans whereas positive for the World Bank. Likewise, for poverty, both banks at 5-year disbursement delays present negative effects whilst negative for ADB and positive for the World Bank at 7-year delays.
3. Because of the fluctuating nature of Indonesia's economic engine, it is critical to have 100% disbursement in year-1. This prevents Indonesia from experiencing a roller coaster ride due to disbursement delays.



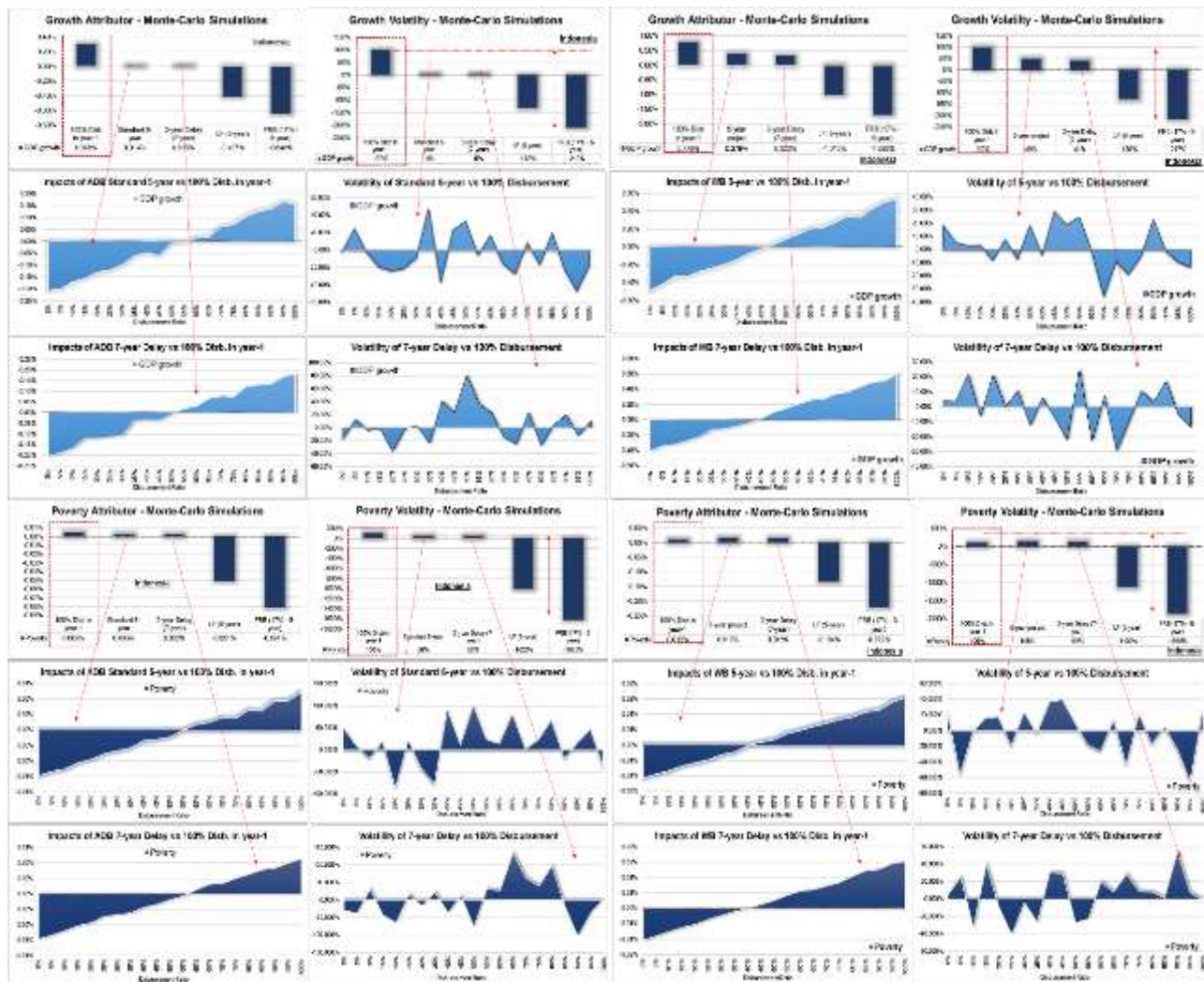


Figure 10. Stochastic Agent-Based Modeling (SABM) Results

Caveat: The results presented in the foregoing sections depicted in all graphs are with the assumption that the loans are disbursed 100% into Indonesia's economy. In reality, only about 10% of Indonesia's total foreign currency loans are disbursed into Indonesia's economy after being converted into Rupiah (Bank Indonesia, 2022, processed).

Capital Flights

Assuming a loan-to-value (LTV) for collateral is 70%, this yields 1.43x of the loans. We estimate a capital flight, defined as those generated from the signed loan agreement including all profits thereof but not benefiting Indonesia, of over \$12 (FRB) per \$1 loan. This comes from 60% in-country disbursement thus 40% is disbursed internationally. Assuming both ADB and the World Bank required more than 1.43x (See Table-4 note 3) collateral, say 5x, this yields $5/1.43 \times \$12 = \42 per \$1 loan. In other words 4200% leakage for each \$1 loan. This corresponds to \$24 (Hickel, 2017), \$25 (Powell, 2009), and \$30 (Hickel, 2022, all with different methods than ours). The problem does not stop here as shown by Sogge (2017, citing Ndikumana and Boyce (2011) and van Bergeijk (2010)) that approximately 60 percent of the funds disbursed in the national economy quickly go out to the recipient country through a revolving door. The total is comparable with a minimum of 50%-300%. The money creation under FRB and CC has not been incorporated, which could be well over 3000%. A vestigial capital flight estimate is presented in Table-4.

Since it is beyond the reach of our paper, we have not endogenized and attributed those capital flights to Indonesia following the DOA exercises elaborated above. In the numerical results (also in SABM bar charts) we briefly exhibited the endogenized capital flights under LF and FRB with negative values as a reminder. To analyze the impacts of which under DOA, requires a separate study. At large,

with ADB's average transport loans to Indonesia (1972-2020) of 0.05% of GDP, and the World Bank (1974-2020) of 0.11% of GDP, if these were endogenized, with Indonesia's average expenses (1966-2020) of 13.07% of GDP (World Bank data), we estimated an increase in the government expenses (GC.XPN.TOTL.GD.ZS) of 1.22% ($13.07 + (0.05 + 0.11)$). This correlates with an average 9.37% increase in GDP. This is about \$100 billion more than Indonesia's 2020 current GDP. Referencing this with Table-2 (Spearman correlation), we can anticipate positive and negative changes in Indonesia's unemployment, growth, and poverty. However, since they were not endogenized, we contend this (9.37% of GDP) is a capital flight.

7. RESULTS AND DISCUSSION

Our findings from four different exercises, show the positive and negative impacts of ADB and World Bank transport loans in foreign currency (US\$) on Indonesia's economy. We may recall that not a penny of any foreign currency loans is entering Indonesia's economy ((US Central Bank, The Federal Reserve Bank (The Fed)) Nichols & Gonczy, 1992, pp. 28–23; Ryan-collins et al., 2011, pp. 191–192; Werner, 2016a, pp. 375–376) except those converted into Rupiah. Despite some positive contributions such as the creation of more jobs and thus unemployment reduction, by and large, the negative impacts outweigh them. These are promotions but then demotions of growth, even into negative growth by ADB loans. Additionally, poverty in all cases has significantly increased despite more jobs being created. Our findings also confirm the conclusion reached by the IMF (Gelos et al., 2004) and Bermejo Carbonell & Werner (2018) that foreign currency borrowing and/or foreign direct investment do not contribute to the borrowers' economic growth

This not only confirms our hypothesis but also the true motive of disbursement delays as a money control mechanism for more poverty, unemployment, and prolongation of slavery (Pettigrew, 1921, pp. 50–51; Heath, 1987, pp. 3–4; Faulkner & Hudson, 2019) through exploitation by extractive institutions (Acemoglu et al., 2001, p. 9 (citing Gann and Duignan (1979, p. 30)). In our view, this is unjust and unsustainable.

Table-5 presents the graphical (FP regression) results summary which in our view is more accurate than numerical and SABM. We provide the summary of the triangulated results combining both ADB and World Bank's transport loans in Table-6.

Based on our results, we view that the loan-financed transport projects can by no means be considered sustainable transport projects as their financing sources in the form of foreign currency, firstly, never entering the economy of the borrower. Secondly, when the fund enters the borrower's banking systems, they must be converted into Rupiah, the national currency, and this makes Indonesia becoming the lender of Rupiah to the ADB and World Bank. Thirdly, because of disbursement delay practices adopted by the ADB and World Bank, our empirical results show that there are more negative impacts than positive as most of their published reports' narrative described.

7.1 Implications

We understand that our study has two implications namely;

1. The theory and policy from Harrod and Domar to Solow, on the need for external borrowing in foreign currency for national development financing to fill the gaps of investment vs savings, require to be revisited given ample contradictory evidence not only exhibited by our study but also by others, such as Werner (2014, 2015, 2016a) and Hudson (2019). Particularly since myriad, if not all, of development literature, failed to incorporate the role of banking and money as capital in their analysis. Thus, making their analysis to be faulty (Bermejo Carbonell & Werner, 2018, p. 431)
2. Given the first empirical test on how banking in practice functions in terms of money creation, Indonesia's development planners and policymakers are required to grasp the self-sufficient concept as expressed by Keynes (1933, p.756), *"above all, let finance be primarily national"* to minimize exchange risks and capital flights.

Table 4. Capital Flights Estimate

Indonesia In-country Disbursement vs Capital Flight (Estimated using \$1 hypothetical loan)												
		In-country Disbursement - Loanable Fund (LF) (FIB)										
	Endogenized Capitals per Dollar*	Loan Amount (%)	40%	50%	60%	70%	75%	80%	85%	90%	95%	100%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	See Note	1/(1)	A = (2)x(3 ... 12)									
Plan (5-year Disbursement)	1.28	78.12%	31.25%	39.06%	46.87%	54.68%	58.59%	62.50%	66.40%	70.31%	74.21%	78.12%
1-3-year Delays (6 to 8-year)	1.48	67.36%	26.94%	33.68%	40.42%	47.15%	50.52%	53.89%	57.26%	60.63%	63.99%	67.36%
5-year Delays (10-year)	1.64	61.03%	24.41%	30.51%	36.62%	42.72%	45.77%	48.82%	51.87%	54.92%	57.98%	61.03%
In-country Disbursement - Fractional Reserve Banking (FRB)												
5 years	12.80	7.81%	3.12%	3.91%	4.69%	5.47%	5.86%	6.25%	6.64%	7.03%	7.42%	7.81%
		Percent (%) Capital Flight Per \$1 Indonesia - Loans (LF)										
	Endogenized Capitals per Dollar*	Actual Loan	40%	50%	60%	70%	75%	80%	85%	90%	95%	100%
			B = 1 - A									
Plan (5-year Disbursement)	1.28	\$ 1.00	68.75%	60.94%	53.13%	45.32%	41.41%	37.50%	33.60%	29.69%	25.79%	21.88%
1-3-year Delays (6 to 8-year)	1.48	\$ 1.00	73.06%	66.32%	59.58%	52.85%	49.48%	46.11%	42.74%	39.37%	36.01%	32.64%
5-year Delays (10-year)	1.64	\$ 1.00	75.59%	69.49%	63.38%	57.28%	54.23%	51.18%	48.13%	45.08%	42.02%	38.97%
Percent (%) Capital Flight Per \$1 Indonesia - Loans (FRB & CC/EM)												
5 years	12.80	\$ 1.00	96.88%	96.09%	95.31%	94.53%	94.14%	93.75%	93.36%	92.97%	92.58%	92.19%
		Capital Flight Per \$1 Indonesia - Loans (LF) (FIB)										
			C = (1) x B									
Plan (5-year Disbursement)	1.28	\$ 1.00	\$ 0.88	\$ 0.78	\$ 0.68	\$ 0.58	\$ 0.53	\$ 0.48	\$ 0.43	\$ 0.38	\$ 0.33	\$ 0.28
1-3-year Delays (6 to 8-year)	1.48	\$ 1.00	\$ 1.08	\$ 0.98	\$ 0.88	\$ 0.78	\$ 0.73	\$ 0.68	\$ 0.63	\$ 0.58	\$ 0.53	\$ 0.48
5-year Delays (10-year)	1.64	\$ 1.00	\$ 1.24	\$ 1.14	\$ 1.04	\$ 0.94	\$ 0.89	\$ 0.84	\$ 0.79	\$ 0.74	\$ 0.69	\$ 0.64
Capital Flight Per \$1 Indonesia - Loans (FRB & CC/EM)												
5 years	12.80	\$ 1.00	\$ 12.40	\$ 12.30	\$ 12.20	\$ 12.10	\$ 12.05	\$ 12.00	\$ 11.95	\$ 11.90	\$ 11.85	\$ 11.80

Source: Processed. *These values derived from \$1 investment with 5% interest per annum for 5 -8 year. The FRB was calculated with 10% bank reserve requirement for 5-year. The values will be bigger for investment longer than 5-year. Note:

- Values in columns (1) were obtained using an average ADB's loan interest rates to Indonesia since 1969 of 4.74% (~ 5%) per annum. We adopted the formula $P(1 + r/n)^{nt}$, where P is the loan principal, r is the interest rate, n is the number of times interest is compounded, and t is the duration.
- The estimate is rudimentary nonetheless serves its purpose. A more detailed estimation incorporating banking theories and practices and foreign currency transactions, is beyond the scope of this paper.
- Estimated between 40%-70% of the loan amounts are disbursed in-country. Literature shows that 50% to 60% of these amount leave the country through revolving door including for payment of goods and services. Per Bank Indonesia's data (2022) only less than 10% of the total foreign currency loans are disbursed into Indonesia's economy.
- The estimate was based on commercial banking practices with loan-to-value (LTV) of 70% of the collateral. This gives 1.43 times of the loan value. Assuming ADB and World Bank's require more than 1.43 times collateral (in-cash, in-kind, quasi-cash, legal provisions and sovereignty pledging), 5x, this yields 5/1.43 multiplier. Thus, capital flight of \$12.40 (FRB) from commercial banking, is equivalent to 3.5 (or 5/1.43) x \$12.40 = \$42 per \$1 loan
- The calculation assumes that Credit Creation (CC) or Endogenous Money (EM) generates the same amount of credit money as the FRB. In reality this could be more or less, depending upon the number of contracts and/or sub-contracts awarded.

Table 5. Graphical Results Summary

	ADB					World Bank				
	From	To	Gap	Share	Remark	From	To	Gap	Share	Remark
Unemployment	4.50	2.50	2.00	55.56%	Reduction	4.50	2.50	2.00	55.56%	Reduction
5-year	4.00	3.30	0.70	82.50%	Reduction	2.50	2.20	0.30	88.00%	Reduction
7-year	4.00	3.50	0.50	87.50%	Reduction	3.00	1.50	1.50	50.00%	Reduction
Growth	5.50	7.50	-2.00	136.36%	Increase	5.70	8.00	-2.30	140.35%	Increase
5-year	5.50	-1.00	6.50	-18.18%	Reduction	5.30	5.10	0.20	96.23%	Reduction
7-year	5.50	-11.00	16.50	-200.00%	Reduction	5.70	6.00	-0.30	105.26%	Increase
Poverty	35.00	70.00	-35.00	200.00%	Increase	37.00	60.00	-23.00	162.16%	Increase
5-year	20.00	65.00	-45.00	325.00%	Increase	30.00	65.00	-35.00	216.67%	Increase
7-year	30.00	70.00	-40.00	233.33%	Increase	35.00	75.00	-40.00	214.29%	Increase

Table 6. Triangulated Effectiveness and Impacts of ADB & World Bank Transport Loans

	Pilot View	Numerical	Graphical	SABM	Financial—Capital Flights (Leakages)
Unemployment	Decrease	Decrease	Increase- Decrease	Increase- Decrease	A minimum of \$12 per \$1 loan is fleeing Indonesia's economy. Our estimate suggests more than \$42 per \$1 loan.
GDP Growth	Increase- Decrease	Increase Decrease	Increase- Decrease	Increase- Decrease	
Poverty	Increase	Increase	Increase	Increase- Decrease	
Triangulation					To mitigate this, 100% disbursement in year-1 upon loan agreement signing into Indonesia's economy and in Rupiah currency is unavoidable.
Unemployment	Decrease	Decrease, 70% effective	70% decrease	Decrease, 60% effective	
GDP Growth	Decrease	Decrease, 90% effective	200% Decrease	Decrease, 40% effective	
Poverty	Increase	Increase, 100% effective	220% Increase	Increase, 190% effective	

Note: This is a combined triangulation of ADB and World Bank's loans with the assumption that 100% disbursement in the same year the loan agreements were signed, including the 5- and 7-year disbursement delays, and into Indonesia's economy.

8. CONCLUSION

1. The mainstream investment-savings gaps theory as the basis for foreign currency borrowing is incorrect. The propagation of which prolongs and sustains poverty instead of alleviating it.
2. As with all foreign currency loans—even after they were converted into Rupiah, the bulk of these loans (70% to 90%)—never enter Indonesia's economy, these loans are detrimental not only to growth and poverty reduction efforts but also to the national wealth formations because of leakages in the form of capital flights. Let alone the sovereignty of Indonesia.
3. For Indonesia's transport development, upgrading, and maintenance program, which in our view requires over 90% of domestically available materials and resources, it is in Indonesia's best interest not to borrow externally. Keynes (1933, p.756) contends; *"above all, let finance be primarily national"*. To comprehend this, an understanding of how banking in practice works, particularly the endogenous money theory, is critical.

9. RECOMMENDATION

Given the importance of transport development financing, development outcome attribution (DOA) is recommended to be incorporated in their assessment and evaluation.

To mitigate further capital flights from Indonesia's transport loans from the ADB and World Bank, we recommend the GOI request immediate full disbursement of its ongoing loans in Rupiah. More importantly, reduce or limit foreign currency lending for import-related goods and services only if their payment terms in local currency cannot be negotiated.

National self-sufficiency, in short, though it costs something, may be becoming a luxury which we can afford, if we happen to want it. –John Maynard Keynes (1933), "National Self-Sufficiency"

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22 Connection between Agriculture, Landscape Carrying Capacity and Climate Change in the Danube-Tisza Interfluve, Hungary

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Abstract

This study examines the landscape carrying capacity of the Danube-Tisza Interfluve (referred to as "Homokhátság"). Environmental, agricultural, and economic data at a 5x5 km resolution were examined to investigate agricultural landscape utilization. The analysis primarily entails evaluating the possible overutilization of the natural resources of Homokhátság by agricultural production. The findings highlight areas within the Homokhátság region where agricultural practices, such as arable farming, orchards, vineyards, and intensive livestock farming, exert heightened pressure on the landscape. The study concludes that considering climate change, a fundamental transformation of land use and agricultural practices is necessary in the region to stop landscape degradation. Sustainable agricultural production requires focusing on low-impact and low-resource agriculture and water management, particularly water retention within the landscape. Moreover, it suggests that certain areas within the Homokhátság region may need to be either abandoned or subjected to transformations to double or triple utilization, such as silvopasture or agro-photovoltaics.

Keywords

agriculture; climate change; Hungary; landscape carrying capacity; landscape suitability; land use

JEL Classification

Q15

1. INTRODUCTION, RESEARCH FRAMEWORK

In recent decades, global agricultural production has become more and more intensive, increasing the use of resources and strengthening exposure to the effects of climate change. Hungary's Danube-Tisza Interfluve (Homokhátság) region is also affected by these processes, with severe drought and soil erosion, making it extremely sensitive to climate change. Therefore, it is crucial to develop sustainable land practices to secure the region's environmental, economic, and social well-being. Our study focuses on assessing the agricultural production's sustainability in the Homokhátság, analyzing various indicators to identify landscape overuse and its factors and drivers. Finally, we aim to provide recommendations for long-term sustainability in the Homokhátság region and geographically similar areas.

The relationship between agriculture and landscape carrying capacity has long been studied. Sustainability, mainly through multifunctional agricultural models, has been a focus of the Common Agricultural Policy of the European Union since the 1990s (Podmaniczky et al., 2007). In Hungary, Ángyán (2003) proposed landscape management zones tailored to local characteristics to guide appropriate and sustainable land use changes, a concept we apply in our assessment of the Homokhátság's agricultural production.

Studies exploring the ecological connection between agriculture and landscape carrying capacity often focus on environmental vulnerability (Barczi et al., 2008; Ángyán et al., 2003), which initially garnered attention in arid and semi-arid regions. In these areas, the scarcity or absence of water resources significantly influences agricultural production, such as in the Homokhátság, officially designated as a semi-arid region by the United Nations Food and Agriculture Organization (FAO).

In addition to water, soil characteristics, and degradation processes, such as wind erosion, are critical factors affecting landscape sustainability. Various soil degradation processes affect about 30% of arable land globally, causing reduced or completely depleted fertility. Wind erosion is one of the most critical factors in soil degradation in the Danube-Tisza Interfluve, characterized by loose, sandy soils.

2. MATERIALS AND METHODS

During the analysis, CORINE Land Cover – CLC (2018), Sentinel satellite data (2021-2023), agricultural census data from the Hungarian Central Statistical Office's (HCSO) TÍMEA database, agro-topographical data, and climate data were utilized. A uniform 5x5 km grid evaluation was employed, with data provided by HCSO TÍMEA. The analyses were conducted using the QGIS program.

The assessment of land use intensity followed the methodology outlined by Gardi et al. (2010), calculating the proportion of intensive production within agricultural areas (CLC category 2) through vineyards, orchards and berry plantations, rice fields CLC categories, and the ratio of animal population expressed in livestock units to their required area. The qualitative and quantitative intensity of large-scale arable cultivation was evaluated by the product of the total productivity over five years (2018-2022) – CLC 211: non-irrigated arable land – and the area of arable land. The soil value index, a composite indicator incorporating various soil properties, was determined as the average value within each grid cell. Our focus on the Homokhátság region aimed to uncover the spatial extent of bare soil areas. The indicator we have developed shows the extent of the occurrence of bare soil for at least six months in two of the years 2021-2022-2023. The results were derived from statistical analysis of NDVI data obtained from Sentinel satellite imagery during vegetation and dormant periods. The vulnerability arising from climatic change was evaluated through the normalized aggregation of changes in the number of heat days, >20 mm rainy days, and the Pálfi index based on multi-year averages (1971-2000; 2036-2045).

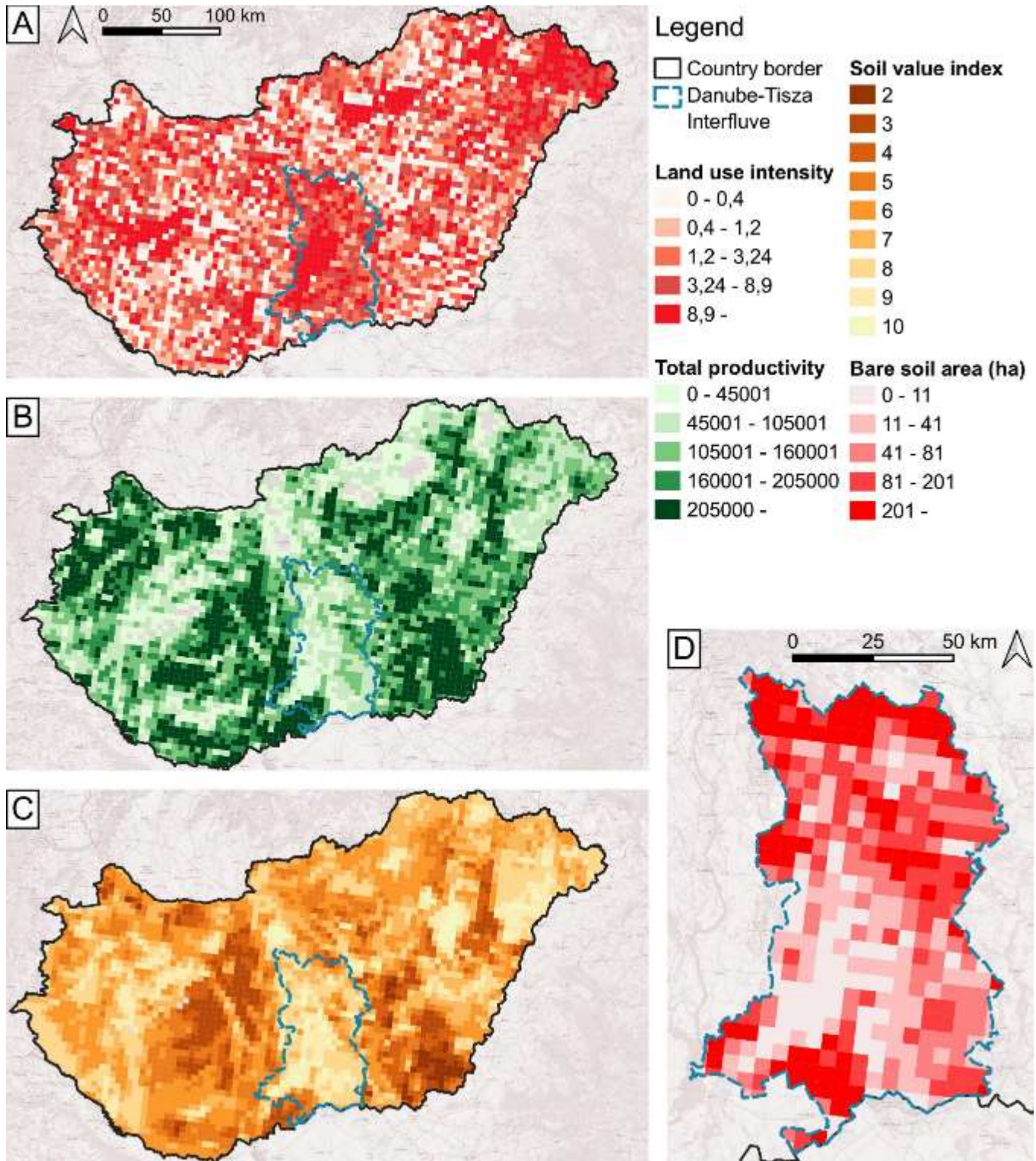
3. RESULTS

Based on the developed land use intensity sub-index (Figure 1/A), it is evident that the Homokhátság region ranks among the most intensively utilized areas across Hungary. Furthermore, the overall productivity index of the Homokhátság region's arable land is lower than the national average (Figure 1/B). These two factors indicate that land use in this region is not in line with the carrying capacity of the landscape. Farmers do not consider the weak agro potential of the landscape, resulting in overuse. This fact is further supported by the soil value index (Figure 1/C), illustrating that the region with the lowest fertility in the country is virtually the Homokhátság.

Improper cultivation practices further exacerbate the problems arising from overuse. A significant area of the Homokhátság region features arable lands that remain without vegetation for at least six months annually (Figure 1/D). Bare soil not only contributes to deflation but also intensifies undesirable effects in connection with climate change (for example, evaporation loss increases, which aggravates the lack of soil moisture and amplifies damage during periods of drought).

4. DISCUSSION AND CONCLUSIONS

Our analysis indicates that agricultural practices do not align with the landscape carrying capacity. This has led to overuse, resulting in insufficient resources and numerous problems in crop cultivation and animal husbandry, often accompanied by inefficiency, low-income generating capabilities, and unsustainability.



Data sources: NDVI; CORINE Land Cover; NÖSZTÉP; HCSO TÍMEA.

Figure 1. A: Land use intensity; B: Total productivity; C: Soil value; D: Bare soil area

The development of a land use system that aligns with natural conditions (water, soil, meteorological factors) is necessary to ensure the economic and social sustainability of the Homokhátság region. This necessitates the abandonment of numerous arable and vineyard areas, the creation of a mosaic landscape structure, and the implementation of soil cultivation practices to improve physical and chemical soil conditions. Without these measures, the region may face depopulation and severe economic depression in the future.

ACKNOWLEDGMENTS

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28 When Sustainable Development Means Unsustainable Development Financing: The Case of Multilateral Development Partner Loans to Indonesia

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Abstract

Our paper analyses public sector investment through foreign currency borrowings from multilateral development partners known as international development partners (IDPs). In the literature review, we demonstrate the three prevalent banking theories and practices. We view this as an introduction to the current banking practices which have been fine-tuned in the last 5000 years. We argue that these are the basis for reviewing the sustainability of the banking and financial sectors. From this angle, we contend that overseas borrowing by the Indonesian government, including those from the IDPs, despite their intended promises to support and promote a sustainable development agenda or goal (SDG) such as sustainable growth, poverty alleviation, and job creation, is unsustainable. Our results, from analyzing over \$33 billion (or 9.11% of Indonesia's total borrowings) of sovereign borrowing from the IDPs from 2007 to 2022 support our finding. We discovered the true IDPs' disbursement ratio of 1.3% per annum of Indonesia's total debt. Compared with borrowing from commercial banks, this should be at least 90% upon loan agreement signing. This signifies about 98% of capital flights from the IDP loans on an annual basis. The impacts of which on Indonesia's overall development are retarded growth, loss of job creation potential of 92% or new job creation of over 300,000, and capital flights of over \$30 per \$1 loan are identified. Additionally, instead of eradicating poverty which is SDG#1, it stimulates more poverty. We argue that Indonesia's cooperation and borrowing from the IDP in foreign currencies are unsustainable as it not only exhausts future generations' resources in paying the loan principal despite only less than 2% entering Indonesia's economy and their interests from the full (100%) loan amounts. It also undermines Indonesia's development agenda because of capital flights and negative impacts. This is an unsustainable practice that needs urgent resolution. Remedying this is not difficult but requires a fundamental shift in the cooperation and implementation arrangements of foreign currency loans from the IDPs.

Keywords

Development bank; foreign currency; poverty; unemployment; capital flights, unsustainability.

1. INTRODUCTION

The establishment of international development organizations (IDOs) also known as international development partners (IDPs), including the Asian Development Bank (ADB), was between the 1940s-1960s, about the same time World War 2 and decolonization ended and the birth of development economics subject. The controlling shares are owned by European-origin countries³⁴, most of them are former colonial power. Japan and the United States (US) of America combined, hold the controlling voting power in the ADB. Lim and Vreeland (2013, pp.44-45) wrote *"Little understood by the general public, the ADB was founded in 1966 as an Asia-Pacific version of the World Bank... Yasutomo thus concludes that the ADB "can serve as a foreign policy tool in the pursuit of Japanese diplomatic interests."* (Emphasized) From this statement, one senses the political nature of ADB, and to holistically analyze Indonesia-ADB cooperation, one needs to dwell on the political economy which

³⁴ Includes Australia and New Zealand as part of the Pacific region.

is beyond the scope of our paper. As we ventured into our analysis, we briefly touched upon the political economy while focusing on the empirical analysis. We began by looking at the seed of development banking particularly multilateral development banks (MDBs) of which ADB is a member.

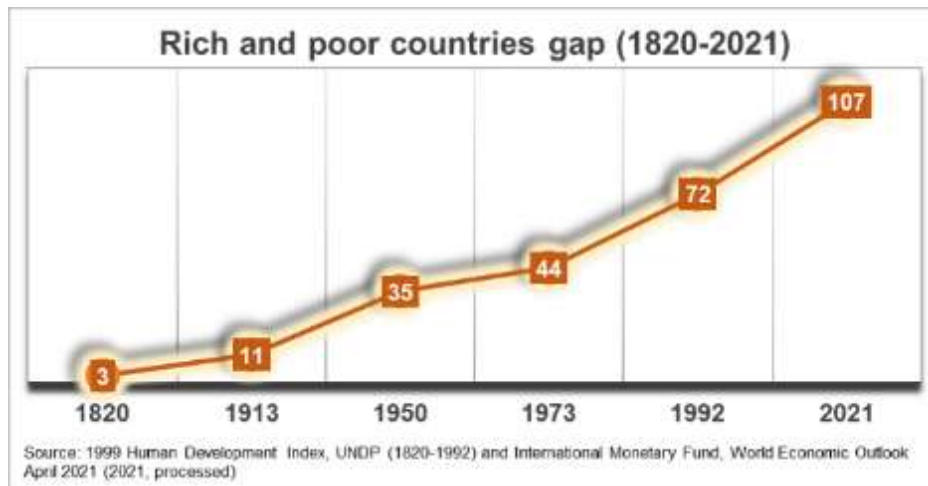
Our paper is addressing the issue of the unsustainability of the IPDs by taking a specific example of the ADB's development funding for Indonesia in the form off foreign currency (US Dollar) loans (FCLs). We argue that the FCLs are one of the underdevelopment tools—defined by Baran (1973) as dependency tethering (or being controlled) and looting (1973; p.274) by western countries capitalists—including their monetary and fiscal costs and their impacts. Despite more than sufficient collateral—including the nation's sovereignty—that must be surrendered by its borrowers, yet the ADB demands full control of the loan fund disbursement through its carefully worded Establishment Act (ADB Charter) which like all member countries, Indonesia has ratified through Law No. 8/1966. We anchor our analysis on the 5000 years of debts history (Graeber, 2011) and banking theories and practices (Werner, 2014). We define endogenous capitals as the unaccounted contributions (in-kind) by the shareholders in addition to their capital subscription (quasi-cash) and paid-in (in-cash). This includes the Loans Agreement (LA) which under today's banking practices is a Promissory Notes used by modern banking to monetarily create money endogenously. Mostly, these in-kind capitals are strategically placed in all agreements—to relinquish some sovereign powers to ADB—signed with ADB and/or project/programs documents. This includes disbursement delays, after considering banking practices. During colonial times, one of the endogenous capitals is not only the land, its resources, and its people but also their sovereignty and freedom. As observed by many, we contend that these patterns are still sustained today with different faces and outfits but with the same core structure that is banking, debt, and finance. Before embarking on the empirical analysis, we take a detour to briefly glinting into the politics behind ADB's establishment.

As summarized by Prof Asad Zaman (2021), Prof Michael J Hudson³⁵ (2021) stated that *“Economic Theory is pure illusion; If we want to understand why absolutely irrational economic policies, ... are routinely implemented ... **we must understand political economy**... ALL trade theory models taught in economics textbooks are completely wrong, because they ignore the political economy.”* (Emphasized) Accordingly, we approach the issue of ADB's relevance to Indonesia through the political economy lenses, yet briefly. Before we venture in, let us establish some facts on inequality. Later in the discussion, we are complementing these facts with our findings from the body of literature before putting our theories then embark on our quantitative empirical analysis.

2. WORLD INEQUALITY

World inequality has been steadily rising and widening the gaps between the poor and rich countries in the last two centuries as shown in Figure-1. The data derived from a long-term analysis of the world income distribution shows a rising trend in the distance between the five richest and five poorest countries. We added 2021 data from the International Monetary Fund (IMF). A quick analysis of the trendline between polynomial and power regression shows almost a perfect match of R-squared of 0.99. This indicates that the income inequality between rich and poor countries is following both polynomial and power patterns. The almost perfect R-squared values indicate that the inequality pattern is not random and appears to sustainably correlate with the current finance and economics system where global debt is rising at an unsustainable level (Wright, 2020).

³⁵ Prof Michael Hudson (2021) Webinar: A 4000-year perspective on economy, money and debt as summarized by Prof Asad Zaman (July 28, 2021) in *“What they don't teach in economics textbooks”* <http://bit.ly/MHudson4000>. See also Prof Ha-Joon Chang (2019): *“Why Economics Is Political”* https://www.youtube.com/watch?v=jXfMzjh_SMA (15 Aug 2021)



Reproduced from Maddison, Angus. 1995. Monitoring the World Economy, 1820–1992. Paris: Organisation for Economic Co-operation and Development, Development Centre.

Figure 1. Two Centuries Inequality between the Poor and Rich

In Figure-2, we exhibit Indonesia's distance from the eleven richest ADB member countries³⁶. It shows that Indonesia during Dutch colonization, is not far from them, another words, the gap is only less than 4. The gap is widening after Indonesia declared independence in 1945. After more than 60 years, it began to approach the 1960 figure of around 10 in 2011 with 14 and continued till 2020 with 12. Since joining ADB in 1966, the gap shows a constant decline from 42 to 14 in 2011, despite the fluctuations in between. The figure shows that the income inequality gap before 1960 is smaller than to date. There are two possible interpretations. One is that income inequality was less during Dutch colonization and perhaps because of the Dutch management of the economy and the other is, Indonesia was sanctioned through different world economics and financial infrastructures for its Independence after defeating the Dutch and its Allied forces (to name a few, Australia, Great Britain, USA, New Zealand) in the war thus penalized for escaping colonization.

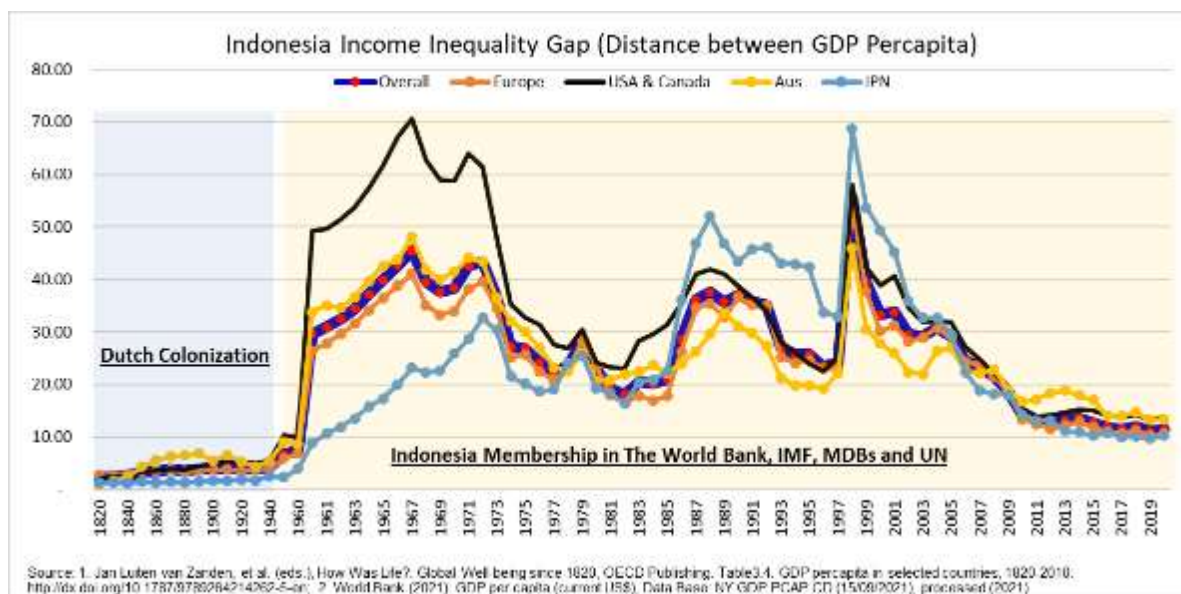


Figure 2. Indonesia Income Inequality With ADB 11 Richest Members

What has caused this?

Some suggest that it is debt (eg., Iacoviello, 2008: p.930) however, in our view something bigger than that since Indonesia has been experiencing much narrower gaps since the Dutch invaded and colonized Indonesia in the early 17th century until the mid-20th century as shown by Creutzberg

³⁶ Australia, Canada, Germany, Spain, France, United Kingdom, Italy, Japan, Netherlands, Sweden, United States, Indonesia

(1979: p.70, Table.15.1) on Indonesia's National Income from 1921-1939. South Centre (2004)³⁷ lays the path open and summarizes that developing countries' debts are partly the results of the unjust transfer to them of the colonizing States' debts. This is what happened to Indonesia during the Dutch mercantilist operations since 1602 and continued throughout the post-war power transfer negotiation in 1949. At this point, we argue that this is continuing till the present time, not only with Indonesia's membership with the ADB but also with the Multilateral Development Bank (MDBs) and International Monetary Fund (IMF). The title of the South Centre's publication: *"Third World Debt a Continuing Legacy of Colonialism"*, explains the core issue that is the legacy of colonialism of which we reason as re-colonialism with different outfits. From this angle, we reason that Indonesia is being penalized for gaining its independence through the war with the Dutch. This is supported by the fact that the Dutch only semi-accepted Indonesia's independence on 17 August 1945 only after 60 years in 2005, when their Foreign Minister, for the first time, attended Indonesia's independence day celebration. Despite this, the Dutch at the highest level, such as Queen Beatrix, never formally acknowledges Indonesia's independence (Pondaag, 2020)³⁸.

Given persistent poverty, malnutrition, unemployment, to name a few, in Indonesia, Bennet (1987, p.13)³⁹ provides a hint that institutions, policies, and ideologies that cause injustice are the roots of modern colonialism. We call them re-colonization vehicles using debt, finance, and banking as their armaments. This hints, they sustain colonization through different cosmetics such as financial, banking, and monetary systems which are not obvious to many. Musari (2021) argues that past imperialism—as colonialism—adopting war as a weapon, but today they utilize debt as its artillery. Harnessing on Indonesia's loans from ADB from 1966 to 2017, totaled over \$33 billion (average 0.42% of GDP), we reviewed Indonesia-ADB cooperation. As ADB is infamous for disbursement delays, we discovered that ADB's control over the fund disbursement is one of the exploitation mechanisms of the former colonies (or re-colonization) and slavery continuation as guided by European financiers (The Hazzard Circular, 1862). This causes Indonesia to suffer both licit and illicit capital flight of more than \$12 per \$1 loan—under 10% fractional reserve banking (FRB) rule—termed as unequal exchange, plunder, or looting. Our findings show ADB loans, instead of increasing growth, retard and reduce it to negative. They constantly correlate with increasing poverty. The loans increased poverty and unemployment levels by over three folds and pulled growth into negative.

3. STRUCTURE

We begin by briefly scintillating over the political economy or history of Indonesia's colonial time under Dutch control, followed by elaboration on Indonesia-ADB cooperation and the disbursement delays. Succeeding this, literature review on development Aid⁴⁰ studies and the reason on why we need to Meta-evaluate ADB's Performance. The last part is a brief discussion on our empirical quantitative methodology, results, and recommendations.

4. LIMITATION

In our paper, we are flagging some unsustainable practices that are uniquely practiced by ADB as part of its establishment act. These issues require a separate study which is beyond the scope of our paper. We focus on the empirical data that shows ADB loans' correlation with Indonesia's development performance. As exhibited by other independent researchers who dealt with the impacts of ADB disbursement delays on Indonesia's economic development, showing both the correlations and causations (Fauzi and Ingratubun, 2020; Cahyadi *et al.*, 2021; Ingratubun *et al.*,

³⁷ South Centre, "Third world debt: a continuing legacy of colonialism", South Bulletin, Issue 85 (August 2004)

³⁸ Salut! Pria Indonesia pemberani ini, menyeret negara Belanda ke Pengadilan dan dia menang. <https://youtu.be/nDVt362ur9c> (1 Sept 2021)

³⁹ Jon Bennett, *The Hunger Machine: The Politics of Food*, Cambridge: Polity Press, 1987, p. 13.

⁴⁰ Loans, grants, technical assistance (TAs), and in-kind assistance is categorized as aid (OECD, 2020). <https://data.oecd.org/oda/net-oda.htm> (17 Oct 2021)

2021). In this paper, we are focusing on showing only the correlations of ADB loans on Indonesia's development indicators namely poverty, unemployment, and growth.

5. BRIEF POLITICAL ECONOMY OF INDONESIA-ADB COOPERATION

Dutch East India Company

By granting special monopoly rights, the Dutch government supported its multinational merchant operations known as the Dutch East India Company or *Vereenigde Oostindische Compagnie* (VOC). This company had colonized Indonesia from the early 17th into the 20th century. Despite its capital resources were regularly replenished and increased, it was later bailed out and nationalized into a state asset because of insolvency. VOC nurtured the spread of—among other—diseases, slavery, bureaucracy, globalization, environmental and cultural destructions, poverty, lack of modern basic infrastructure, and exploitation on an unfathomable scale (Shorto, 2013). It midwived the birth of modern banking, capital markets, stock exchange, and planted the seed of multilateral cooperation banks to develop colonized lands and trade monopolies. During this period, the Dutch generated billions of dollars of capital from Indonesia in various forms—including slave trading—and flown them to the Netherlands. In achieving this, the VOC used all tactics both legal and illegal by conviction through governance or compulsion through military force and by agreement, fraud, or deceptions.

VOC charter or establishment act was accorded in 1602 for twenty-one years renewable. This charter granted VOC special rights not only monopoly for the Asian trade, especially with Indonesia, but also administrative and military rights including appointing judges and establish courthouses. Additionally, unknown to many, the VOC was also granted special monopoly rights (*Octroi*) by King Willem I on 9 December 1826 to conduct its businesses—among others—as a commercial and central bank at the same time with special rights to print and issue money and administer the transactions and currency exchanges (Nugroho, 2016)⁴¹.

It is the first joint-stock company operating by issuing stocks or shares to its investors with guaranteed interests or profit-sharing payments of 7.5% per annum (VOC Charter)⁴². Its stocks were initially held by provincial governments in the Netherlands and later also diversified to allow individual foreign and national investors who were the prominent clients of the *Amsterdamsche Wisselbank* the grandfather of the now Dutch Central Bank, the Bank of Amsterdam. "*The VOC transformed financial capitalism forever in ways few people understand*" (Taylor, 2018)⁴³.

Little that known to many, the VOC model as the central bank becomes the basis of the modern central and commercial private banking around the world (Quinn and Roberds, 2007, 2008, 2010) operating the theory of loanable fund (LF) or financial intermediary which root came around the 1100s in Italy. Furthermore, they discovered the fractional reserve banking or money multiplier and credit creation or endogenous money method relying on the government sovereign power—as shown during the Song dynasty (960-1279 AD), in China when they invented paper money (Graber, 2011, p. 269)—and put it into practice in Indonesia. Additionally, VOC as a special administrative entity with sovereignty and power to make business and political agreements or wage war with other countries became the seedling model for the League of Nations which was later replaced with the United Nations.

Traces of the Fabianism that carry socialism idea as the parallel of communism, in the formation of these international organizations, including ADB, were identified by Griffin (1996). Since its founding in 1884, the Fabian Society is instrumental in propagating the concept of multilateralism and

⁴¹ Apa itu Oktroi dalam De Javasche Bank? <https://www.kompas.com/skola/read/2020/07/05/134503269/apa-itu-oktroi-dalam-de-javasche-bank?page=all#page2> (20 Aug 2021)

⁴² Charter of the VOC. https://rupertgerritsen.tripod.com/pdf/published/VOC_Charter_1602.pdf (22 Aug 2021)

⁴³ The First and the Greatest: The Rise and Fall of the United East India Company - Global Financial Data.

<https://globalfinancialdata.com/the-first-and-the-greatest-the-rise-and-fall-of-the-united-east-india-company> (1 Sept 2021)

sustainable development agendas⁴⁴. One of Fabian's scholars is John Maynard Keynes (Pugh, p. 158)⁴⁵.

Strange Post War of Independence Negotiations

Historically, despite heavy defeats in Indonesia's war of Independence, the Dutch were reluctant to let go of Indonesia as its cash-cow colony and imposed on several incomprehensible conditions during power transfer negotiations—known as the Round Table Conference (*Konferensi Meja Bundar*)—post-1945 of Indonesia's declaration of independence. One of which was for Indonesia to pay off the Dutch's debts of about \$1.13 billion in 1949 during and after colonizing Indonesia (Isnaeni, 2010). One peculiar condition demanded by the Dutch was to keep the *De Javasche Bank* (DJB) in operation and function as the new Republic of Indonesia's central bank.

The Dutch resisted Indonesia's proposal to have its national Bank Negara Indonesia 1946 (BNI-46) as its central bank (Rahardjo, 2005: p.2). The DJB was a Dutch publicly owned state enterprise that functioned during colonial time as both a private commercial bank and a central bank for the Dutch colonies. It has branches in several countries including in New Amsterdam (New York), in the United States of America (USA)⁴⁶. It is a peculiar decolonization condition that allowed the Dutch to control the finance and central banking of the new Republic of Indonesia from the Netherlands. Strangely, Indonesia agreed! This marks the beginning of the Dutch disease working in reverse or Dutch Curse on Indonesia since 1945.

With this background, we consider it is prudent to examine all economics development in Indonesia by anchoring on how bank works and the way money is created and controlled. Literature on how the development banks are functioning is extremely scarce. This is best described by Sarah Babb (2009, p.x) who researched the Multilateral Development Banks (MDBs) with a "black box" to "*which outside observers lack the key.*" The very existence of the black box is already a sign of unsustainable practice as it is not defensible as public financial organizations which must operate with extended transparency.

Many researchers such as Arndt et al. (2011), Bourguignon and Sundberg (2007), Gibson et al. (2005), and Nissanke (2010) have voiced the same findings and suggested the requirement to open the "black box" relevant to the development fund or aid delivery mechanism to comprehend how the policy and practices are being designed, approved, implemented and supervised. The 'black box' is known to be part of any system that operates or is perceived to function without the need to elaborate on how that system converts and processes inputs into outputs (Birkland, 2014). The black box refers to the banking theories, procedures, and practices that are peculiarly mostly missing in the mainstream textbooks. To this, Keen⁴⁷ (2015) contends: "*...If you look at mainstream economics there are three things you will not find in a mainstream economic model - Banks, Debt, and Money. How anybody can think they can analyze capital while leaving out Banks, Debt, and Money is a bit to me like an ornithologist trying to work out how a bird flies whilst ignoring that the bird has wings...*"

6. THE ASIAN DEVELOPMENT BANK (ADB)

We reason that following the model of VOC banking operations that relies on multilateralism and joint stock ownership of wealthy regions and individuals, the central banking operations, initially as the clearinghouse, sprouting almost at the same time in the Netherlands, Germany, England, Sweden, France and later expanded to the USA between 17th and 19th centuries. Literature (Ref. xtbax) suggests that the founders are the same group of private financiers moving around Europe until they settled in the Netherlands and helped established and funded the VOC. The same business and

⁴⁴ Fabianstw.info - Tunbridge Wells Fabians. <https://www.fabianstw.info/> (1 Sept 2021)

⁴⁵ The Fabian Society and Keynesian Economics. <https://modernhistoryproject.org/mhp?Article=FabianSociety&C=7.0>. (1 Sept 2021)

⁴⁶ De Javasche Bank, Perusahaan Perbankan dari Jawa yang Menguasai Wilayah New York. <https://www.boombastis.com/de-javasche-bank/82076> (20 Aug 2021)

⁴⁷ Quote by Steve Keen. <https://www.goodreads.com/quotes/1175490-if-you-look-at-mainstream-economics-there-are-three-things> (21 Mar 2021)

operation model was adopted by the World Bank and International Monetary Fund 1940s. This model becomes the template for all succeeding development banks, including the ADB. Each member subscribed to its capital's stocks and paid-in their cash contributions and adhered to the decision-making power based on the value of their shareholdings. The only marked difference with the VOC is that the stockholders of development banks and IMF do not receive profit-sharing or dividend payments, whereas with VOC they do. This was adopted by some of the central banks. Most notably the Federal Reserve Bank of the USA pays a 6% dividend to its stockholders (The Fed, 2019)⁴⁸.

7. CONFLICT OF INTEREST (COI)

The US Congress (1968a: p.280) record on the US and its allies' investment in ADB registers that *"we find that many of the members... put in \$1 and get out \$7 [or 700%]."* Furthermore, *"[w]hen the Japanese parliament was supposed to vote for the US-Japan Security Treaty in the 1960s, continuing US occupation, all opposition parliamentarians were arrested by the police ... Then "majority" approved."* (Werner, 2020). Subsequently, Calder (1988) discovered evidence of *"gaiatsu"* described as a Japanese policy as a reaction to US pressure in transmitting aid flows across borders and regions, in exchange for safeguarding the security and interests of Japanese multinational firms and US market access. This appears as a conflict of interests (COI) as elucidated by Kilby (2006, 2011, 2020) who argues that the ADB is used as geopolitical tools not only by Japan and the USA as the largest shareholders of the ADB but also European countries, including Australia and New Zealand.

The COI causes a capital flight of 4.98%-GDP from Indonesia's total loans from ADB (Cahyadi *et al.*, 2021: p.131) which is almost double the expected return of 700% per \$1 (2.91%-GDP) by developed member countries in their investment in ADB (US Congress, 1968a:280). The evidence shows that ADB loan volatility through disbursement delays is not incidental. Acemoglu *et al.* (2001) attribute this to economic retardation in less developed countries (former colonies) because of the creation of extractive institutions. *"In fact, the main purpose of the extractive state was to transfer as much of the resources of the colony to the colonizer, with the minimum amount of investment possible."* (Acemoglu *et al.*, 2001:2).

8. INDONESIA AND ADB

The relationship between Indonesia and ADB is political in nature, and whatever comes out of their cooperation, as long as they can be convincingly evidenced, is made to happen. Whether they are good or bad, they are designed to be that way as US President Franklin D Roosevelt suggests; *"In politics, nothing happens by accident. If it happens, you can bet it was planned that way."*

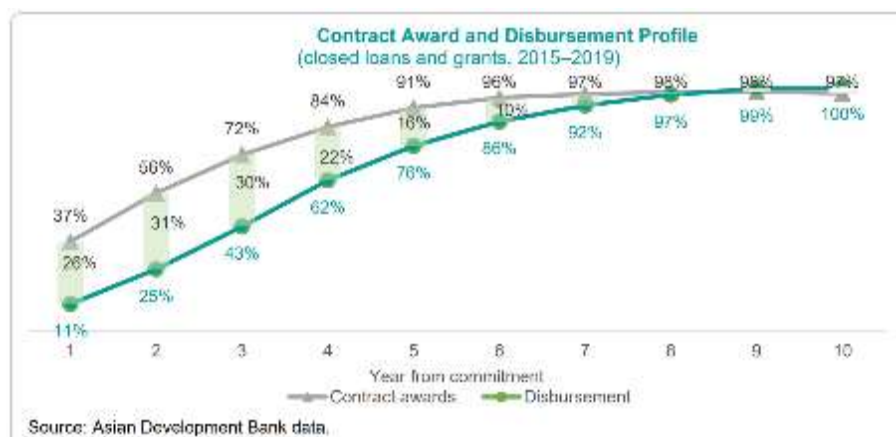
The ADB was established as a quasi-government that requires an establishment act (or charter, similar to VOC's), which each member country has to ratify through their national law. Indonesia has enacted law No.4/1966 accordingly. This provides ADB with no competition or monopoly to provide its services in Indonesia. Block (1988: p.3) expresses that when the government gives legal status to an entity and passes a law that protects it from competitors, it creates unemployment. Block argues that *"[i]n almost every case, government programs are the cause of joblessness"* while the United Nations expresses that unemployment or joblessness and underemployment are the major causes of poverty (UN, 2012: p.3-4).

ADB Disbursement Delays

Development banks, such as the ADB, operate in similar ways to traditional banks (Mazzi, 2013: p. xxvi). However, unlike borrowing from a commercial bank where the fund or bank credit disbursement is in full and deposited into the borrower's account upon Loan Agreement (LA) signing, borrowing from ADB does not work like this. It takes less than one day for commercial banks to make a full disbursement while ADB needs more than 7 years (Figure-3) because of conditionalities. During

⁴⁸ Federal Reserve Board - Section 7. Division of Earnings. <https://www.federalreserve.gov/aboutthefed/section7.htm> (1 Sept 2021)

which, the funds stay in the banks and gain compounded interest disfavoring Indonesia and affect its economic growth. These gains and their impacts have been mostly overlooked in development studies. We view, ADB disbursement delays are one of Indonesia's endogenous capitals since it takes only one day for a commercial bank to disburse the loan fund compare with ADB of more than 7 years.



Source: Figure 16, ADB Annual Portfolio Performance Report (APPR) 2019b

Figure 3. ADB Actual Disbursements

The ADB ties its disbursements with certain conditionalities and controls the loan account. Kanbur (2000: p.413-416), a former World Bank staffer, expresses that conditionality of whatever type has failed in Africa and they designed it to fail as a systemic imperative to ensure the aid keeps flowing. Conditionality incriminates the actual issue that is "*one of an unhealthy interaction between donor and recipient processes which propagate aid dependence but are not so simple as to be characterized as the strength of the donors and the weakness of the recipients.*" (Kanbur 2000: p.414)

9. LITERATURE REVIEW

What Do Studies/Reports on Development Aid Show?

Edwards (2014) ⁴⁹ summarizes that there are three factions of development aid (or aid) studies namely, *pro*, *intermediate*, and *contra*. Almost all of them studied the linkages between growth and aid leaving other development indicators such as poverty, unemployment, almost untouched. Jeffrey Sachs (2009) is one of the proponents (*pro*-side) and staunchest defenders of aid and has been debated and debunked by a former world bank staffer William Easterly (2009) who is on the *contra*-side. Burnside and Dollar (2000), who are one of the few on the neutral position (*intermediate*-side), suggested that aid "can work" effectively to the extent there is a good policy in place. This is then used as the basis for urging the borrowers of the MDBs, including the ADB, and International Monetary Fund (IMF) to reform their legal and regulatory institutions. Among many scholars who tried to replicate their study, were Easterly *et al.* (2003) and Asirvatham (2010)—they failed. It was argued that that there is a disconnection in aid policy based on the assumption that aid promotes growth which in reality is the opposite (Easterly 2006: p.41).

After analyzing hundreds of scholarly studies and meta-analysis reports done by independent researchers, Edwards (2014) concludes: "*Overall, the results from this large body of research have been fragile and inconclusive.*" The problem does not end here. Mahembe (2019) contends: "*Thus, the poverty-reducing effects of aid are not well documented (White, 2015, p.187). Mosley (1987) refers to the lack of attention to poverty impact of aid as "a disgrace". Easterly (2006: p.368) reasons "to make individuals better off, not to transform [reform] governments or societies...aid cannot achieve the end*

⁴⁹ How effective is foreign aid? World Economic Forum (weforum.org). <https://www.weforum.org/agenda/2014/11/how-effective-is-foreign-aid> (15 Aug 2021)

of poverty". Ingratubun *et al* (2021: p.4) add: *"there is worryingly scarce literature that deals with the aid nexus with unemployment and poverty."* In another word, nobody knows exactly whether aid is effective or not. On a harsher tone, Toussants (2019) muses that the developing countries (borrowers) have been re-colonized through the World Bank (we opine that ADB is included) and its group's never-ending economic *coup d'état* thus a new form of decolonization is urgently required.

Why Do We Need to Meta-evaluate ADB's Performance?

After working 15 months, in 2019 the World Bank chief economist and also Nobel Laureate Paul Romer quitted his job. He was quoted as stating that *"I've never in my professional life encountered professional economists who say so many things that are easy to check and turn out not to be true"* (Lowy Institute, 2018). He was upset because of the imprecise use of language in reporting what the World Bank has achieved or not. His castigation has been similarly noted by other observers, Franco Moretti and Dominique Pester earlier in 2015 who remarked that the World Bank's language is more self-referential and more inclined to *"contain many promises and very few facts"* (Moretti and Pester, 2015). This phenomenon is generic in all Multilateral Development Banks (MDBs), which includes the ADB, due to the pressure for being diplomatically correct while politically motivated despite they are socially and culturally destructive similar to the colonial time (Hancock, 1989). With this in mind, we need to be careful when reading the official reports on the MDBs successes. This includes ADB's reports.

As was prompted by a former World Bank staffer, William Easterly (2003: p.38) who cited the report described in the OECD and UNDP publication (1999: p.2). *"[I]t has to be asked how the largely positive findings of the evaluations can be reconciled with the poor development outcomes observed ... clearly fails to give a proper reflection of the lasting impact on standards of living."* Easterly (2003: p.39) referred to the recommendation made by the Meltzer commission⁵⁰ that aid agencies, the like of ADB, should *"undergo an independent evaluation"*.

Aid Volatility, Growth, Unemployment, and Poverty

Easterly (2003: p.35), found an inverse correlation between aid and growth. He expresses that there is a disconnection in aid policy based on the assumption that aid promotes growth, which in reality is the opposite (Easterly, 2006: p.41). From this, we infer that aid promotes poverty since growth is required to create jobs and opportunities. In 2009, the IMF identified that the right type of development aid has a positive impact on long-running economic growth (Minoiu and Reddy, 2009: p.6)⁵¹. However, their most recent study discovered that there is no robust evidence that aid increases growth (Dreher and Lohmann, 2015: p.5).

Over the past 40 years, significant evidence shows that aid volatility has had a severe negative impact on growth, but little knowledge about their primary sources (Desai and Kharas, 2010: p.1) and on their nexus with employment and poverty. ADB (2016: p.2) presents that economic growth played an important role in poverty reduction, employment opportunity creation, and increasing public spending expenditures in the areas of health, education, and infrastructure. Desai and Kharas (2008: p.9) exhibit that disbursement volatility has massive negative shocks on growth and national income similar to those experienced by developed countries during the two World Wars and the Great Depression. Sambodo *et al.*, (2016: p.3) demonstrate that Indonesia's low electricity connectivity has direct correlations with low economic growth and high poverty level.

Fauzi and Ingratubun (2020) discovered that overall ADB loans (energy included) have very little to no positive impact on the economic growth of Indonesia but cause negative growth or act as a handbrake for accelerating growth. Cahyadi *et al* (2021) disclosed that overall ADB loans raise

⁵⁰ Professor Alan Meltzer headed the International Financial Institution Advisory Commission, chaired that produced the report March 2000 containing recommendation on how international development institutions, such as ADB can be reformed and must do a much better job than they have done in the past. <https://www.treasury.gov/press-center/press-releases/Documents/meltzer.pdf> (15 Aug 2021)

⁵¹ See McKee *et al* (2020) footnote 16 for more detailed elaborations on aid promotes or discourages growth at <https://www.cgdev.org/sites/default/files/WP524-McKee-Mitchell-Aid-Effectiveness.pdf> (14 Dec 2020)

Indonesia's unemployment by 300%. Fauzi and Ingratubun (2020) show that over 10 folds of Indonesia's capital per one dollar loan fund being delayed are capital flights. These are benefiting the economic growth of the countries where ADB keeps Indonesia's loan funds, hence decelerates Indonesia's growth. Ingratubun *et al* (2021) present that ADB energy loans in Indonesia increase poverty by more than 300 percent.

Financial Impact of Disbursement Delays

Aldashev and Verardi (2012: p.3-4) show that doubling aid volatility (or disbursement delays) causes a fall in average GDP growth by two-thirds (67%). Using return per \$1 aid invested and disbursed by donors as a measure of delays, this shows a range of 15%-2400% (Jepma, 1991; Andrews and Wilhelm, 2008; GFI et al., 2015; ANU, 2017; Lotti and Presbitero, 2019; Hickel, 2019, 2021; and Fauzi and Ingratubun, 2020). The U.S. Congress (1968a: p.280) record relating to 1969 budget appropriation for the ADB registers that *"we find that many of the members ... put in \$1 and get out \$7 [or 700%]."* For paying interest alone it consumes 0.8%-GDP and total capital flights are 7.6%-GDP (Griffiths, 2014) ⁵².

10. ANALYSIS FOUNDATION: BANKING THEORIES, PRACTICES AND GOVERNANCE

"It is well enough that the people of the nation do not understand our banking and monetary system, for if they did, I believe there would be a revolution before tomorrow morning." ~ Henry Ford, Founder of Ford Motor Company

Galbraith (1975: p. 5) expresses that the knowledge of how banks work is essential. He says that *"[t]he studies of money, above all other fields in economics, is the one in which complexity is used to disguise truth or to evade truth, not to reveal it. ... Money, in contrast, is equally important to those who have it and those who don't. Both, accordingly, have a concern for understanding it."* The subsequent section expatiates on the three banking theories identified by Werner (2014, 2016). We understand that the following section on banking practices are elaborating the unsustainable practices and the sources of ecological debts (Soddy, 1926). However, we need to first recognize them, their footprints, and their impacts while finding the way around it for more ecologically equitable financial and banking systems.

Before proceeding, the following evidence is important to prepare us for understanding how banking systems work.

- The modern banking system manufactures money *out of nothing*. (Hawtrey, 1919: 20; Angas, 1937: p.20-21; Werner, 2014: p.361, and in p.367 quoted Macleod, 1906: p.408⁵³).
- The Chicago Federal Reserve Bank (Nichols, 1992 (1st ed., 1961: p.11)), *"Of course they [Banks] do not really pay out loans from the money they receive as deposits. If they did this, no additional money would be created."*

Note: These references are mostly predating the founding of ADB in 1966.

Rothbard (2008: p.98) expresses *"Commercial banks (fractional reserve banks) create money out of thin air. Essentially, they do it in the same way as counterfeiters."*

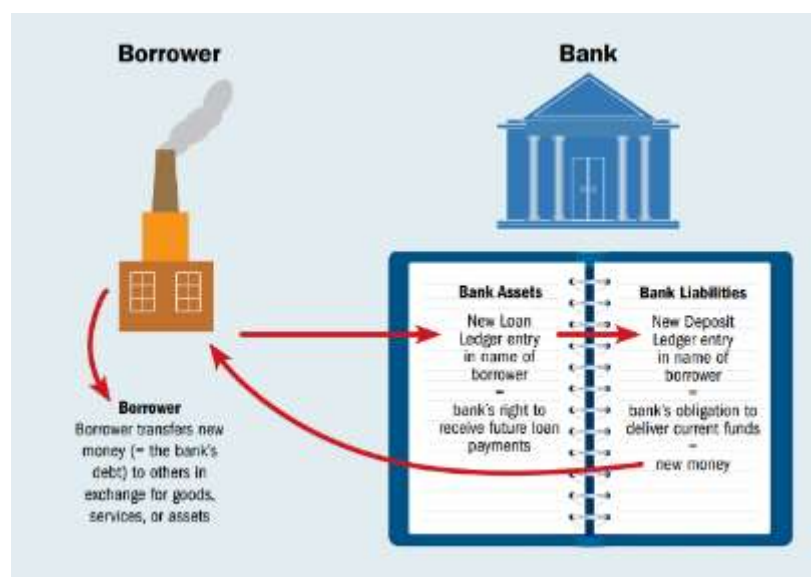
- The Bank of England states;
"Whenever a bank makes a loan, it simultaneously creates a matching deposit in the borrower's bank account, thereby creating new money." (McLeay, et al., 2014: p.15)
- The International Monetary Fund (IMF) shows a simplified chart on bank money creation (Figure-4) and expresses;
"New funds are produced only with new bank loans (or when banks purchase additional financial or real assets), through book entries made by keystrokes on the banker's keyboard at the time of

⁵² Developing countries lose \$2 for every \$1 they earn. <https://www.euractiv.com/section/development-policy/opinion/developing-countries-lose-2-for-every-1-they-earn/?fbclid=IwAR1-sYzJR0cWMFVtBiaBOuSe3Kp3RWqtIW70wG8f8mgloGYvl7e4qxTltnU> (23 Dec 2020)

⁵³ Werner's citations from the 6th edition of 1906).

disbursement. This means that the funds do not exist before the loan and that they are in the form of electronic entries—or, historically, paper ledger entries—rather than real resources. (Emphasized) (Kumhof and Jakab, 2016: p.51)

Up to this point, a question emerges whether Indonesia needs to borrow externally from foreign banks when they merely manufactured money out of nothing?



Source: Kumhof & Jakab, 2016: p. 52.

Figure 4. Bank Money Creation Process (Note, there is no deposit from external sources)

Financial Intermediation Banking (or Loanable Funds) (LF)

First, LF is the most dominant theory which holds that banks are merely financial intermediaries. They gather deposits, mostly in cash, from patient savers and lend them out to customers or impatient spenders and charge interest. ADB appears to practice the LF as it continuously requests its member countries to replenish its ordinary capital resources. The Bank of England classifies this as a common misconception “...that banks act simply as intermediaries, lending out the deposits that savers place with them.” (McLeay, et al., 2014: p.15).

Money Multiplier Or Fractional Reserve Banking (FRB)

Second, the FRB theory adopts that banks create money via multiple deposit expansion by using a fraction of the money in their possession as the basis for credit generation. A bank with \$10 cash in its entire holding can lend out \$100 (10 times) under the 10% reserve rule⁵⁴ (Nichols, 1992: p.11). At the time of ADB creation in 1966, the Fed⁵⁵ required all banks to maintain a reserve ratio of 4-6% (The Fed, 2020, Footnote 10-13). Frederick Soddy (1926), a Nobel Prize winner in chemistry, and a political ecologist, has quixotically criticized not only this FRB practice but also compounded interests as unsustainable and against the second law of thermodynamics of entropy.

The Fed nullifies this requirement on 26 March 2020⁵⁶ (The Fed, 2020) which means any bank can lend out money with zero reserves (Nichols, 1992: p. 3). Per its 2020 Information Statement (ADB, 2020a: p. 4)⁵⁷, ADB lending operation appears to maintain between 4-8% reserve (FRB) ratio. We measured this from the paid-in capital (PIC) in cash (\$7,372 million) or Other Reserves (Table 12, Footnote c: p. 24) over its maximum lending ceiling (MLC) of \$192,547. This is 1.3 times over its Subscribed Capital (SC) of \$147,120. With 4-8% reserve, ADB can lend out between 12.5-25 times of

⁵⁴ Adopted based on Indonesia, Article 62.b, Law No.23 (1999) on Bank Indonesia.

⁵⁵ Federal Reserve Bank, the central bank of the US.

⁵⁶ Reserve Requirements. <https://www.federalreserve.gov/monetarypolicy/reservereq.htm> (8 Sep 2021)

⁵⁷ ADB Information Statement 2020. <https://www.adb.org/sites/default/files/institutional-document/417506/information-statement-2020.pdf> (25 Aug 2020)

its PIC. Based on this evidence, we assumed that ADB, through its banking governance, is adopting both the FRB and LF. Our paper uses these two terms in the analysis.

Werner (2014, 2016), Keen (2014), and Moore (1983), and a growing number of central banks, for example, the Fed (Carpenter and Demiralp, 2010) and the Bank of England (McLeay, *et al.*, 2014), have mathematically, empirically, and practically proven that both LF and FRB theories are untenable, factually incorrect and not reflecting reality hence are indefensible.

Credit Creation (CC)

Third, the CC or also known as endogenous money is the most dominant theory and currently practiced around the world in which banks require neither deposits nor reserves. The Bank of England describes the money creation begins when a client signs the LA. They state that *"The bank, therefore, creates its funding deposits, in the act of lending in a transaction that involves no intermediation whatsoever."* (Jakab & Kumhof, 2015: p. ii). All the banks need for credit money creation is a signed LA or promissory note (PN). This is the oldest banking theory in a modern civilization based on 5000 years of practice (Werner, 2016; Hudson, 2018). Werner (2014: p. 14) in the first-ever practical empirical test of 5000 years of modern banking, observed in real-time and in an actual bank environment. A BBC⁵⁸ crew was filming the entire process of LA signing until he received the credit money into his bank account. The entire process took 35 minutes in contrast to the fund outlaid by ADB that takes over 5 years or an average of 7-8 years. ADB's actual disbursement data in the last five years (2015-2019) suggests more than 10 years (Figure-3).

Almost immediately after Werner (2014) publicized his study, the central bankers have come out in concert admitting the long-held suspicion that banks create money out-of-nothing or ex-nihilo. This includes the much-cited publication by the Bank of England (McLeay, *et al.*, 2014) of which Graeber (2014) commented, *"[i]n other words, everything we know is not just wrong—it's backwards. When banks make loans, they create money."*

Caveat: For these banking theories and practices to benefit the borrowers, they must deposit the loan funds within the national banking system and in the local currency (Ryan-Collins *et al.*, 2011; Werner, 2015). Or otherwise, the borrower becomes the lender to the creditors (Werner, 2015: p.12). Since ADB does not directly disburse Indonesia's loan proceeds into its national banking system and in Rupiah, we argue, that given the historical banking establishment or banking political economy and the three banking theories and practices, the banking system and procedures adopted by ADB—and most, if not all, banks around the world—are of unsustainable practices in nature.

Subsequently, Werner (2015) and Ryan-Collins *et al.*, (2011) show that every loan made in foreign currencies makes the borrower lends the money in its national currency to its lender hence becomes the lender to its creditor. Werner (2015) argues that there is no need for borrowing money internationally, as it can be created nationally. Keynes (1933: p.756) makes the same arguments when emphasizing the importance of self-reliance. Borrowing externally is the same as unconsciously exporting much-needed domestic capital at a loss because of currency exchange.

Finally, the Fed Joining the Crowd

The Fed's position is critically important to ADB and its borrowing members as it operates under the US Dollar which is under the control of the Fed. Its economic Research Team, Ihrig *et al.* (2021) writes that the linkage between Banks and the Fed's money multiplier (FRB) and reserve requirements (CC) is dead. They quote the Fed Chairman, Jerome Powell⁵⁹ who states; *"Well, ...that classic **relationship between monetary aggregates and economic growth and the size of the economy, it just no longer holds... so something we have to unlearn, I guess.**"* They exhibit *"the fact that reserve requirements have no essential role in an ample-reserves regime."*⁶⁰ So, mathematically, the money

⁵⁸ The British Broadcasting Corporation, <https://www.bbc.com/>

⁵⁹ U.S. Senate, Committee on Banking, Housing, and Urban Affairs. "The Semiannual Monetary Policy Report to the Congress." February 23, 2021; <https://www.govinfo.gov/content/pkg/CHRG-117shrg44741/pdf/CHRG-117shrg44741.pdf>.

⁶⁰ The Federal Reserve's announcement and explanation at <https://www.federalreserve.gov/newsevents/pressreleases/monetary20200315b.htm>.

multiplier equation is literally no longer definable." They recommended teaching the way the Fed operates that it has a dual mandate, assigned by Congress, of creating and achieving maximum employment and stable prices.

10. IDENTIFIED UNSUSTAINABLE BANKING PRACTICES BY ADB

ADB appears to practice LF by requesting its members to contribute to their equity capital proportionate to their shares as stockholders, in form of cash as paid-in capital that comprises 50% national currencies and 50% in US Dollar. This is complemented by their subscribed capital in the form of quasi-cash or Promissory Note. Additionally, they also practice FRB with 4-8% reserve ratios over its cash-holdings. These are captured in the ADB's Establishment Act that was ratified by its sixty-eight member countries. Werner's (2014) empirical test, along with some central banks' publications shows that banks do not need reserve (FRB) nor deposits (LF) to lend credit money. All they need is a signed loan agreement (LA) or Promissory Notes (PN).

First, the myth of intermediation (LF) and money multiplier (FRB) (Sgambati, 2019) are institutionalized in the ADB's legal documents despite their incorrectness as empirically proven by Werner and attested by many such as the IMF, central banks, and particularly the Fed. This raises a question as to what if ADB's stated mission of poverty alleviation is the opposite to what they deliver as pointed by Pettigrew (1922: 30-51) that is more poverty through plunder and slavery by controlling the fund (disbursement delays)? What transparent accountability mechanism should be had to govern their practices that harnessed unsustainably—and already debunked—banking theories? Later in the paper, we present evidence that more ADB loans correlate with intensified poverty. Ingratubun *et al* (2021: pp.7-8) exhibits evidence that ADB energy loans to Indonesia not only correlate with but also cause more poverty.

Second, ADB regularly requires its members to replenish its capital resources despite it never pays out dividends or profit-sharing. Why this is an issue? Firstly, ADB never shares its profits or pays a dividend to its stockholders that includes Indonesia. Secondly, the CC or endogenous money allows ADB to create as much as credit money it possibly wishes, to the extent its borrowers keep borrowing as all they need is a signed LA. Why does ADB keep on requesting its members to submit their cash (paid-in capital) and quasi-cash (subscribed capital) as the basis for their capital when they can create this using the LA and they are not constraint by reserve requirements by the Fed keeping in mind their US Dollar lending operations? In our view, this is a subtle draining of the national capitals or, in the context of the first issue, licit and illicit capital flights.

Werner (2018)⁶¹ shared that one of the prominent private investment banks based in Europe was in trouble due to a shortage of liquidity, in another word, they are running out of credit money and at the brink of bankruptcy. How did they escape from failure without asking for capital injection by their shareholders? Through their networks, they managed to sign a loan agreement with one of their sovereign clients in the Middle-east. They leveraged the LA as the basis to create the credit money they require to stay afloat. It appears ADB too can do the same with its sixty-eight sovereign member countries without requesting regular capital replenishments. Many have been asking about the true benefits of joining the ADB if they were constantly required to pay their stock-holding with zero profit sharing. On this point, VOC was more of a profitable investment notwithstanding, they were unsustainable, later liquidated, and dissolved.

Third, with the advent of the body of literature, both opinions and empirical in nature, on how the bank operates and they can create money even if they do not have any deposits, capital, or reserve, it can be contended that ADB's regular capital replenishment is unnecessary and seems as a bail-out in disguise as in the case of VOC.

Note: Our paper is flagging these unstainable issues and but not dealt with therein. These require separate studies which are beyond the scope of our paper.

⁶¹ Conversation with Prof. Richard Werner.
zyTX2nE&ab_channel=DialogueofCivilizationsResearchInstitute (10 Sept 2021)

https://www.youtube.com/watch?v=8FT-zyTX2nE&ab_channel=DialogueofCivilizationsResearchInstitute

Nevertheless, the overwhelming evidence on a bank's ability to create credit money, and the fact that ADB members do not receive dividend or profit-sharing payments, their regular capital replenishment or equity injection demanded by ADB from its member countries carries a psychological meaning. In which those borrowers, all of them developing countries, must pay only to relinquish control over their fund which has been collateralized with over seven times the value of the loans compared with about 1.5 with commercial banks. To this, Rodney (1973: p.115) contends; *"Power is the ultimate determinant in human society.... When one society finds itself forced to relinquish power entirely to another society that in itself is a form of underdevelopment."* (Emphasized)

11. BANKING PRACTICE ILLUSTRATIONS

To illustrate the gains from money creation under the three banking theories, this online calculator⁶² helps view those gains. The calculator uses the compounded interest formula of $A = P(1+r)^t$. We run two scenarios, namely *borrow-to-invest (BTI)* and *borrow-to-project finance with a \$10 annual withdrawal (BTPF)*. BTI refers to using the 100% borrowed fund and invested in a time deposit, whereas BTPF depicts the same investment scheme with regular withdrawal to fund the project progress payments. Annual interest (r) is using the estimated average ADB loans (energy loans included) to Indonesia of 4.727% and compounded annually. A hypothetical loan (P) of \$100 under LF and 10% bank reserve, hence, $100/10\% = \$1000$ ⁶³ money creation under FRB or CC. For (t), we applied eight years under LF to reflect the average ADB delay and five years for FRB/CC, which coincides with the ADB grace period when loan repayment begins in year-6 and the beginning of FRB/CC money creation reduction. We did not calculate the loan principal repayment plus interest to mirror the implementation phase or grace period of ADB loans. The results show gains (A) of \$44.70 (BTI) and \$23.48 (BTPF) under LF and \$12.60 for FRB. Hence, per \$1 loan is between \$0.24 and \$12.60 or 30% and 1170% for LF and FRB, respectively. This includes the newly created money plus compounded interest which is not in favor of Indonesia, hence a capital flight or loss.

This means for every one-year delay in ADB loan-funded project causing the borrower (i.e., Indonesia) to lose between \$0.03 (\$0.24/8year) and \$2.52 (\$12.60/5year) per \$1 loan or \$0.003-\$0.21 per \$1 loan per month under LF and FRB correspondingly. In brief, if ADB does not disburse the loan fund 100% in the year-1 upon LA signing, it costs the borrower between \$0.3-\$21⁶⁴ per \$100 loan per month under prevalent banking practices. The ADB (2018, footnote a: p. 37) states that for every 2 months the delay avoided in their project implementation might increase the net economic benefit by 1% of their loan portfolio, which is equivalent to \$0.5 per \$100 loan per month. Based on this, we infer that ADB is gaining interest through BTPF on undisbursed funds (See also U.S. Congress, 1968a: p.274).

12. METHODOLOGY

A Case Study with One Country and One Source of Funding

As identified by the World Bank (Bourguignon and Sundberg, 2007: p.316), Aldashev and Verardi (2012: p.2); Edwards (2014); and Howarth (2017: p.41-49) found that lumped aids and countries in the analysis have fragile, fragmented, ambiguous, spurious and gives inconclusive results. Hudson (2015: p. 66) concludes that the most important predictor of aid volatility is debt-financed loans. Dreher and Lohmann (2015: p.5) identified the gap in the literature on aid effectiveness because of the lack of empirical evidence at the country level. Hence, our paper covers only one country (i.e., Indonesia), one sector (transport, energy, water, and sanitation, or rural and urban development), and one component of the aid, which is the ADB loans (excluding grants or Technical Assistance).

⁶² Savings calculator at <https://www.thecalculatorsite.com/finance/calculators/savings-calculators.php> (17 Oct 2020)

⁶³ Smaller reserve ratio gives bigger results.

⁶⁴ Smaller reserve ratio, such as that of adopted by ADB, yields bigger values between minimum \$0.5-\$32 per \$100 loan per month.

Method

We apply the empirical method to provide a solid foundation for our recommendations. We use a quantitative attribution methodology identified as Development Outcomes Attribution (DOA) on Bank Outlays Growth On-development Results (BOGOR) (Ingratubun, 2020). This method relies on triangulation—a principle widely used in geodetic and geo-positioning (e.g., GPS) sciences—of the results which give a 3-dimensional view of the outcomes. DOA-BOGOR applies quantitative attribution by treating a scenario of 100% loan disbursement upon LA signing⁶⁵ in year-1 as the benchmark. We then compared this with progressive payment based on project budget versus actual disbursement's S-curve and integrated money creation, compounded interests, and fees from undisbursed amounts, using a triangulation of numerical, graphical, and stochastic agent-based modeling (SABM) approaches. In this paper, we only present the results from the graphical method.

The Philosophy of DOA-BOGOR

We define attribution of DOA as taking a slice of economic development (i.e., preferably current GDP or GDP per capita) indicators and examining their composition most relevant to the project/program, assessing and understanding their outcome apportionment to the source of funding which is ADB loans. Using these equations,

$$x_n = (A/g)_n \quad \dots (Eq.1)$$

where:

x_n = Annual attributor (e.g., growth, poverty, unemployment, etc); \bar{x} = Overall attributor; A = ADB loans (as % of GDP); g = attributor (growth, poverty, unemployment, etc)

13. THEORY AND HYPOTHESIS

Ibnu Khaldun, who appears to be a political ecologist and economist, in the 14th century predating all Nobel Prize laureates, likened capital to water with which it makes the surrounding areas flourished and green. Water is correlative to capital or credit, greens pastures, and fertile soils (Khaldun, 1377: p.465) and various economic indicators of GDP growth, wealth, unemployment, poverty, credit, wages, savings, productions capital, and consumption goods (Fisher, 1896: p. 534). Moore (1983) found statistically significant evidence on the impact of credit on employment (Moore, 1983, p.542). Keen (2014a, p.287) shows that credit and unemployment have an inverse correlation meaning as credit increases, unemployment decreases and conversely. Figure-5 shows Indonesia's situation which shows a significant (0.02) correlation of positive unemployment level by the increase of domestic credit creation.

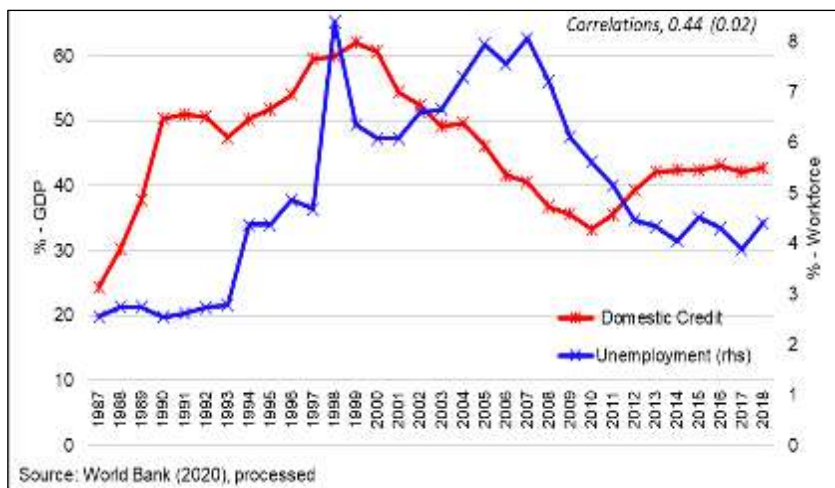


Figure 5. Indonesia Domestic Credit and Unemployment

⁶⁵ Keeping in mind that a signed LA is a promissory note and within the same day creates new money and generates gains thereupon.

This can be translated that 44% of the domestic credit creation pushed unemployment higher and 56% of the domestic credit has an insignificant impact on Indonesia's unemployment. We suspect that the bulk of these credits were expended in the non-GDP transactions such as financial assets purchases and real estate development. We shall see the correlation with ADB loans later.

14. DATA

Time-series data sets from ADB⁶⁶ (Appendix-C), World Bank⁶⁷, Ministry of Finance (MOF) of the Government of Indonesia (GOI), and St. Louis Fed (FRED).⁶⁸ The World Bank data provide the current GDP growth, current GDP, unemployment, poverty, imports. We got the exchange rates of USD/IDR from fx.com. FRED data caters to various interbank lending rates. We fill data gaps by interpolating or taking them from their neighboring values.

Graphics

After observing the data trend lines between linear, quadratic, and polynomial, we selected the *fractional polynomial* (FP) as an intermediate between nonlinear and polynomial regressions (Royston and Sauerbrei, 2007: p.27). We chose FP over linear regression since its Bayesian information criterion (BIC) is smaller. The smaller the AIC and/or BIC numbers are, the more accurate in representing the data in regression. Accordingly, we plotted all graphs under FP with the help of STATA. We converted negative growth for the year 1998⁶⁹ of -13.127 into zero in our Fractional Polynomial (FP) regression to get AIC and BIC⁷⁰ numbers as STATA software does not accept negative values. We needed these numbers to ensure our choice of FP is the best fit compared with other regression graphs. In the graphical plots, we maintained the negative value. FP's AIC and/or BIC constantly provided the smallest values over other regression methods, such as linear, polynomial. Hence, it is the most accurate in representing data accuracy. From the ADB loan dataset, we extracted energy loans to see their impacts on Indonesia's poverty level.

15. CORRELATION VS CAUSATION

One of the generic issues in development aid studies is the conundrum in presenting the correlation and causation of aid impacts. This is an ongoing struggle because other funding sources are almost impossible to separate from the aid intervention in funding development projects. For example, the construction of secondary schools. Even if the funding is 100% from development aid sources, the donors and recipient governments will struggle to claim or to accredit any success to their aid fund. This is because successful construction is inseparable from the good roads, bridges, drainage, water supply, logistics supply chain, availability of skilled labours and building materials, safety and security to name a few, all of which were funded by other sources. To bridge this issue, we offer our attribution quantitative-comparative methodology with clear correlation and causation relationships. In this paper, we are only showing the correlation.

16. RESULTS

With ADB loans attribute about 1.4%, 3%, and 0.02% of Indonesia's growth, unemployment, and energy poverty correspondingly, we reviewed Indonesia-ADB loans from 1969 to 2017. Figure-6 shows Indonesia's national performance whilst Figure-7 exhibits ADB loans operations' impacts.

⁶⁶ Source: <https://data.adb.org/dataset/statement-adbs-sovereign-loans-1968-2017> (17 Oct 2021)

⁶⁷ Source: World Bank Open Data <https://data.worldbank.org> or <https://data.worldbank.org/topic/economy-and-growth> (17 Oct 2021)

⁶⁸ Source: <https://fred.stlouisfed.org> (17 Oct 2021)

⁶⁹ Asian financial crisis, 1997-1998

⁷⁰ Akaike's Information Criteria (AIC) and Bayesian Information Criteria (BIC). AIC is a measure of regression model goodness of fit while BIC is a model selection parametric.

From Figure-6 we can see a glaring comparison of Indonesia's performance which has invariably sustained economic growth at 5.1%, reduced poverty level from more around 80% down to 10% (over 8 folds reduction) and reduce unemployment from 7.5% to 3% (more than double).

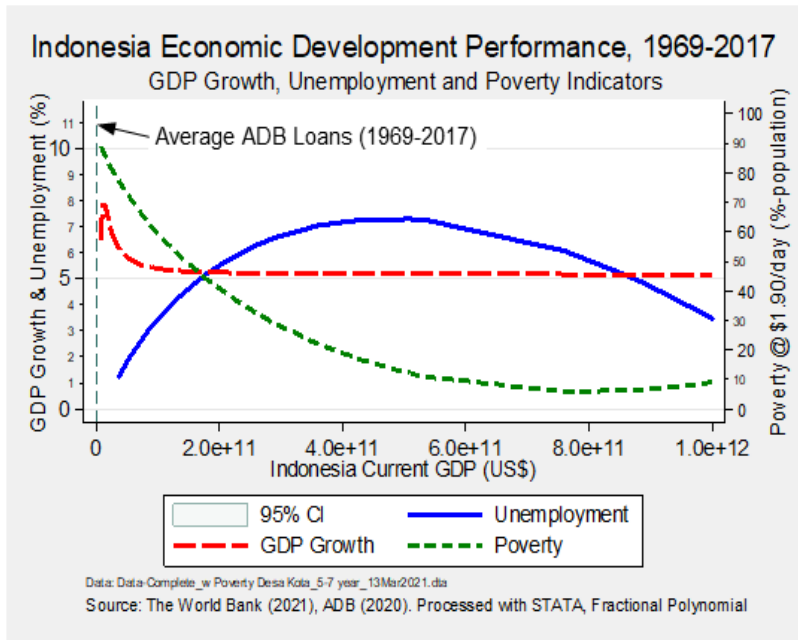


Figure 6. Indonesia National Economic Development Performance

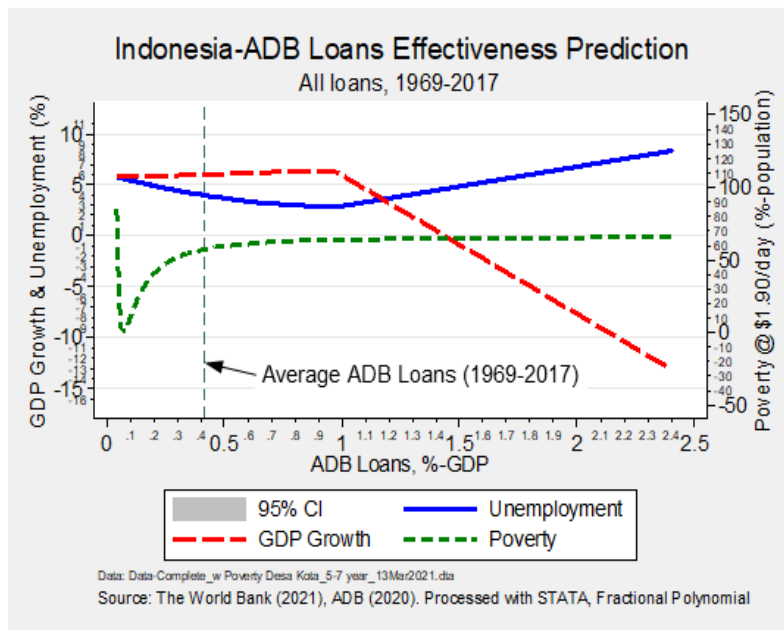
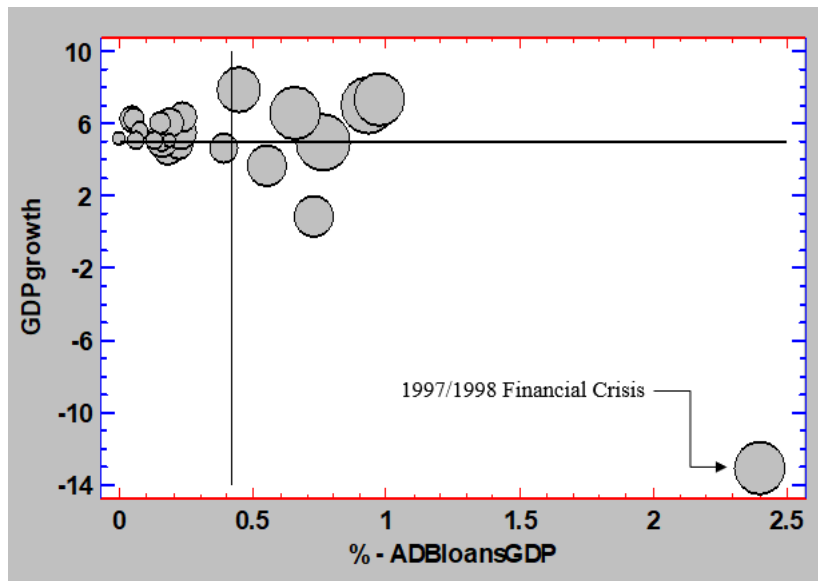


Figure 7. Indonesia-ADB Loans Impacts

On the contrary, ADB loans, despite initially showed short-term positive results such as reduction in both poverty (from 70% to 10%) and unemployment (from 5% to 2%) and a slight increase in GDP growth (from 6% to 7%), they show prolonged negative impacts (Figure-7).

As ADB loan increases—relevant to Indonesia's GDP—they correlate with negative impacts such as increased poverty level by seven times and unemployment by three folds. Growth is sharply reduced to negative as ADB loans exceed 1% of GDP. Figure-8 displays Indonesia's poverty bubble chart relevant to ADB loans sizes. From this, we observe counterfactual empirical data that as ADB loans get bigger, Indonesia's poverty level increases correspondingly proportional with the growth. This evidence establishes that ADB is not delivering its stated mission of growth promotion and poverty eradication. On the contrary, growth retardation and poverty furtherance. This serves as another

evidence that sustaining borrowing from the ADB for Indonesia's development is an unsustainable practice. Using different datasets, aggregated countries, and methodology, similar findings were exhibited by Easterly (2006) along with other independent researchers.



Source: ADB (2020) and World Bank (2020)

Figure 8. ADB Loan Correlation with Indonesia's Poverty

17. RECOMMENDATIONS AND CONCLUSION

In mitigating moral hazard⁷¹ (Coase, 1960), we recommend fundamentally reform the governance of ADB's loan disbursement and relinquish control over the loan fund to the joint account held by Indonesia and ADB's representatives in Indonesia's national banking systems. Rodney (1973) argues that control itself is a form of underdevelopment and exploitation. Keeping in mind that Indonesia provides more than sufficient collateral for all its loans. It requires complementary studies with different attributors, endogenized capitals, and LA conditionalities.

ADB appears to practice unsustainable banking practices under the guise of development. Both political economy and literature in banking and development aids expose the unsustainability of Indonesia's cooperation with ADB. This is supported by empirical evidence of the negative impacts on Indonesia's development. On one hand, Indonesia gains zero benefits from its shareholding, payments, and financial commitments of its stocks holding in ADB (as of 2017, a total of \$8 billion) which is continuously demanded by ADB to be replenished. Replenishment itself is a sign of unsustainable operations since it cannot self-sustain. On the other hand, Indonesia suffers capital flights over \$12 per \$1 loan, not only from the money creations under credit creation or endogenous money theories but also from paying interests which doubled every fifteen years on average. Remedying this is simple such as, among which, 100% disbursement in year-1 in Rupiah currency into Indonesia's national banks and refining vote and profit-sharing arrangements.

"Debt is a cleverly managed re-conquest of Africa. It is a reconquest that turns each one of us into a financial slave." ~ Thomas Sankara (1987).

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⁷¹ Amoral hazard is a situation in which decision-makers maximize their benefits while impairing others because of incomplete information on how things work, such as banking theories and practices and money creation.

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33 The role of the Financial Intermediary System in Development Policy, Highlighting Regional Development in the 2007-2013 EU Development Period in Hungary⁷²

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Abstract

This study aims to explore how the financial intermediary system could play a more significant role in regional development within the framework of higher-level development policies. In my investigation I focused on analysing the Hungarian financial intermediary system handling refundable subsidies from the European Union between 2007 and 2013. This period was chosen because it presents the most diverse range of institutions involved in mediating repayable subsidies, offering insights into tailoring financial solutions to the specific needs of beneficiaries.

The investigation's most significant finding: the expertise of institutions' experts in the market played the most important role in the effective deployment of repayable resources through intermediary institutions. The geographical proximity of financial intermediaries, while facilitating, is not the most significant factor in the successful deployment of support.

Furthermore, this research highlighted the potential for optimizing the use of financial instruments for cohesion purposes by integrating policies at a higher level. This integration would involve collaboration between the social and financial sectors, as well as territorial development policy. Such collaboration would enable the introduction of combined support products at the implementation level, where financial instruments could be complemented with non-financial support such as consultancy, education, or mentoring. These additional supports, particularly focusing on management, organizational development, and strategic planning, could enhance the effectiveness of financial instruments in delivering regional development.

1. FINANCIAL INTERMEDIATION AND ECONOMIC GROWTH

Financial intermediation plays a crucial role in economic growth and the formation of regional disparities. Supporting micro, small, and medium-sized enterprises (MSMEs), particularly startups, is of significant interest from a national economic perspective. The state and financial intermediaries influence this support by setting targeted sectoral and resource frameworks. Scholars such as Schumpeter (1980), King & Levine (1993), Mérő (2003) and Kay (2015) have highlighted the importance of financial intermediation in stimulating economic growth. Recent studies, like Yakubu et al. (2021), emphasize the short-term positive effects of financial intermediation on economic growth, particularly in countries like Turkey.

Understanding the relationship between financial intermediation and economic growth is crucial for effective development policies. Kay (2015) identifies four fundamental functions of the financial intermediary system: operating payment and settlement systems, linking investors and borrowers, reallocating financial resources across life stages, and risk management. Additional functions include information processing and overcoming incentive problems (primarily based on Merton & Bodie, 1995, as cited in Mérő, 2003; and Mérő & Erdős, 2010). However, financial institutions face

⁷² This study is a shortcut of the following article: Sára Somogyi-Farkas: *Unlocking the Potential of the Financial Intermediary System in Development Policy: A Focus on Regional Development* in: KÖZ-GAZDASÁG 19 : 1 pp. 77-102. , 26 p. (2024).

limitations in fulfilling these functions, leading to market failures and the need for state intervention, as emphasized by scholars like Tanzi (2011).

2. REPAYABLE EU SUPPORTS

The European Commission expanded its toolbox with support instruments managing repayable resources based on the Fifth Cohesion Report published in 2010. These instruments, including (micro)credit, capital, and guarantees, aim to support enterprise and infrastructure development, research, and innovation. Hungary began experimenting with these instruments in the 1990s, focusing on microfinancing. The 2007-2013 period saw a significant scale-up of these supports through the Jeremie program, targeting enterprise development.

The Jeremie program initially focused on microcredit, but expanded to medium-sized enterprises by the end of the period. However, ex-post evaluations revealed that the utilization of these financial products were not align with the originally intended target groups and there was still a prevailing financing gap⁷³ for domestic SMEs. In the 2014-2020 period, funding for repayable supports increased nearly threefold, with expanded objectives covering research, innovation, SME competitiveness, energy, and employment.

During the 2007-2013 period, various types of financial intermediaries facilitated the transfer of funds to businesses, including banks, enterprise development agencies, and venture capital funds. However, the 2014-2020 cycle saw a shift towards a more centralized institutional structure led by the Hungarian Development Bank (MFB). The MFB implemented an agency-type intermediary model for credit products, establishing MFB points across the country. Despite high territorial coverage, challenges persisted in reaching target groups, especially micro-enterprises⁷⁴. The deployment of venture capital also underwent changes, with the establishment of Hiventures to manage funds, aiming for more efficient allocation. However, challenges remained in aligning the intermediary system with local priorities and ensuring cohesion policy effects.

3. TERRITORIAL CHARACTERISTICS OF FINANCIAL INSTRUMENT UTILIZATION DURING THE 2007-2013 EU DEVELOPMENT PERIOD IN HUNGARY

This short analysis, primarily based on secondary sources due to limited access to territorial data, aims to explore the distribution and the territorial patterns of the financial instruments. During the 2007-2013 EU development period in Hungary the utilization of financial instruments was marked by distinct territorial characteristics, reflecting a concentration in urban areas and highlighting significant disparities between urban and rural regions.

The lack of detailed sub regional data on Hungary's development-oriented financial instruments (2007-2013) partly required me to rely on policy papers prepared according to the standards of the European Commission, and partly to apply a new information-gathering methodology. It is also important to note here that the lack of territorial data is not unique to Hungary, as the ESPON 2019 report highlights, in terms of financial instruments, there was a general scarcity of subregional territorial data in the EU member states for the period 2007-2013.

Information on the territorial pattern of utilization of financial instruments during the 2007-2013 development cycle in Hungary is just partly available through the mid-term central evaluation (KPMG, 2013) and the subsequent final evaluation (Századvég, 2016). The distribution of financial instruments during the 2007-2013 cycle exhibited strong territorial concentration, with urban areas, particularly Budapest and cities with county rights emerging as primary beneficiaries. Regarding the sectoral classification of beneficiaries, the highest territorial concentration is observed among

⁷³ According to data published by the Hungarian Development Bank (MFB) in 2016, there was a prevailing financing gap of 570 billion HUF in the Hungarian economy (MFB, 2016).

⁷⁴ The evaluation of the financial instruments for the 2014-2020 period highlights that “the new institutional system, despite a larger number of customer access points, was less successful in accessing micro-enterprises, thus, addressing this segment requires specific banking incentives and methods” (Prime Minister’s Office, 2021)

companies operating in the information and communication sector and 60% of the financial instruments were utilized in the Central Hungary region. (Századvég, 2016).

In the deployment of capital products, urban-rural disparities exert even stronger dominance, with Budapest's influence standing out prominently in the details. While the competitiveness region were largely excluded from various constructions or received significantly lower resource allocations, in the case of urban areas located in the nearest convergence regions, as evidenced by the Századvég evaluation in 2016, beneficiaries often comprised businesses headquartered in the capital but operating activities in the neighbouring rural areas.

The 'Budapest effect' in capital product placement may be attributed to the city's concentration of capital funds and research, development, and innovation activities. Financial instruments also reached businesses operating in rural areas, but mainly in those regions which proximate to the capital.

Specialization among institutions is also observable from a territorial perspective. According to the ex-ante study by Századvég (Századvég, 2016), during the designated period, two-thirds of credit cooperatives participating in the program were located in settlements with populations below 5,000.

4. METHODOLOGY

Given the dearth of detailed territorial data, a qualitative approach, employing the Delphi method, was adopted for data collection and analysis. This method, widely used across various domains, facilitated consensus-building among experts through iterative rounds of questioning.

Expert participants, selected based on their involvement in territorial development policies and financial instrument implementation, provided insights into the characteristics and challenges of EU financial instruments.

The first round of interviews focused on identifying key characteristics of successful institutional frameworks and assessing changes and challenges in the 2007-2013 and 2014-2020 development cycles. Statements derived from these interviews formed the basis for the second round of questioning, where experts evaluated some statements on a Likert scale. The aim was to foster some consensus statements among experts.

5. RESULTS

Analysis of expert consensuses revealed key insights into the effectiveness and challenges of EU financial instruments. Consensus statements highlighted the importance of market experience in institution experts, from the perspective of the financial intermediary institutions the role of specialization in financial products and the need for an integrated policy mix to align financial instrument deployment with strategic development objectives.

While the geographical proximity of financial intermediary institutions to businesses was considered important for central planning, the study emphasizes enabling target groups to access resources, including the promotion of financial literacy and agility.

6. SUMMARY AND CONCLUSIONS

The analysis underscores the need for a more integrated approach to development policy, emphasizing collaboration between the public and financial sectors to address territorial disparities effectively. Specialization in financial products from the aspect of the financial intermediary institutions and an integrated policy mix were identified as crucial factors in enhancing the impact of financial instruments on territorial development. For example, a policy mix can facilitate the creation of more complex support products, in addition to the combination of currently existing repayable and non-repayable support, innovative methods could be used to supplement credit or guarantee products with educational or mentoring support. These latter additions could include the development of sustainable management, leadership, organizational development, and strategic planning skills of the final beneficiaries.

Overall, the study calls for institutional and governance reforms to reduce regional disparities and promote sustainable economic development. By strengthening local structures and developing a more integrated development policy, Hungary would be able to increase the effectiveness of EU financial instruments in order to achieve its development goals.

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45 High-Speed Railway station Impact on Regional Economic Development in China: An Empirical Analysis Using the SDID Model

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Abstract

This research delves into the profound implications of high-speed railway station construction on regional economic development in China. Employing the SDID model, the study meticulously analyzes the opening of high-speed railway stations and its subsequent impact on county-level economies. The findings, drawing from empirical data, underscore the following pivotal conclusions: Firstly, the study establishes a positive correlation between the introduction of high-speed railway stations and economic growth at the county level. Beyond the direct impact, the research illuminates the existence of spatial spillover effects, affirming the transformative influence of high-speed railway station construction on county economies. Secondly, the investigation reveals that high-speed railway station openings play a crucial role in the upgrading of industrial structures within counties. This effect is particularly pronounced in central and western regions, emphasizing the broader implications for economic activity concentration and growth in both primary and tertiary industries. Thirdly, the study highlights the nuanced nature of the impact of high-speed rail construction, contingent on regional characteristics such as existing infrastructure, population density, and industry structure. Policymakers are urged to consider these local nuances for effective planning and implementation.

In light of these conclusions, the research posits several key policy recommendations. Firstly, a thorough evaluation of the economic impact on neighboring counties is recommended before planning and constructing high-speed rail networks to mitigate potential negative spatial spillover effects. Secondly, policymakers are encouraged to adopt spatially differentiated policies, considering both direct and spatial spillover effects. Tailored approaches, accounting for regional disparities in economic development, can maximize the positive impacts of high-speed rail infrastructure. Thirdly, recognizing the spatial agglomeration effects of high-speed rail stations, the study recommends strategic placement in central locations to enhance economic networks, fostering inter-regional trade and facilitating the flow of people, goods, and capital. Lastly, the study underscores the importance of prioritizing accessibility and connectivity. High-speed rail, by reducing commuting costs, attracts residents to areas with lower living costs and high environmental quality. Policymakers should ensure selected station sites are easily accessible and connected to local transportation modes, with a focus on counties with significant economic development potential.

In conclusion, this research contributes valuable insights into the multifaceted impact of high-speed railway infrastructure on China's economic development. By considering regional nuances and implementing targeted policies, high-speed railway has the potential to serve as a catalyst for sustainable economic growth, industrial advancement, and spatial integration across the nation. Future research could delve into heterogeneous effects on economic growth and explore broader impacts on the environment, society, and culture.

Keywords

Spatial spillover externality; Spatial heterogeneity; Industry heterogeneity

1. INTRODUCTION

The rapid development of China's economy has been greatly supported by the construction and acceleration of the high-speed railway network. In the past decade, China's high-speed rail construction has undergone significant improvements and progress. The national high-speed rail passenger traffic has increased at an average annual growth rate of 23.38% from 2012 to 2020, with an average increase of 21.37% in passenger turnover. China's high-speed rail planning has been upgraded from the "four vertical and four horizontal" plan in 2008 to the "eight vertical and eight horizontal" road network construction plan. By 2013, 317 districts and counties across the country had opened high-speed rail stations. This figure increased to 510 in 2019. As of December 2021, China's high-speed rail operating mileage exceeded 40,000 kilometers, ranking first in the world. China's total railway operating mileage exceeded 150,000 kilometers, ranking second in the world. It is of great practical significance to study the influence of high-speed rail on the regional economic development of China.

As the most fundamental administrative and economic unit in China, the county economy is a fusion zone of rural and urban economies. The opening of high-speed rail station in county-level provides a more efficient and convenient way of commuting between rural areas, counties, and cities. Since 2008, China's high-speed railway construction has included a large number of counties into the coverage of the railway network, and the energy radiation of the development of the central urban area has gradually shifted to the county space, the county area has become an important node for network development. The network structure of high-speed rail in county-level has become an important spatial model that needs to be explored.

This paper conducts empirical research based on the natural experiment of HSR station opening at the county-level in China from 2013 to 2019 to explore the neighbor effect and regional heterogeneity caused by the HSR station to the county economy, with the aims to test the following two correlations: first, whether the high-speed rail stations opening will bring economic growth and spillover at the spatial level of the county economy; second, whether it will help the development of a more balanced spatial structure of the national county economy, and whether it will promote the further agglomeration of the macro-regional economy in space; third to explore whether the HSR will improve the industry structure to utilize the high-quality economy. Building upon the existing literature, this study employs the Spatial Difference-in-Differences (SDID) model to investigate the spatial neighbor effects, regional heterogeneity effects, and industry heterogeneity effects of high-speed rail opening on county-level economies wishing to provides a powerful tool for isolating the causal impact of high-speed rail development while controlling for potential confounding factors, thereby enhancing the robustness and validity of the empirical findings.

The remainder of this paper is structured as follows: the second part provides a literature review, followed by the third part, which presents the theoretical hypothesis. The fourth part discusses the data sources and variable design, and the fifth part introduces the model construction. The sixth part discusses the impact of high-speed rail access on the spillover of county economic space, the impact of high-speed rail spillover on regional disparity, and the influence of high-speed rail on the high-quality development of regional economy through tertiary industry development. The seventh part concludes the article.

2. LITERATURE REVIEW

Three main aspects have been identified by scholars regarding HSR's impact on the regional economy. The first aspect is the economic growth effect, which takes roles in accelerating transportation and communication efficiency and reducing commuting and transportation costs to improve regional economic growth. Aschauer (1989), Rohr and Williams (1994), Goodwin and Pearman (1994), Bruyelle and Thomas (1994), Zhang Nannan and Xu Yilun (2015), Kim Kwang Sik (2000), Sun Feiyang and Mansury Yuri S (2016), Ahlfeldt Gabriel M, Feddersen Arne (2010), Vickerman Roger (2015), and Zhang Xueliang (2012), have demonstrated the positive impact of HSR on economic growth, and three dimensions have been involved, namely, the investment effect,

cost-saving effect, and market access effect. The second aspect is the industrial structure effect of HSR, which transforms the industrial structure from primary to advanced industries in less developed areas. This facilitates the introduction of advanced production technology and human capital from developed areas to developing areas to enhance local county-economic efficiency, as demonstrated by Li Yuwei and Ni Pengfei (2013) and Qin (2017). The third aspect is the spatial structure effect, as explored by Ding Qiuxian, Zhu Lixia, and Zhang Hui (2015), Wang Li, Cao Youhui, and Qiu Fangdao (2017), Yu Tao, Chen Zhao, and Zhu Pengyu (2012), Calderón and Servén (2004), Dong Yanmei and Zhu Yingming (2016), and Wang Yufei and Ni Pengfei (2016), the impact of transportation infrastructure on the differentiation of regional economic development through spatial clustering and diffusion effects. The existing body of research, including studies by Calderón and Servén (2004), Dong Yanmei and Zhu Yingming (2016), and Wang Yufei and Ni Pengfei (2016), has demonstrated that transportation infrastructure affects the differentiation of regional economic development through the spatial agglomeration and diffusion effects proposed by the new economic geography school. This has resulted in heterogeneous development of spatial economies, as documented by scholars such as Clark et al. (1969) and Keeble et al. (1982). But as to whether this heterogeneity is more beneficial to develop or backward areas takes divergent views in the academic community. Vickerman (1995), Rodríguez-Pose and Fratesi (2004), and Rietveld (1989), have found through research on Europe's inter-regional transportation network that transportation infrastructure tends to favor core areas over economically backward peripheral areas. Thus, it may not be advisable to rely solely on transportation infrastructure, such as high-speed rail networks, to reduce the regional economic gap between developed and backward areas. The infrastructural endowment, which is referred to as the "social fixed capital", is an important strength to improve economic growth (Aschauer, 1989; Munell, 1990; Hulten and Schwab, 1995). High-speed rail (HSR), as a modern and significant transportation infrastructure, has received considerable attention from researchers in terms of its role in regional economic development (Elhorst and Oosterhaven, 2008; Tierney, 2012; Chen, 2012; Duranton and Turner, 2012; Ahlfeldt and Feddersen, 2015). These studies have focused on the relationship between HSR and economic growth, but have relatively paid less attention to regional economic disparities, such as why certain areas are more developed than others and how HSR affects regional economic integration, division, and agglomeration growth. Such disparities arise from the differential flow of population and factors in different regions. This, in turn, leads to different spatial economic development outcomes in the area (Li et al., 2014). Therefore, exploring the impact of HSR on regional disparities is an essential approach to guide policy-making for local governments.

Several studies suggest that the construction of HSR has a powerful economic agglomeration effect (Hall, 2009; Urena et al., 2009; Qin, 2017; Shao, 2017; Jetpan Wetwito and Hironori Kato, 2017). Prior research (Calderón and Servén, 2004; Dong Yanmei and Zhu Yingming, 2016; Wang Yufei and Ni Pengfei, 2016) has indicated that transportation infrastructure affects the differential differentiation of regional economic development through the action of two economic forces, namely spatial agglomeration (Krugman, 1985) and spatial diffusion effect (Baum-Snow, 2007), leading to the heterogeneous development of the spatial economy (Clark et al., 1969; Keeble et al., 1982).

However, the academic community holds different views on whether this heterogeneity is more beneficial to developed regions or backward regions. Some scholars (Vickerman, 1995; Rodríguez-Pose and Fratesi, 2004; Rietveld, 1989) have found that transportation infrastructure, such as Europe's trans-regional transportation network, is more conducive to the economic growth of the core region than the marginal and backward regions. Therefore, reducing the regional economic gap between developed and backward regions through transportation infrastructure may not be advisable, and exploring the impact of HSR on regional disparities is an essential approach to guide policy-making for local governments, represented by HSR networks. Using the Kuznet curve, Chen and Haynes (2017) analyzed the influence of the Chinese HSR system on regional economic disparities, while Qin (2017) investigated the distributional impact of high-speed rail upgrades in China using the general equilibrium effect and shows the importance of access in HSR. Ahlfeldt and Feddersen (2018) measure agglomeration effects using HSR, while Faber (2014) suggests that

improved transport linkages can benefit core regions at the expense of peripheral regions through a trade channel.

In terms of research tools, previous studies have primarily used the double differential DID model, mainly focusing on city-level research samples (Wang and Meng, 2014). However, when conducting the DID analysis, they did not examine the externalities caused by spatial spillover effects at high-speed rail sites. Ding et al. (n.d.) studied the threshold effect of infrastructure space spillover but did not consider the regional economic heterogeneity caused by the opening of high-speed rail stations. Afterall, these studies both important on the relationship between the HSR and economy growth, but less on regional economic disparity, such as why certain areas are more developed than others? Or how the HSR affects the regional economic integration, regional division, regional agglomeration growth, these are both caused by the different flow of population and factors in different regions, and then caused different final spatial economy development in the area (Li et al., 2014). So, to query how the HSR effects on the regional disparity is another important way to give the local government some policy guide.

3. THEORETICAL HYPOTHESIS

The phenomenon of space spillover in the county economy refers to the externalities caused by the spatial proximity effects from adjacent counties and the agglomeration effect from peripheral areas towards central areas. High-speed rail (HSR) is considered to be a critical factor in promoting regional economic development and plays a significant role in achieving the development of the county economy. Based on prior research, this study employs a spatial double difference model (SDID) to investigate the temporal effect of HSR on the county economy, and to examine the spatial effect of HSR on neighboring areas and the regional spatial structure effect of HSR on the county economy. Specifically, this study aims to determine whether the opening of HSR stations at the county level in China breaks or maintains the spatial structure imbalance. In other words, does the opening of HSR stations at the county level promote further agglomeration or diffusion of China's spatial structure? To answer this question, we used county-level data from 2013-2019 in China to investigate the causal effects of HSR on the structure of economic space at the county-level and to determine whether the opening of HSR stations caused regional spatial externalities. The aim is to demonstrate the unbalanced effect of HSR access on the spatial structure of the county economy. Based on the foregoing, we propose the following theoretical hypotheses:

3.1 The Spatial Spillover Effect of HSR Access on the County Economy

In addition to serving as a factor in infrastructure construction, HSR also promotes economic growth through spatial externalities, that is, the opening of HSR and HSR stations has spatial economic effects. The rapid development of HSR provides a good sample for studying HSR as transportation infrastructure. Chinese scholars, including Liu Bingyun and Zhang Xueliang, have investigated the spatial spillover effect of transportation infrastructure on total factor productivity growth, as well as the spatial spillover effect of foreign transportation infrastructure on local economic growth. Their research proved that the spatial spillover effect is greater than the direct effect on local economic growth. Foreign scholars Nakamura and Ueda (1989) compared the population growth rates of external areas and shinkansen urban areas and found that the shinkansen has a significant spatial agglomeration and siphon effects on the population of external areas. Moreover, the establishment of HSR stations has a positive impact on the rural economy due to local natural tourism resources. Therefore, the opening of HSR stations can lead to the formation of denser, more developed, and efficient traffic networks between county economy, in addition to the direct investment effect that drives economic growth, also has a spatial externality effect on the economy of neighboring counties. Based on this, we propose the following hypothesis:

Hypothesis 1: HSR access can promote spatial spillover externalities at the county level.

3.2 The spatial structure effect of HSR access on the county economy

The phenomenon of unbalanced economic growth, as the essential characteristic and objective expression of regional economy, is often reflected through regional selectivity rather than comprehensiveness of economic growth. The county economy, as a diversified space, also shows the characteristics of unbalanced growth in different regions, with a difference between developed areas and backward areas, and universal growth of county economy is not observed. The theory of new economic geography suggests that the spatial gathering of economic activities improves the spatial efficiency of agglomeration areas and endogenously promotes regional economic growth.

The presence of high-speed rail (HSR) stations, as noted by Kingsley E.H. (1997), represents a change in the spatial interaction patterns of regional connections and regional industrial complexes. The work of Gimpel (1993) further highlights the important role of HSR networks in changing socioeconomic structures and regional spatial patterns. Additionally, Thompson (1994) notes that HSR offers greater opportunity and competitiveness for peripheral areas that are far from the outlying conditions in which the core area is at a disadvantage. Therefore, the opening of HSR stations can lead to the formation of denser, more developed, and efficient traffic networks between central cities and marginal areas, resulting in changes to the regional and urban spatial structure due to the spillover effect and agglomeration effect. As such, this study proposes the following hypothesis:

Hypothesis 2: Access to HSR can promote the spatial agglomeration from backward areas towards developed areas.

3.3 The industrial structure effect of HSR access on the county economy

According to the theory of equilibrium development proposed by Rosenstein-Rodan (1943), infrastructure development should meet local industrial specialization needs. Several studies have shown that the construction of high-speed rail has a significant positive impact on regional economic growth in eastern and large high-speed rail cities through employment, including secondary and tertiary industries, with a negative impact observed in other regions, consistent with Puga's findings. This suggests that the construction of high-speed rail may reduce the consumption level of cities with lower service or consumption levels, benefiting large cities and to some extent, harming small cities. Moreover, the construction of high-speed rail has a positive effect on the economic growth of high-speed rail cities in the west by affecting the employment of the primary industry. Studies by Arduin (1995) and Bonnafeous (1995) found that new high-speed rail stations in France have boosted the local economy and greatly encouraged the development of commerce, tourism, and other services. Additionally, Gibb et al. (1990) studied the impact of the Channel Tunnel on the surrounding area of the UK, focusing on the impact on ports and tourism in Devon and Cornwall. Therefore, this study proposes the following hypothesis:

Hypothesis 3: The HSR stations has a positive effect on the upgrading of the county's economic and industrial structure, particularly in terms of the upgrading of the secondary industry to the tertiary industry.

4. DATA SOURCES AND MODEL BUILDING

4.1 Data sources

The empirical study in this paper mainly uses the high-speed rail opening and economic development data at the district and county level in China from 2013 to 2019. This paper retains 14,252 observations from 2,036 districts and counties as analysis samples after removing the samples of districts and counties with incomplete data.

District and county high-speed rail opening data is mainly based on the "high-speed rail network" high-speed rail opening public information statistics, as of 2019, this paper counted a total of 14252 districts and counties that opened high-speed rail stations nationwide. Districts and counties across the country are considered as quasi-natural laboratories, and control groups and uncontrol groups are set up based on the opening or non-opening of high-speed rail stations. Dummy variables are

used to represent districts and counties that have opened high-speed rail stations (represented by '1') and those that have not (represented by '0')." District and county GDP as the dependent variable, primary industry GDP "ARG", secondary industry GDP "IND", district and county area "SIZE", primary industry and secondary industry output value proportion "INS", economic density as the control variable, the national districts and counties are divided into East China, North China, South China, Southeast China, Southwest, Northwest and Northeast seven regional plates, the spatial spillover effect of high-speed rail stations is introduced into the general SDID model, that is, the spatial double difference model. The spatial spillover effect and spatial heterogeneity of the county economy brought about by the opening of high-speed rail stations were analyzing, and the spatial heterogeneity was based on the east-west and north-south differences of the county economy, and the impact of industrial upgrading and high-quality development brought about by them.

4.2 Model building

The Spatial DID (Spatial Differences-in-Differences, SDID) model is set on the basis of the traditional dual difference model, which fully considers the avoidance requirements of spatial multicollinearity. Classical SDID models include: Double Differential Spatial Error Model (SEMDID), Double Differential Spatial Autoregressive Model (SARDID), Double Differential Space Doberman Model (SDMDID), etc. The biggest feature of the spatial econometric model is that it relaxes the assumption that the spatial units are independent of each other, that is, there is a correlation between the local area and the neighboring area, and the changes in the local area variables not only directly affect the local area, but also affect the neighboring area, and finally act on the local area by affecting the neighboring area. The impact of the region on the region is called the Direct Effect, and the average impact of the region on the neighboring area is called the Indirect Effect or Spatial Spillover Effect.

The Spatial Lag of X Model (SLX) is the most combined with DID in the spatial econometric model, and SLX introduces (all) the spatial lag term of the independent variables at the right end of the equation of the ordinary linear model, in the form of equation (1)

$$Y = \alpha_1 N + X\beta + WX\theta + \epsilon \quad (1)$$

WX in equation (1) is the spatial lag term for all independent variables, and since the right end of the equation does not include the spatial lag term of the explanatory variable, the model can be treated as an ordinary linear model and estimated using the ols method. Thus, the β in equation (1) measures the magnitude of the direct effect, and θ measures the magnitude of the indirect effect (Vega & Elhorst, 2015). SDID is based on equation (1), but only the spatial lag term of the DID interaction term on the right side of the equation, and the rest of the independent variables are used as control variables in their initial form, like equation (2):

$$Y = \alpha_1 N + X\beta + \varphi did + \theta Wdid + \epsilon \quad (2)$$

Among them, φ represents the direct effect of policy, that is, the treatment effect to be examined in most papers, while θ represents the indirect effect or spatial spillover effect of policy. According to the above standard DID model, the spatial DID model for the establishment of high-speed rail stations to the economic growth of counties across the country is as follows:

$$\ln Y_{it} = \alpha + \theta did_{it} + \beta_1 \ln ARG_{it} + \beta_2 \ln IND_{it} + \beta_3 \ln SIZE_{it} + \beta_4 \ln INS_{it} + u_i + v_t + \mu_{it} \quad (3)$$

where Y_{it} is the variable being explained, high-speed rail station D_{it} is the explanatory variable, and the control variables are primary industry ARG_{it} , secondary industry IND_{it} , county area $SIZE_{it}$, and the output value ratio INS_{it} of the primary industry and the secondary industry.

Moreover, taking spatial factor into model (3), the generally spatial econometrics model as follow:

$$\ln Y_{it} = \rho W \ln Y_{it} + \alpha + \theta did_{it} + \beta_1 \ln ARG_{it} + \beta_2 \ln IND_{it} + \beta_3 \ln SIZE_{it} + \beta_4 \ln INS_{it} + \theta' W \times did_{it} + \beta'_1 W \times \ln ARG_{it} + \beta'_2 W \times \ln IND_{it} + \beta'_3 W \times \ln SIZE_{it} + \beta'_4 W \times \ln INS_{it} + u_i + v_t + \mu_{it} \quad (4)$$

With $\mu_{it} = \lambda W \mu_{it} + \epsilon_{it}$

Where the coefficient of θ is the treatment effect, and θ' is the spatial term of did used to capture the spill-over effect of high-speed rail. Especially, if $\rho \neq 0, \lambda \neq 0$ and $W \times X_{it}$ in the model this is the SAC-DID. If $\rho = 0, \lambda \neq 0$ it is SEM-DID; if $\rho \neq 0, \lambda = 0$, it is the SDM-DID, without taking spatial term into the model it become the SAR-DID.

W is the spatial weight matrix, with the value of 1, if the distance between two district($distance_{ij}$) is larger than 20km, and value of 0, with the distance smaller than 20km.

$$W_{it} = \begin{cases} 1, & distance_{ij} > 20km \\ 0, & distance_{ij} < 20km \end{cases} \quad (5)$$

4.3 Variable Description

The purpose of this paper is to investigate the disparity of economic growth, industrial structure and spatial economic growth between the districts and counties with and without high-speed rail opening in the seven major regions of the country(according to the spatial distribution of China's regional economy, it is divided into Central China, South China, North China, East China, Southwest, Northwest and Northeast) from 2013 to 2019, thus demonstrating the impact of high-speed rail opening on high-quality economic development and spatial economic agglomeration. In the summary, the descriptive statistics of the main variable involved in this paper are report in Table 1.

Table 1. Descriptive statistics of main variables

Variables	Variable representation	N	MIN	MAX	MEAN	SD
station	HSR station open	14,252	0	1	0.122	0.327
d1	East China	14,252	0	1	0.212	0.409
d2	South China	14,252	0	1	0.156	0.363
d3	Central China	14,252	0	1	0.0742	0.262
d4	North China	14,252	0	1	0.146	0.353
d5	Southwest	14,252	0	1	0.162	0.368
d6	Northwest	14,252	0	1	0.0845	0.278
d7	Northeast	14,252	0	1	0.166	0.372
lnarg	The logarithm of primary industry gdp	14,252	7.518	14.28	12.05	1.035
lnind	The logarithm of secondary industry gdp	14,252	4.419	16.85	12.95	1.390
ins	Proportion of primary industry to secondary industry	14,252	0.0678	119.1	1.285	1.881
r3	Proportion of tertiary industry to gdp	14,252	0.0607	0.910	0.392	0.112
lnsize	The logarithm of county area	14,252	4.043	12.22	7.732	0.949
lngdp	The logarithm of gdp	14,252	9.674	17.52	13.91	1.142

5. EMPIRICAL TEST RESULTS

5.1 The Spatial Growth Effect of High-Speed Railway on County-level Economy

According to hypothesis 1: HSR access can promote spatial spillover externalities at the county level. We use the Double Difference Fixed Effects Model to estimate the spatial growth effect of High-Speed Rail on the County-level Economy, consider the spatial correlation between the independent variable spatial lags and the dependent variable, the results are as follows in Table 2:

Table2. The Double Difference Fixed Effects Model of HSR to County-level Economy growth

	SAC		SDM		SEM		SAR	
	Estimate	Se	Estimate	Se	Estimate	Se	Estimate	Se
lambda	0.44251082*	0.241511	-2.1791***	0.619951			-2.17484***	0.638415
rho	-5.7747471**	2.767679			-4.32753005***	1.302323		
station	0.01025551**	0.004148	0.009996*	0.004143	0.01017689**	0.004148	0.014484***	0.004277
lnarg	0.17489446***	0.002133	0.174842***	0.002132	0.17495354***	0.002133	0.174491***	0.002183
lnind	0.44470575***	0.003624	0.443896***	0.003627	0.44462875***	0.003625	0.425024***	0.003632
lnsize	-0.021378***	0.001521	-0.02145***	0.001519	-0.02140889***	0.001521	-0.02125***	0.001565
ins	0.05150236***	0.000867	0.051421***	0.000866	0.05149775***	0.000867	0.053259***	0.000893
wstation	-3.5492109***	0.342681	-3.52878***	0.342274	-3.5431169***	0.34269		
wlnarg	1.22387027***	0.121562	1.218013***	0.121428	1.22221546***	0.121568		
wlnind	0.54634857***	0.059642	0.545242***	0.059578	0.54606068***	0.059645		
wlnsize	0.57548471**	0.181951	0.573506**	0.181743	0.57505111**	0.181959		
wins	-0.0321	0.020527	-0.03185	0.020507	-0.03201	0.020529		

*, **, *** denote significance at the 10%, 5%, and 1% levels, respectively, for $\Pr(>|t|)$.

From the four models SAC, SDM, SEM, and SAR DID estimate result list in table 1, two roles can be seen from HSR regarding the County-level economy:

First, the spatial economic growth effect can be seen in table 2.

According to the data in the table, it can be seen that the influence of high-speed railway stations on county-level economies is significant in the SDM, SEM, and SAR models, and the impact is also close to significant in the SAC model. In the SDM, SEM, and SAR models, the coefficient of the impact of high-speed railway stations on county-level economies is 0.009996, 0.01017689, and 0.014484, respectively, all of which are positive, indicating a positive correlation between high-speed railway stations and county-level economies. This means that setting up more stations within a county will promote its economic development. The SAC model shows a slightly larger positive impact coefficient of 0.01025551 for high-speed railway stations compared to other models. This suggests that in the SAC model, the influence of high-speed railway stations on county-level economies is more significant and the spatial correlation within the economic system is strong and significant. Therefore, the opening of high-speed railway stations has a direct promotional effect on the economic growth at the county level.

As to the industry structure, the positive significant effect can be seen from HSR station to the primary industry and second industry. According to the data in the table, there is a positive correlation between the high-speed railway station and agricultural economy ($\ln \arg$) in all four models, and the regression coefficients are significant in all models (the $\Pr(>|t|)$ values are all less than 0.01). This indicates that the opening of a high-speed railway station can promote the development of the agricultural economy. One possible explanation is that the development of the county town brings more market demand and economic vitality, which stimulates the development of the surrounding agricultural economy. In addition, the construction of modern facilities and service facilities in the county town can also improve the efficiency and quality of agricultural production, thereby driving the development of the agricultural economy. Regarding the secondary industry, according to the regression results table given, it can be seen that in the SAC, SDM, and SEM models, the high-speed railway station is positively correlated with the natural logarithm of the secondary industry, while this variable is not included in the SAR model. Specifically, in the SDM model, the coefficient of the high-speed railway station is 0.009996 (with a p-value of 0.0158), and in the SEM model, the coefficient is 0.010177 (with a p-value of 0.0141). This means that when controlling for other factors, an increase in the high-speed railway station is accompanied by an increase in the natural logarithm of the secondary industry. In other words, the construction of high-speed railway stations has a positive impact on the development of the secondary industry. From the given table, we can also see that the station (high-speed railway station) is positively correlated with the ratio of the primary and secondary industries ($\ln s$), indicating that the establishment of a high-speed railway station will lead to an increase in the proportion of the primary industry and a decrease in the proportion of the secondary industry. Specifically, in the SAC, SDM, and SEM models, the coefficients of the station are 0.0515, 0.0514, and 0.0515 respectively, and the p-values in all models are less than 0.05, indicating that this result is statistically significant. Therefore, it can be seen that the opening of a high-speed railway station is more conducive to the development of the primary industry compared to the secondary industry.

Second, got the space externality effect from HSR to the County-level economy.

In the SDM and SEM models, the estimated coefficients of ρ here are -4.3275 and -2.1748, respectively, both negative and significant, indicating that an increase in economic activity level in surrounding areas would lead to a decrease in economic activity level in the region. The significant impact of the high-speed railway station in this county has a negative spatial effect on the economy of neighboring counties, indicating that the high-speed railway station in this county has negative spatial spillover effects on the economy of neighboring counties. This suggests that high-speed railway stations have significant spatial agglomeration effects, significant spatial autoregression, and obvious spatial growth effects, with a significant positive effect on the neighboring county areas. But as to the industry structure, couldn't see the significant adjacent relation effect, both the primary industry second industry are got no significant effect from HSR to the labor-county-economy.

5.2 The dynamic effect of HSR on economic growth

In this paper, we use the panel data to estimates the effect of highway access on the regional economic growth, which is different with the traditional DID method that has two-period sample only. And especially, in our sample, there are some treat group that has affect by the HSR in the first year of 2013. Hence, we select the sample that HSR doesn't open in 2014 to estimates the dynamics effect of HRS. As a consequence, there are two year hasn't affect by HSR.

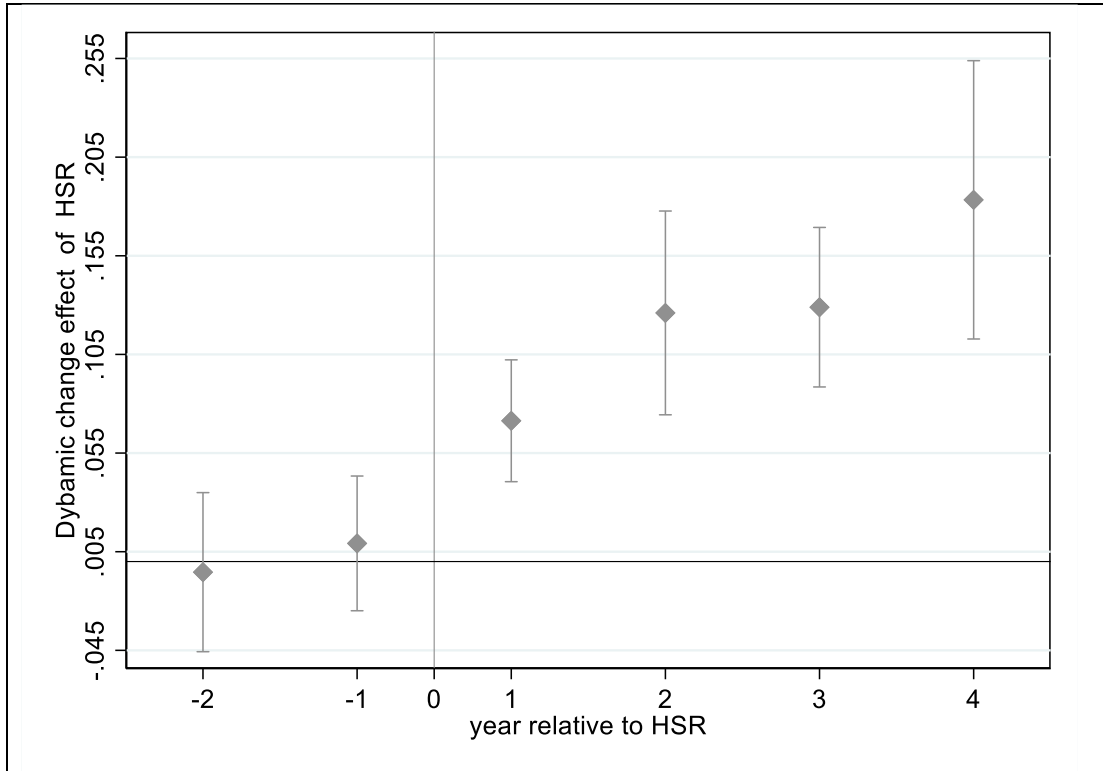


Figure 1. The dynamic effect of HSR on the regional economic growth. And the mean of “-1” is the 1 year before the opening of HSR.

Figure 1 illustrates the dynamic effect of HSR on economic growth. As shown, the coefficients on HSR are insignificant different from zero for the two years before the opening of the highway speed rail, with no distinguish trend between control-groups and treat-groups before the opening of RHS. Then, note that the coefficients of RHS increase immediately from zero to positive value after the opening of RHS, and significant at 5% level. Moreover, the promote effect of RHS on economic growth has a high level at after 2-4 year after the opening of the HSR. In sum, figure 1 shows that we has passed the parallel trend test, the conclusion in this paper is robust.

5.3 The spatial heterogeneity effect of HSR on county-level economy

As the concludes we gain above have been verify the hypothesis 1 that HSR access can promote spatial spillover externalities at the county level, now we'll continue to test hypothesis 2 that Access to HSR can promote the spatial agglomeration from backward areas towards developed areas. Also, we use the spatial Difference-in-Differences (DID) to analysis the impact of HSR opening on various districts and counties, where "station" is a dummy variable and "d1-d7" represent the dummy variables of Southwest, North China, Northeast, Northwest, East China, and Central China high-speed rail stations, respectively, with South China region (d6) as the base period. The econometric results are as follows in table 3:

Table 3. Regional Heterogeneity Using Dummy Variables (with South China as the Base Period)

	SAC		SEM		SDM		SAR	
	Estimate	Se	Estimate	Se	Estimate	Se	Estimate	Se
Station	0.0379***	0.0100	0.0375***	0.0100	0.0366***	0.0100	0.0354***	0.0103
Station*d1	-0.0730***	0.0135	-0.0725***	0.0135	-0.0713***	0.0135	-0.0565***	0.0139
Station*d2	0.0125	0.0157	0.0131	0.0157	0.0146	0.0157	0.0213	0.0162
Station*d3	-0.0491***	0.0184	-0.0489***	0.0184	-0.0484***	0.0184	-0.0442**	0.0191
Station*d4	-0.0200	0.0177	-0.0197	0.0177	-0.0188	0.0177	-0.0033	0.0183
Station*d5	0.0024	0.0119	0.0027	0.0119	0.0033	0.0119	0.0052	0.0123
Station*d7	-0.0773***	0.0134	-0.0770***	0.0134	-0.0761***	0.0134	-0.0749***	0.0138
lnarg	0.1753***	0.0021	0.1754***	0.0021	0.1753***	0.0021	0.1753***	0.0022
lnind	0.4432***	0.0036	0.4431***	0.0036	0.4424***	0.0036	0.4244***	0.0036
lnsize	-0.0211***	0.0015	-0.0211***	0.0015	-0.0211***	0.0015	-0.0211***	0.0016
ins	0.0513***	0.0009	0.0513***	0.0009	0.0512***	0.0009	0.0531**	0.0009
wstation	-3.7843***	0.3435	-3.7769***	0.3435	-3.7593***	0.3431		
wlnarg	1.2998***	0.1218	1.2978***	0.1218	1.2926***	0.1217		
wlnind	0.5795***	0.0597	0.5791***	0.0597	0.5778***	0.0596		
wlnsize	0.8089***	0.1856	0.8073***	0.1856	0.8024***	0.1854		
wins	-0.0406**	0.0205	-0.0405**	0.0205	-0.0402**	0.0205		
lambda	0.4536**	0.2304			-2.1814***	0.6163	-2.1743***	0.6350
rho	-5.9658**	2.7600	-4.4478***	1.3266				
Regional effect	yes	yes	yes	yes	yes	yes	yes	
Time effect	yes	yes	yes	yes	yes	yes	yes	
N	14252		14252		14252		14252	

*, **, *** denote significance at the 10%, 5%, and 1% levels, respectively, for $\Pr(>|t|)$.

As the data shows in table 3, the concludes can be gain as follows:

- (1) The coefficient of the Station dummy variable indicates that the impact of HSR opening on the dependent variable is significantly positive (estimate is 0.0379, P-value is less than 0.001). This means that HSR access has a positive effect on the economic development and industrial structure changes of various districts and counties.
- (2) The coefficients of the interaction terms between the dummy variables (d1-d7) of the HSR stations and the Station dummy variable show that the impact of HSR access on different districts and counties has regional differences. Among them, the interaction term coefficients of the Southwest region (d1) and the Northeast region (d3) are negative, indicating that the impact of HSR access on these two regions is less significant than that on other regions, while the interaction term coefficient of the East China region (d5) is positive, indicating that the impact of high-speed rail on this region is the most significant.
- (3) The coefficients of other control variables (such as lnarg, lnind, lnsize, and ins) indicate that they have a significant positive or negative relationship with the dependent variable. For example, the coefficient of lnind (the natural logarithm of total industrial output value) is 0.4432, indicating a significant positive effect on the dependent variable. The presence of regional and time effects indicates that the model takes into account fixed effects of different regions and different times to eliminate their influence on the results.
- (4) In summary, this analysis in table 3 provides preliminary results on the impact of HSR access on various districts and counties, showing that its impact has regional differences, and provides estimates of the impact of other control variables. To confirm the different impact of HSR access on different regions, we change the Base Period to East China, get the outcome as follows in table3.

Overall, the results suggest that there is significant regional heterogeneity in the data, and this needs to be taken into account when analyzing the data and making policy decisions. Analysing from table 3, the concludes can be gain as follows:

- (1). The HSR access has a significant promoting effect on the economic growth of different regions and counties. The results in Table 3 show that the HSR can significantly promote county-level economic growth, and the effect of the HSR access varies among different regions.

(2). The HSR access has the most significant effect on the economic growth of counties in the South China region. it can be seen that compared to the base period of the East China region, the impact of the opening of high-speed railway stations on county-level economic growth in other regions are: the Southwest region has the largest negative impact, the North China region has no significant impact, the Northeast region has a negative impact, the Northwest region has a negative impact, the Central China region has no significant impact, and the South China region has the largest positive impact. This suggests that the effect of the HSR access on county-level economic growth varies significantly among different regions, and the South China region benefits the most. Therefore, we can find that the HSR access has a significant promoting effect on county-level economic growth in different regions, but the impact varies significantly among different regions, mainly due to the influence of other control variables.

5.4 The industry structure heterogeneity

5.4.1 The impact on second industry

When examining the impact of high-speed rail on the development of the second industry, it is essential to take into account the heterogeneity of industry structure. By utilizing the SAC, SEM, SDM, and SAR models, we are able to examine the causal relationship between the presence of high-speed railway stations and the development of the industrial sector. Based on the estimation results in Table 4, we can further explore the impact of high-speed rail on the second industry with a focus on second industry heterogeneity in the County-level in whole country.

Table 4. Estimated results of HSR Access on the development of the secondary industry.

	SAC		SEM		SDM		SAR	
	Estimate	Std.Error	Estimate	Std.Error	Estimate	Std.Error	Estimate	Std.Error
station	0.0115	0.0096	0.0115	0.0096	0.0113	0.0096	-0.0111	0.0099
lnarg	-0.1354***	0.0048	-0.1356***	0.0048	-0.1351***	0.0048	-0.1294***	0.0049
lnsize	-0.0717***	0.0035	-0.0717***	0.0035	-0.0716***	0.0035	-0.0845 ***	0.0035
ins	-0.1305***	0.0017	-0.1306***	0.0017	-0.1303***	0.0017	-0.1388 ***	0.0017
wstation	-5.2468***	0.5459	-5.2543***	0.5460	-5.2312***	0.5452		
wlnarg	2.3916***	0.2631	2.3943***	0.2632	2.3859***	0.2628		
wlnsize	7.1883***	0.3305	7.1893***	0.3304	7.1838***	0.3300		
lambda	-0.8833	3.4825			-3.1291***	1.0336	-3.3473 ***	1.0823
rho	-2.4408	6.2144	-3.6017***	1.1496				
Regional effect	yes		yes	yes	yes	yes	yes	
Time effect	yes		yes	yes	yes	yes	yes	
N	14252		14252		14252		14252	

(*, **, *** denote significance at the 10%, 5%, and 1% levels, respectively, for $\Pr(>|t|)$.)

The estimated results of the impact of the HSR access on the development of the secondary industry, as measured by four different regression models: spatial autoregressive model (SAC), spatial error model (SEM), spatial Durbin model (SDM), and spatial autoregressive model with a spatial lag dependent variable (SAR).The results show that the HSR has a positive but small effect on the development of the secondary industry, as indicated by the coefficient estimate of station (0.0115). However, this effect is not statistically significant in any of the models. The coefficients for station, lnarg and lnsize are not significant, which indicates that the impact of HSR on the second industry is not homogeneous across regions or industries. Furthermore, the coefficients for wstation, wlnarg and wlnsize are significant, which suggests that the industrial structure heterogeneity affects the impact of HSR on the second industry. However, the estimates for lambda and rho are not significant, which implies that the regional and temporal effects do not play a significant role in the impact of HSR on the second industry. Overall, the results suggest that the impact of HSR on the development of the second industry depends on the heterogeneity of the industry structure.By the other side,the variables related to the size and investment of the secondary industry have negative and statistically significant effects on its development, as indicated by the coefficient estimates of lnarg, lnsize.This

suggests that the primary industry ,the county area have a harder time growing in the presence of high-speed rail.The spatial adjacent variable (wstation, wlnarg, wlnsize) have positive and statistically significant effects on the development of the secondary industry, suggesting that the industry tends to grow in areas where neighboring regions are also growing.

Finally, the spatial autoregressive coefficients (lambda and rho) have mixed results across the models, with only one model (SDM) showing a statistically significant negative effect of spatial dependence on the development of the secondary industry. This suggests that the development of the industry is not strongly influenced by the development of neighboring regions. In summary, the results suggest that the HSR access has a limited and insignificant impact on the development of the secondary industry, which is instead affected by the county-size and the growth of neighboring regions.

5.4.2 The impact on Tertiary Industry

Table 5. Estimated Results of HSR access on the Development of the Tertiary Industry

	SAC		SEM		SDM		SAR	
	Estimate	Std.Error	Estimate	Std.Error	Estimate	Std.Error	Estimate	Std.Error
station	0.0447***	0.0091	0.0453***	0.0091	0.0446***	0.0091	0.0537***	0.0095
lnarg	0.1063 ***	0.0047	0.1064***	0.0047	0.1062***	0.0047	0.0994***	0.0049
lnind	0.1121***	0.0080	0.1131***	0.0080	0.1119 ***	0.0080	0.0649***	0.0081
lnsize	-0.0716 ***	0.0033	-0.0716***	0.0034	-0.0716***	0.0033	-0.0727***	0.0035
ins	0.0629 ***	0.0019	0.0632***	0.0019	0.0629 ***	0.0019	0.0670***	0.0020
wstation	-1.2442 *	0.7536	-1.2741*	0.7557	-1.2446 *	0.7534		
wlnarg	0.4148	0.2674	0.4237	0.2681	0.4149	0.2673		
wlnind	0.9335 ***	0.1312	0.9373***	0.1315	0.9334 ***	0.1311		
wlnsize	1.5570 ***	0.4002	1.5667***	0.4013	1.5571 ***	0.4001		
wins	0.2818***	0.0452	0.2822***	0.0453	0.2817***	0.0451		
lambda	-5.3757*	2.9360			-5.7290***	1.4708	-5.9060***	1.5416
rho	-0.2054	0.6620	-6.5348***	1.6947				
Regional effect	yes		yes	yes	yes	yes	yes	
Time effect	yes		yes	yes	yes	yes	yes	
N	14252		14252		14252		14252	

(*, **, *** denote significance at the 10%, 5%, and 1% levels, respectively, for $\Pr(>|t|)$.)

Table 5 presents the estimated results of the High-Speed Rail (HSR) access on the development of the tertiary industry, using four different regression models (SAC, SEM, SDM, and SAR) and various control variables,both regional and time effects are included in all four models,includes the estimated coefficients for the lambda and rho parameters, which represent the spatial autocorrelation effects. From the table results can be see that HSR access has a significant positive impact on the development of the tertiary industry, along with other control variables.

The lambda coefficient is negative and statistically significant in the SDM and SAR models, indicating the presence of spatial autocorrelation in the error term. The rho coefficient is negative and statistically significant only in the SDM model.From the four models SAC, SEM, SDM, and SAR, with estimates and standard errors for each model in table4, the variables related to HSR access, such as station, lnarg, lnind, lnsize, and ins, are found to be statistically significant at the 1% level. Specifically, for each model, the estimates for these variables are positive, indicating that HSR access has a positive impact on the development of the tertiary industry.In addition, the variables wstation, wlnarg, wlnind, and wlnsize are also included in the models, which represent the interaction effects between HSR access, which are negative but not statistically significant in the SAC, SEM, and SDM models.

Based on the results, several variables have significant impacts on the development of the tertiary industry: the results can be see that stations in the four models SAC, SEM, SDM, and SAR have positive impacts on the development of the tertiary industry, with estimates ranging from 0.0446 to 0.0537.lnarg (the logarithm of the primary industry), ins (industry structure proportion), and wins (neighboring county proportion industry structure) also have positive impacts on the development

of the tertiary industry, with estimates ranging from 0.0629 to 0.1063. $\ln ind$ (the logarithm of the secondary industry), $\ln size$ (the logarithm of the county size), $w \ln ind$ (the interaction term between $\ln ind$ and stations), and $w \ln size$ (the interaction term between $\ln size$ and stations) have negative impacts on the development of the tertiary industry, with estimates ranging from -0.0727 to 0.1121. The other interaction terms ($w station$, $w \ln arg$, $w \ln ind$, and $w \ln size$) are not significant. The λ and ρ parameters represent regional and time effects, respectively, and they have significant impacts on the development of the tertiary industry in some cases. Overall, the results suggest that HSR access can have a positive impact on the development of the tertiary industry, particularly in areas with high agriculture proportion. However, the impacts may vary depending on the industrial structure and city size of the regions.

6. CONCLUSION AND DISCUSSION

6.1 Conclusion

In conclusion, the construction of high-speed rail has a significant impact on regional economic development. Based on the empirical analysis of the data, we can draw the following conclusions:

(1) Firstly, this paper uses the SDID model to investigate the impact of high-speed rail station opening on county-level economic growth in China. The results show that the opening of high-speed rail stations has a positive impact on the economic growth of counties. At the same time, the impact of high-speed rail station opening on economic growth is not only direct but also indirect, indicating the existence of spatial spillover effects. the construction of high-speed rail has a significant positive effect on the economic growth of the county. The opening of high-speed railway stations has a direct promotion effect on the economic growth at the county level, which can be observed from the positive correlation between the high-speed railway station and county-level economy in all four models. This suggests that the construction of high-speed rail should be further promoted as it can enhance the economic development of regions that it serves.

(2) Secondly, The opening of high-speed rail stations promotes the upgrading of the industrial structure of the county, and the industrial structure upgrading effect is particularly significant in the central and western regions. In addition, the opening of high-speed rail stations also promotes the concentration of economic activities and regional economic growth. high-speed rail promotes the development of the primary and tertiary industries. The opening of high-speed railway stations has a significant positive effect on the agricultural economy, and a positive correlation between the high-speed railway station and the tertiary industry was observed in the SAC, SDM, and SEM models. This indicates that the construction of high-speed rail can promote the development of the primary and secondary industries.

(3) Finally, it is worth noting that the effects of high-speed rail construction may vary depending on the specific regional characteristics, such as the existing infrastructure, population density, and industry structure. Therefore, policymakers should consider local conditions when planning and implementing high-speed rail projects. In future research, more attention could be paid to the heterogeneity of high-speed rail station opening effects on economic growth in different regions and the impact on different types of industries. The government can adopt policies to encourage the development of industries that are more compatible with high-speed rail infrastructure, such as the service industry, high-tech industry, and logistics industry. This will help to maximize the economic benefits of high-speed rail infrastructure and promote industrial structure upgrading in the regions that benefit from it. Moreover, the mechanism of how high-speed rail station opening promotes economic growth and its spatial spillover effects can be further explored. In addition, future research can focus on exploring the impact of high-speed rail on other aspects, such as the environment, society, and culture.

6.2 Discussion and policy recommendations

The results of the study suggest that the opening of high-speed rail stations has a significant positive impact on the economic development of districts and counties in China. Specifically, it promotes economic growth, industrial structure upgrading, and spatial economic agglomeration. These findings have important implications for policy makers in China and other countries considering the development of high-speed rail infrastructure. The policy recommendations can be suggested as follows:

- (1) The study has important implications for policymakers in China, particularly in the context of the ongoing high-speed rail network construction. As the Hypothesis 1 prove that HSR access can promote spatial spillover externalities at the county level. The analysis suggests that the high-speed railway station in a county has negative spatial spillover effects on the economy of neighboring counties. Therefore, it is recommended to evaluate the economic impact of high-speed railway stations on neighboring counties before planning and constructing high-speed railway networks.
- (2) The findings suggest that policymakers should pay attention not only to the direct impact of high-speed rail station opening on economic growth but also to its spatial spillover effects, and the policies should take into account regional differences in economic development. Efforts should be made to maximize the spillover effects of HSR infrastructure. Governments could incentivize the development of complementary industries and services around HSR stations to attract more businesses and visitors to the area.
- (3) As to spatial heterogeneity, the government can use high-speed rail infrastructure to promote spatial economic agglomeration and regional integration. The HSR station both have significant spatial agglomeration effects and significant spatial autoregression. Therefore, the HSR station sites should choose the counties that in the local center to bring more economic networks. That's means the government should take into the spatial spillover effects when increase the HSR stations on the county level. The study found that high-speed rail stations have a significant spatial spillover effect, which means that the economic benefits of high-speed rail infrastructure can extend beyond the regions where the infrastructure is located. To fully capitalize on these benefits, the government can use high-speed rail infrastructure to connect different regions, promote inter-regional trade, and encourage the flow of people, goods, and capital between different regions.
- (4) Encouraging prioritize accessibility and connectivity. The HSR effectively reduces commuting costs, at least in terms of the opportunity cost of travel time. According to standard urban economics models, equivalence constraints mean that a reduction in commuting costs will attract new residents to these places where housing and living costs are relatively low and environmental quality is high. In turn, the increase in the resident population increases access to the local workforce and consumer markets, and may eventually attract new businesses. The selected station sites should be easily accessible and connected to other modes of transportation, such as local bus and metro systems, to ensure convenient travel for passengers. And the selection of HSR station sites should not only focus on economic benefits but also consider regional development. The selected station sites should help promote economic development in the surrounding areas, including job creation, industry clustering, and tourism development. So, the government should prioritize HSR development in counties that have the potential to benefit the most from the transportation infrastructure. This could include counties that are located near major metropolitan areas, have a high population density, and have strong economic growth potential. Also emphasizes should put on government to improve transportation connectivity within counties to maximize the benefits of HSR. This could include investments in local public transportation systems, bike lanes, and pedestrian walkways to connect HSR stations to key economic centers.

In conclusion, the study provides important insights into the economic impact of high-speed rail infrastructure in China. By promoting economic growth, industrial structure upgrading, spatial economic agglomeration, and sustainable development, high-speed rail infrastructure has the potential to play a critical role in the economic development of regions across the country.

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52 Dynamic Evolution of Urban Space and its Sustainable Path under Climate Change - A Case Study of the Guangdong-Hong Kong-Macao Greater Bay Area

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Abstract

Climate change is a major challenge facing humanity under sustainable development. In 2015, China proposed achieving a carbon peak by 2030 and actively adopted policies and actions to address climate change. Based on the dynamic trajectory of urban ecology, our study constructed an integrated framework of ecology-human-new ecology, evaluated the ecological spatial pattern based on the impact of economic development and transportation factors on land use from 2005 to 2020, and further analyzed the effect of related factors on ecological spatial heterogeneity. Our study concludes that: 1) Urban expansion and aggregation are closely related to land use, and the Greater Bay Area's urban and rural construction land is expanding yearly. The overall development is mainly concentrated in the Pearl River port, reflecting the river basin's significant driving and radiation effect on coastal cities along the Pearl River; 2) Urban expansion has resulted in the reduction of watersheds and the diminishing of cropland and forests in certain cities, and the northern eco-bay area serves as a beneficial factor in mitigating the climatic risks associated with externalities of climate change; 3) there exists notable regional variation in the driving forces influencing the spatial growth of cities within the Greater Bay Area, and the interactions between the driving factors are bifactorial enhanced or non-linear enhanced; 4) the factors such as ecological transformations and advancements in transportation infrastructure are identified as primary contributors to the spatial disparities observed in the Greater Bay Area; 5) the spatial evolution of this region is characterized by a gradient distribution extending from the southeast to the northwest, with a trend towards concentration around the geographical centre, and this concentration is attributed to a self-enhancement effect. This study aims to investigate the impacts of climate change on the development of ecological cities in the Greater Bay Area, and to provide a reference path for promoting the transition of Bay Area cities to clean and sustainable development.

Keywords

Spatiotemporal evolution; ecological non-equilibrium paradigm; Geodetector; Guangdong-Hong Kong-Macao Greater Bay; sustainable transformation.

1. INTRODUCTION

Developing sustainable urban space in response to climate change is one of the most important challenges facing humanity. Urban space, however, is the carrier of spatial limitations on resources and the environment as well as a fundamental component of human production and living. In addition to involving the creation and renewal of large-scale physical space forms and the ongoing accumulation of national wealth, China's urban construction and development are currently developing quickly. This is causing a significant transformation of social and economic functions, along with issues like land waste, environmental degradation, and an increase in the risks associated with climate change. Promoting the sustainable transformation of urban functions and facilitating the adaptive evolution of urban space have thus become crucial concerns.

The Central Urban Work Conference (2015) emphasized that cities in China have the highest concentration of diverse factor resources and economic and social activities. Urbanization has significantly altered the Earth's natural landscape, converting it into a human-utilized social structure (Foley et al., 2005). However, land use change is a direct manifestation of urban development and a growing focus in the research on global environmental change. In 1995, the International Geosphere-Biosphere Programme (IGBP) and the Human Dimensions Programme on Global Environmental Change (HDP) collaboratively launched and coordinated a worldwide research initiative called "LUCC" (Land Use and Land-Cover Change). Scholars proposed a framework for land use and land cover change at an international meeting (IGBP/HDP Report, 1996).

Land use change has become a prominent subject of research about the relationship between human activities and land use, as well as sustainable development within urban spatial development (Zhang, Kang, Wang, et al., 2010). This involves evaluations of land use sustainability (Qiao, Hu, Guo, et al., 2022), urban spatiotemporal development patterns and mechanisms (Zhang, Yu, Li, et al., 2020), and examination of the spatial impacts of land use and ecosystem services (Shi, Gu, Xiao, 2023; Yang, Luan, Zhang, 2023; Li, Liu, Feng, et al., 2022). Fan Jie (2014) extensively examined the sustainability of human-environment interactions and highlighted that the primary driving force of human-environment relationships is the potential energy difference resulting from regional disparities in people's quality of life and that the carrying capacity of resources and the environment is the limit that determines whether humans can achieve sustainable development. Urban space quantitative methods are also gradually becoming more sophisticated and spatialized, using remote sensing images (Zhang, Li, Song, et al., 2020; Huang, Luo, Gao, et al., 2021), Geographic Information System (GIS), Geodetector (Zhang, Yu, Li, et al., 2020), Land Benefit Transformation (Wu, Ma, Li, et al., 2023), complex mathematical algorithms such as information entropy, adaptive neural fuzzy inference, random forest algorithms, cellular automata, etc. (Chen, Liu, 2001; Parvinnezhad, D., 2021; Zhang, Liu, Wu, et al., 2019). Tu, Gao and Li et al. (2023) using the Spatial Cooperation Simulation (SCS) method to simulate coordinated changes in land use, population, and economic space; Li, Liu and Feng et al. (2022) evaluated the dynamic changes of ecological services and ecological security patterns in Hexi region based on morphospacial pattern (MSPA), entropy weight method and circuit theory; Li, Huang, and Liu (2023) conducted an empirical analysis of the spatial differentiation mechanism of urbanization using the Geodetector, taking into account the spatial characteristics of resource endowment, economic development level, and urbanization. In addition, factor detection was used to determine the primary influencing elements of spatial differentiation in target dimensions, including human settlements, the human environment, and the human-city relationship. Urban space evolves along a continuous point-chain development trajectory, characterized by heterogeneity, mobility, and reliance, forming a comprehensive and complex ecosystem. The majority of the literature that has been written thus far, which is based on Pareto optimality, examines the best course for target cities' spatial growth based on land use, traditional ecological service systems, and spatiotemporal evolution patterns. A small amount of literature, guided by the idea of neo-ecology, investigate the evolution and development of urban space and its sustainable development path under the non-equilibrium paradigm (Odum, E. P., 1992) and contend that ecological balance is not the norm of ecosystems (Wang, 2011).

This paper uses the Greater Bay Area as the research area to investigate the evolution of urban ecological dynamics and its sustainable development conditions. It does this by analyzing the spatial heterogeneity, spatial distribution, and driving factors of urban development in the Greater Bay Area and drawing conclusions about changes in urban space improvement, space use intensity, and evolutionary morphological dimensions. All of this is based on the theoretical framework of ecology-human-new ecology, as illustrated in Figure 1.

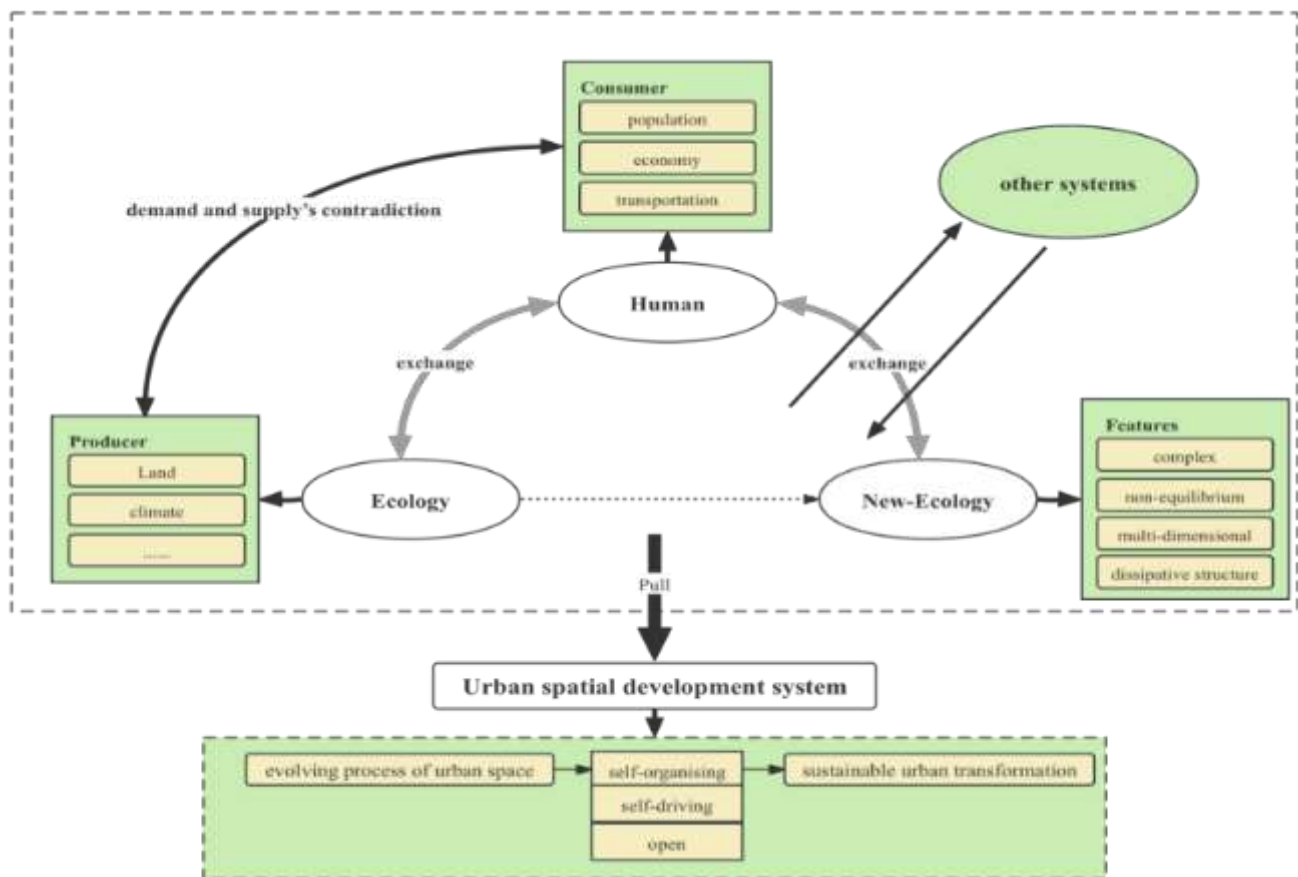


Figure 1. The intrinsic relationship between ecology-human-new ecology

2. DATA AND METHODOLOGY

2.1 Representative case

The Guangdong-Hong Kong-Macao Greater Bay Area comprises Guangzhou, Shenzhen, Dongguan, Foshan, Zhuhai, Zhongshan, Huizhou, Zhaoqing, Jiangmen, Hong Kong, and Macao. The land area of the Greater Bay Area was 56,098 square kilometers by the end of 2022, according to statistics from HKTDC Research. The topography of the Greater Bay Area is dominated by plains and hills, benefiting from its unique geographic position of being "surrounded by mountains on three sides and converging on three rivers." The nine cities that constitute the Greater Bay Area are home to a typical southern subtropical humid monsoon climate, characterized by alternating hot and cold seasons, long summers, and occasional brief frosts. On the contrary, Hong Kong experiences four distinct seasons with alternating winter and summer monsoons, while Macao enjoys warm winters and scorching summers, along with distinct dry and wet seasons. By the end of 2022, the Greater Bay Area recorded a population of 86.62 million, a GDP of US\$1,943.54 billion, and a per capita GDP of US\$22,585, with the tertiary sector accounting for 64.0% of the GDP. Figure 2 displays the location map of the Guangdong-Hong Kong-Macao Greater Bay Area.

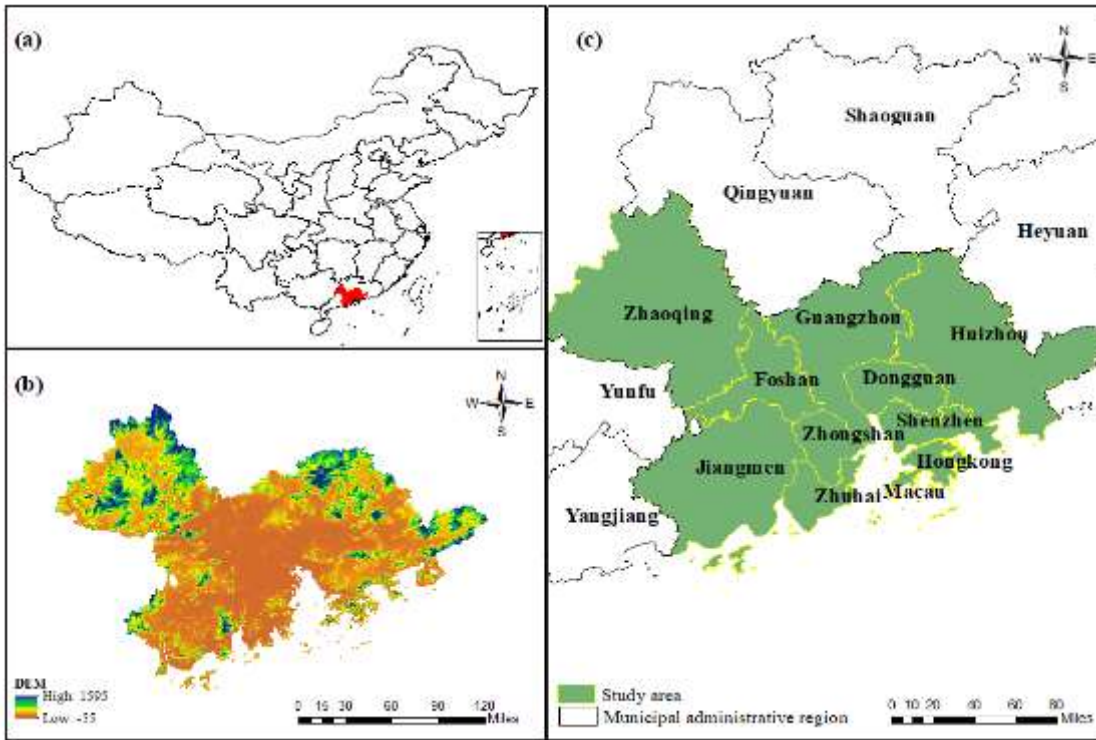


Figure 2. Location of the Guangdong-Hong Kong-Macao Greater Bay Area

2.2 Data source

This study focuses on the Guangdong-Hong Kong-Macao Greater Bay Area and utilizes land use and land cover change (LUCC) data set is provided by Data Center for Resources and Environmental Sciences, Chinese Academy of Sciences (RESDC) (<http://www.resdc.cn>). NDVI data is primarily sourced from the Chinese Academy of Science Discipline Data center for Ecosystem (Jilin Yang, Jinwei Dong, Xiangming, Xiao, et al., 2019). The study selected 30m maximum NDVI datasets for the years 2005, 2010, 2015, and 2020, which were then processed by trimming and normalizing the NDVI values. The socio-economic variables were mostly obtained from statistical almanac datasets of cities and administrative divisions spanning from 2005 to 2020. Missing data is filled in using the mean imputation approach. The road network data primarily comes from the Harvard University dataset (Baum-Snow et al., 2016) and the 2020 geographical distribution data of China's roadways by the Chinese Academy of Sciences.

2.3 Methods

2.3.1 Land Use Dynamics

The land use intensity composite index quantifies the impact of human activities on the land system by grading the land use degree. It reflects the degree of land use intensification for all land use types in a specific year. This comprehensive index reflects the impact of human activities on land development and use (Yan, Zhang, Liang, et al., 2017). It is an essential indicator for measuring the depth and breadth of regional land use. According to the grading and assignment table of land use degree proposed by Zhuang Dafang and Liu Jiyuan (1997), barren or hard-to-use land is assigned a value of 1, forest, grassland and water are assigned a value of 2, cropland is transferred a value of 3, and impervious is assigned a value of 4. The formula is as follows:

$$K = \sum_{i=1}^n L_i * \frac{A_i}{A} * 100\% \quad (1)$$

where K represents the composite index of land use degree in the study area; A hierarchical value represents the level of land use at level I; and A represent the area of land use at level I and the total area of land within the area, respectively; n denotes the grading of land use numeric value.

As a tool for analyzing land use, the land transfer matrix can effectively reveal the mutual transformation of land use types in a specific area (Zhu, Li, 2003), including the structural characteristics of quantity and the direction of transfer, which is the application of the Markov model to land use change (Xu, Zhao, 1993). The land-use transition matrix is derived from the quantitative description of system state and state transfer in system analysis. The analysis of land use change and the description of urban expansion characteristics are mainly reflected in the spatial distribution and development pattern of urban construction land, and there is also a specific spatial structure and the relationship between the scale of urban construction land in different spatial units of urban agglomerations. The mathematical expression for the 2D land transfer matrix is as follows:

$$A_{pq} = \begin{bmatrix} A_{11} & A_{12} & \cdots & A_{1n} \\ A_{21} & A_{22} & \cdots & A_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ A_{n1} & A_{n2} & \cdots & A_{nn} \end{bmatrix} \quad (2)$$

Where A represents the land use area; n represents the graded value of land use degree; p and q indicate the land use types at the beginning and end of the observation period, respectively. Usually, the results of the study are presented in tabular form.

2.3.2 Geodetector

This paper uses a Geodetector (Wang, Xu, 2017) to detect the spatial differentiation of cities in the Greater Bay Area. Factor analysis is the process of seeing the extent to which an independent variable explains the spatial differentiation of the dependent variable. Where q indicates that each independent variable explains the spatial differentiation of the dependent variable to varying degrees, and the larger the value, the greater the degree to which the independent variable explains the spatial differentiation of the dependent variable. The formula for q is as follows:

$$q = 1 - \frac{\sum_{h=1}^L N_h \sigma_h^2}{N \sigma^2} = 1 - \frac{SSW}{SST} \quad (3)$$

where $h=1, \dots, L$ is the stratification of variable Y or factor X, i.e., classification or partitioning; and N are the number of units in layer h and the whole area, respectively; and are the variance of the Y values for the layer h and the entire area, respectively. SSW and SST are the sum of the within sum of squares and the total sum of squares. In extreme cases, a q value of 1 indicates that factor X fully controls the spatial distribution of Y, a q value of 0 indicates that factor X has no relationship to Y, and a q value indicates that X explains $100 \cdot q\%$ of Y. The formula for SSW is as follows:

$$SSW = \sum_{h=1}^L N_h \sigma_h^2, SST = N \sigma^2 \quad (4)$$

interaction_detector can quantitatively characterize the relationship between two independent variables on the pattern of dependent variables. It mainly evaluates whether factors X_1 and X_2 increase or decrease the explanatory power of the dependent variable Y when they interact. The evaluation is done by calculating the q values of the two factors X_1 and X_2 against Y: $q(X_1)$ and $q(X_2)$, respectively, and calculating the q values at the time of their interaction.

2.3.3 Standard deviation ellipse method

The standard deviation ellipse method is utilised as a directional distribution tool to identify the direction of urban spatial development and distribution trends in the Greater Bay Area. And the basic elements of the standard deviation ellipse include the centre, the corner, the standard deviation along

the long axis, and the standard deviation along the short axis.(Li, Peng, 2024). The formula is as follows:

$$SDE_x = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{X})^2}{n}} \quad (5)$$

$$SDE_y = \sqrt{\frac{\sum_{i=1}^n (y_i - \bar{Y})^2}{n}} \quad (6)$$

Where X_i and Y_i are the spatial location coordinates of each element, \bar{X} and \bar{Y} are the arithmetic mean centres; Center X and Center Y denote the centroid of the ellipse; XstdDist and YstdDist denote the length of the X-axis and the length of the Y-axis, respectively; and Rotation denotes the direction angle of the ellipse. When features are spatially customarily distributed, which are densest at the centre and become sparse closer to the periphery, the first standard deviation, including the centroids of about 68% of the total input features, is used.

2.3.4 OLS Spatial Regression

In this paper, the spatial regression model was used to analyze the influence of each driving factor and the land use composite index(Liu, Wang, xiang, et al., 2021). The formula is as follows:

$$Y = \beta_0 + \sum_{q=1}^n \beta_q X_q + \varepsilon \quad (7)$$

Y represents the dependent variable in the spatial regression model (referring to the land use composite index); β_0 denotes the spatial intercept term; β_q is expressed as the relative weight of the independent variable of the q term (the regression coefficient of the driver); X_q represents the value of the argument of the q term; ε represents the model residual term.

3. RESULTS

3.1 Mechanism of spatial dynamic evolution

Using ArcGIS10.8 software, the LUCC data were clipped and overlay analysed to extract the land use types of the Greater Bay Area for the four periods of 2005, 2010, 2015 and 2020, and the results are shown in Figure3 below: 1) the land use types of cities in the Greater Bay Area have changed to varying degrees; 2) changes in urban and rural construction land, the radiation effect of the Pearl River Port and the coastal areas of Hong Kong and Macao is significant, especially in Dongguan and Shenzhen in eastern Guangdong, Dongguan is mainly expanding from cropland to impervious, Shenzhen is expanding from forest to impervious, Guangzhou is expanding impervious to the north of the city centre yearly, and Zhaoqing, Jiangmen and Huizhou are experiencing localised and sporadic land expansion; 3) Especially in Foshan and Zhongshan from 2005 to 2010, the water area decreased most obviously, which was mainly occupied by cropland and impervious; 4) From 2010 to 2020, the cropland area decreased significantly, and Zhaoqing, Jiangmen, Guangzhou, and Huizhou all showed different land reduction changes; 5) Forest and grassland changes can be found that the green space in Zhuhai increased significantly from 2005 to 2020 compared with other cities; 6) The development of urbanization has improved the efficiency of the barren, especially at the junction of the northeast of Macao and the north of Guangzhou.

Based on the land use data for the Greater Bay Area in 2005 and 2020, the study revealed the land use evolution information by creating a land use transition matrix (as depicted in Table 1). As shown in Table 1, in 2020, the distribution of land use types in the Greater Bay Area, in descending order, is as follows: forest (53.47%), cropland (14.98%), impervious (14.98%), and water (7.40%). Grassland and barren accounted for a relatively small proportion, totaling about 2.13% in the Greater Bay Area.

From 2005 to 2020, the land use transfer matrix changed significantly. From the perspective of various land-use conversions, the net increase in land-use area was in impervious and grasslands. The impervious area increased by 28.45%. The transfer matrix indicates that cropland is mainly converted to impervious, with a conversion area of 458.0398 km². The net decrease in land use area included cropland, forest, water, and barren land. The cropland area decreased by 1,049.427 km², with the majority being converted to impervious and water, accounting for 63.08% of the change. The water area decreased from 4,269.4939 km² in 2005 to 4,054.2522 km² in 2020, a decrease of 5.04%.

Figure 4 illustrates the regional distribution of land use intensity in 2005 (Fig. 4a) and 2020 (Fig. 4b). The results indicate the following: 1) Land use intensity is predominantly concentrated in the central area of the Greater Bay Area, particularly in Dongguan, Zhongshan, and Macao; 2) Due to urbanization progress, the land use intensity in Foshan, Shenzhen, and Jiangmen has decreased to different extents, suggesting constraints like the land supply-demand imbalance; 3) Due to the influence of topography, economy, and many other factors, the land use intensity of Zhaoqing and Huizhou remains in the middle to lower range, resulting in slow development and change.

3.2 Analysis of Urban Spatial Heterogeneity

In this paper, the land use intensity of the Greater Bay Area was considered the dependent variable (Y), while six driving factors were considered independent variables. The Geodetector quantitatively describes each factor's driving contribution rate and interaction to explore significant differences in the influence of independent variables, such as ecological, transportation, and socio-economic factors, on the dependent variables and the interactions between them.

The results show that China's land use quality is affected by a combination of factors, such as ecology, socio-economic development, road network density, etc., and the impact of the various influencing factors on land use quality in the Greater Bay Area is significantly different. From the results of the two factors in the following table, it can be seen that: 1) in 2020, according to the q value from high to low, the order is: NDVI, road density, railway density, administrative land area, GDP, and population density. The ecological factor NDVI (Normalized Difference Vegetation Index) has the most significant degree of spatial differentiation explanation for land use quality and remains stable year by year, with a value of 0.8037; 2) the traffic factor has the most significant effect on land use. In 2020, the q values of railway density, road density, and the ecological factor were all in the range of 0.5~0.8, indicating that ecological status and transportation development were the main reasons for the spatial differentiation of land use intensity in the Greater Bay Area in 2020, GDP was identified as the second reason, with a q value consistently greater than 0.1 since 2010; 3) The effect of population density on land use intensity has been decreasing annually, reaching its lowest q value in 2020 was at 0.0552, indicating that population has the least influence on the spatial differentiation of land use intensity in the Greater Bay Area.

Furthermore, this paper utilizes the Geodetector to analyze the interaction of the driving factors influencing land use intensity in the Greater Bay Area. It explores the explanatory power of the driving factors on land use quality. The results presented in Table 3 below (top four interaction values are listed) indicate the following: 1) From 2005 to 2020, the impact of driving factors on land use intensity primarily involved bifactorial enhancement and nonlinear enhancement, with no weakening or independence observed. This suggests that the explanatory power of the interaction between driving factors differed from that of the single-factor effect; 2) The intensity of the interaction between ecological factors and other factors during the study period was generally more significant than that of the environmental factor, with a q value of the interaction between other factors reaching as high as 0.9324; 3) There were notable nonlinear enhancement effects between socio-economic factors, ecology, road network density, and land factors. The combined effects of ecological factors, socio-economy, and transportation policy planning influenced the spatial pattern of land use quality in the Greater Bay Area.

3.3 Analysis of the Stability of Urban Spatial Development

Figure 5 illustrates the geographical distribution of urban spatial development in the Greater Bay Area from 2005 to 2020. To understand the evolution of urban spatial disparities in the Greater Bay Area (GBA) study region, this study divides the spatial distribution into four zones labeled as nodes a, b, c, and d, as illustrated in Figure 5. The analysis reveals the following findings: overall, the urban spatial development in the Greater Bay Area (GBA) shows a consistent trend from the Pearl River estuary towards the inland in the northwest direction. Over time, there is a gradual convergence toward the center of the GBA, indicating an increasing self-reinforcing mechanism within the region. During the 2010-2015 period in zones b, c, and d (primarily the southeastern part of the Greater Bay Area), the centrifugal force in urban space outweighed the agglomeration force, resulting in varying degrees of urban expansion. During the period 2015-2020, cities seem to have shifted towards the center as a result of a stronger agglomeration force compared to the centrifugal force of urban space. Table 4 explicitly presents data on urban spatial migration in the Greater Bay Area. The center of the land development ellipse in the Greater Bay Area in 2005 is located at coordinates (1,815,034.6074, -681,045.7645). The ellipse with a major semiaxis of 87,004.9316 meters and a minor semiaxis of 73,493.2552 meters can cover approximately 68% of the total land area in the Greater Bay Area. The agglomeration area of land use has a roughly northwest-southeast distribution, mainly on the estuarine floodplain of the Pearl River Delta, encompassing most of the administrative districts of Dongguan, Shenzhen, Hong Kong, Macao, Zhuhai, Foshan, and Guangzhou. The rotation angle decreased from 97.3467° in 2005 to 97.2797°, but there was a slight rebound adjustment in 2015 to 97.3375° in 2020. The overall land use situation in 2005 remained the same as in 2015. The results indicate that the overall development objectives of the Greater Bay Area are relatively stable, and the foundation of urban development is strong. The development of the urban spatial agglomeration evolution path in the Greater Bay Area between 2005 and 2020 has been relatively consistent. Still, there are situations where the migration direction of local cities is adjusted due to urban disparities.

3.4 Driving mechanism

The development of urban space is influenced by ecological, land capacity, socio-economic, and other factors. The research factors primarily include ecological constraints, socio-economic variables, and transportation factors. Since most driving factors have spatial attributes, this paper constructs a spatial regression model (Equation 7) using ArcGIS software to study and analyze the main influencing factors of land use intensity from a spatial perspective. Using spatial data from 2020 as the research object, the following experimental results were obtained:

$$Y = 266.9684 - 27.1804X_1 + 0.1006X_2 - 0.0056X_3 - 34.3952X_4 + 6.6325X_5 - 0.004X_6 \quad (8)$$

The value of R^2 is 0.9848, indicating that the model fitting results are promising. There is a negative correlation between ecological factors, GDP, railway density, land area, and land use intensity, and a positive correlation between population density, road density, and land use intensity.

A comprehensive spatial quantitative analysis of the driving factors of land use intensity in 2020 was conducted using a spatial regression model. The results presented in Figure 6 below indicate the following: 1) a significant positive correlation between NDVI and land use intensity was observed in Zhaoqing, Huizhou and Jiangmen, whereas the relationship between NDVI, ecological constraints, and land use intensity in Dongguan, Zhongshan, and Macao was not significant; 2) Socio-economic factors such as population density and GDP were found to be positively associated with land use intensity in Guangzhou, Shenzhen, Foshan, Dongguan, and Hong Kong, while Zhaoqing, Jiangmen, and Zhongshan showed weak correlations. 3) Traffic factors in general show that there is a weak correlation between traffic and land use intensity in Zhaoqing, Huizhou, and Jiangmen, while road density and land use intensity in Hong Kong, Macao, Shenzhen, Dongguan, and Foshan are more closely related. The difference is that the railway density in Guangzhou, Dongguan, and Macao is more closely related to land use intensity.

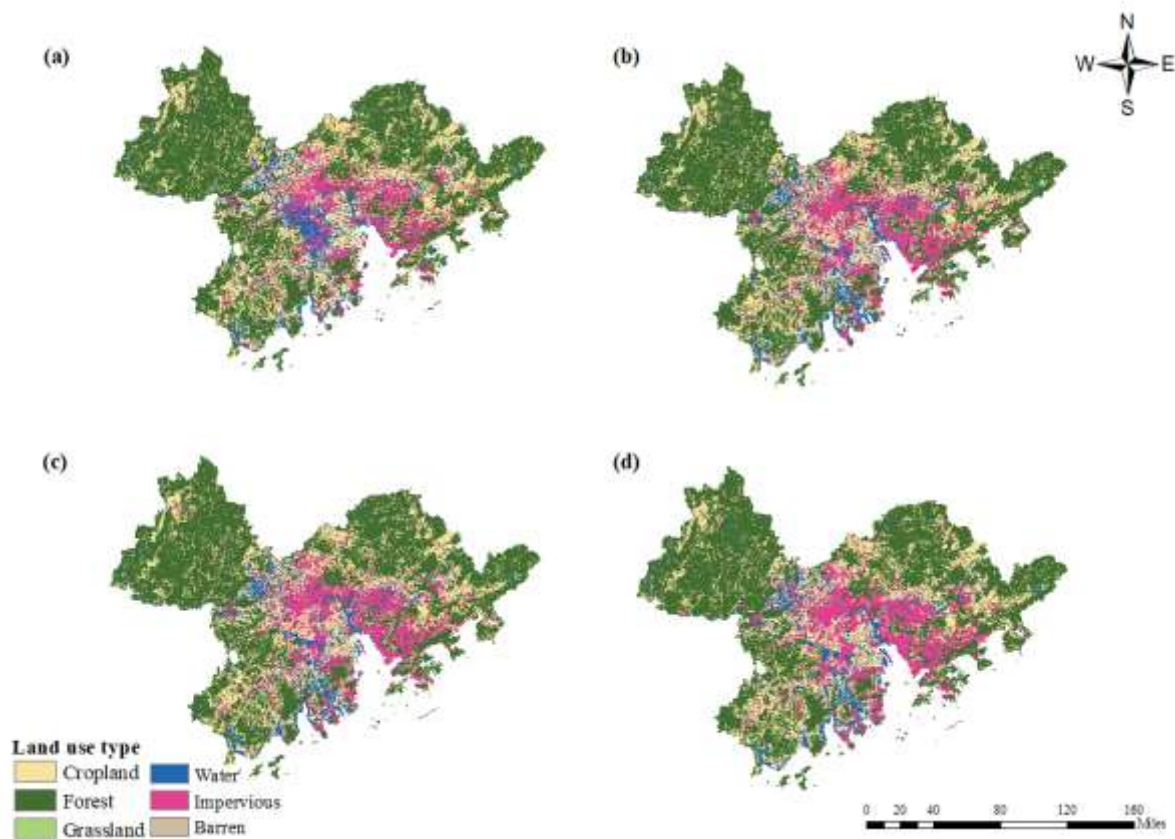


Figure 3. Evolution of land use types, 2005-2020

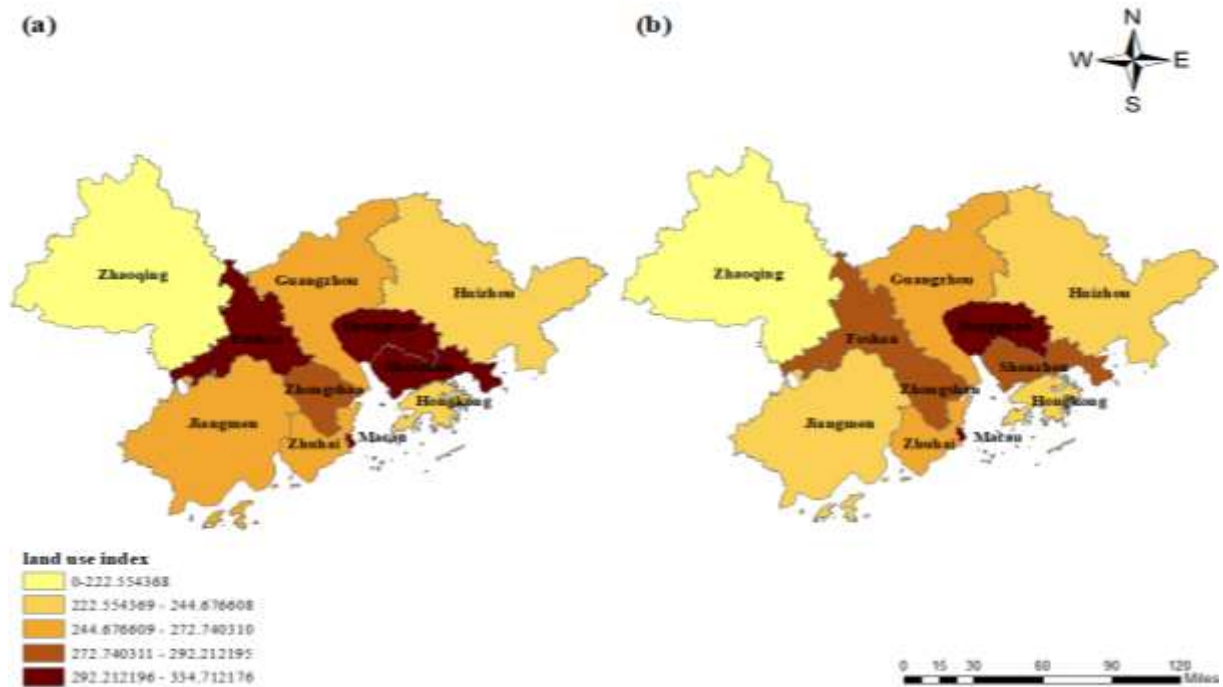


Figure 4. Comparison of land use composite indices, 2005-2020

Table 1. Land use transition matrix, 2005-2020

2005 2020	Cropland	Forest	Grassland	Water	Impervious	Barren	Total	Net change
Cropland	10653.6983	336.9433	37.6562	609.1292	1480.8767	0.2319	13118.5356	-1049.4274
Forest	379.2507	28533.5315	103.1303	159.2776	715.0883	0.3951	29890.6735	-580.8828
Grassland	22.6188	74.0422	948.7841	16.7597	58.9557	0.0564	1121.2169	38.9862
Water	554.6784	90.8029	18.1455	3094.8343	510.8629	0.1699	4269.4939	-215.2417
Impervious	458.0398	273.0357	52.3793	171.9116	5436.8017	0.0746	6392.2427	1818.4962
Barren	0.8222	1.4351	0.1077	2.3398	8.1537	6.0552	18.9137	-11.9305
Total	12069.1082	29309.7907	1160.2031	4054.2522	8210.7389	6.9832	54811.0763	0

Table 2. q values for Geodetector factor analysis, 2005-2020

Factors	2005	2010	2015	2020
NDVI	0.8037	0.8037	0.8037	0.8037
Population	0.4399	0.0552	0.0552	0.0552
GDP	0.0780	0.1161	0.1161	0.1161
Railway density	0.1800	0.2007	0.0780	0.5073
Road density	0.3558	0.7924	0.4763	0.5248
Land area	0.5224	0.5286	0.5286	0.4763

Table 3. The results of Geodetector interaction (top four)

Year	Types	Inter_value	inter_action
2005	(NDVI \cap Population)	0.9324	Enhance_bi-
	(NDVI \cap Railway)	0.9136	Enhance_bi-
	(NDVI \cap Land)	0.8941	Enhance_bi-
	(NDVI \cap GDP)	0.8897	Enhance_nonlinear
2010	(Road \cap Land)	0.9170	Enhance_bi-
	(NDVI \cap Population)	0.9138	Enhance_nonlinear
	(NDVI \cap Road)	0.9110	Enhance_bi-
	(NDVI \cap Railway)	0.9038	Enhance_bi-
2015	(NDVI \cap Population)	0.9138	Enhance_nonlinear
	(Population \cap Road)	0.9138	Enhance_nonlinear
	(GDP \cap Road)	0.9138	Enhance_nonlinear
	(NDVI \cap GDP)	0.8921	Enhance_bi-
2020	(NDVI \cap Population)	0.9138	Enhance_nonlinear
	(Population \cap Land)	0.9138	Enhance_nonlinear
	(GDP \cap Land)	0.9138	Enhance_nonlinear
	(Railway \cap Land)	0.8941	Enhance_bi-

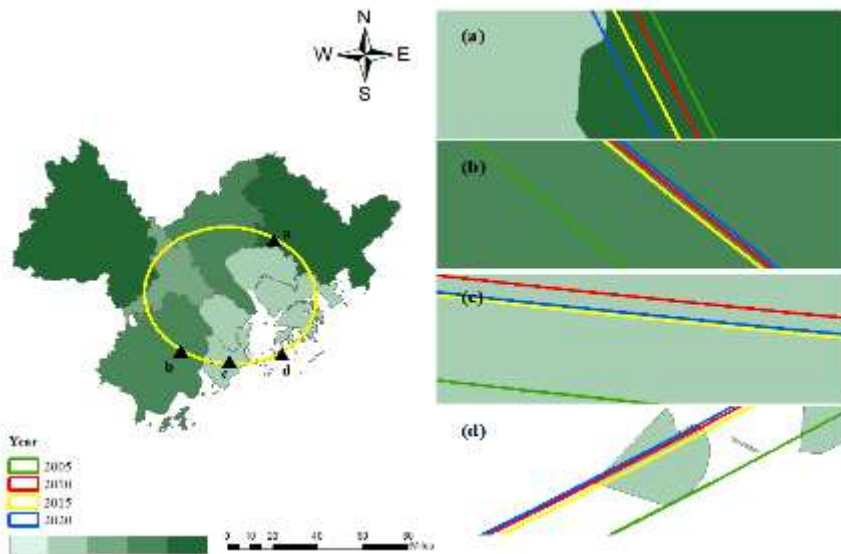


Figure 5. Spatial distribution of standard ellipses, 2005-2020

Table 4. Standard elliptic difference attribute data, 2005-2020

Year	Center X	Center Y	XStdDist	YStdDist	Rotation
2005	1815034.6074	-681045.7645	87004.9316	73493.2552	97.3467
2010	1815010.2957	-680853.5315	86895.8858	73118.8340	97.2797
2015	1815027.4256	-680950.8199	86764.0945	73131.8195	97.2820
2020	1814982.0512	-680925.6249	86636.1152	73133.0736	97.3375

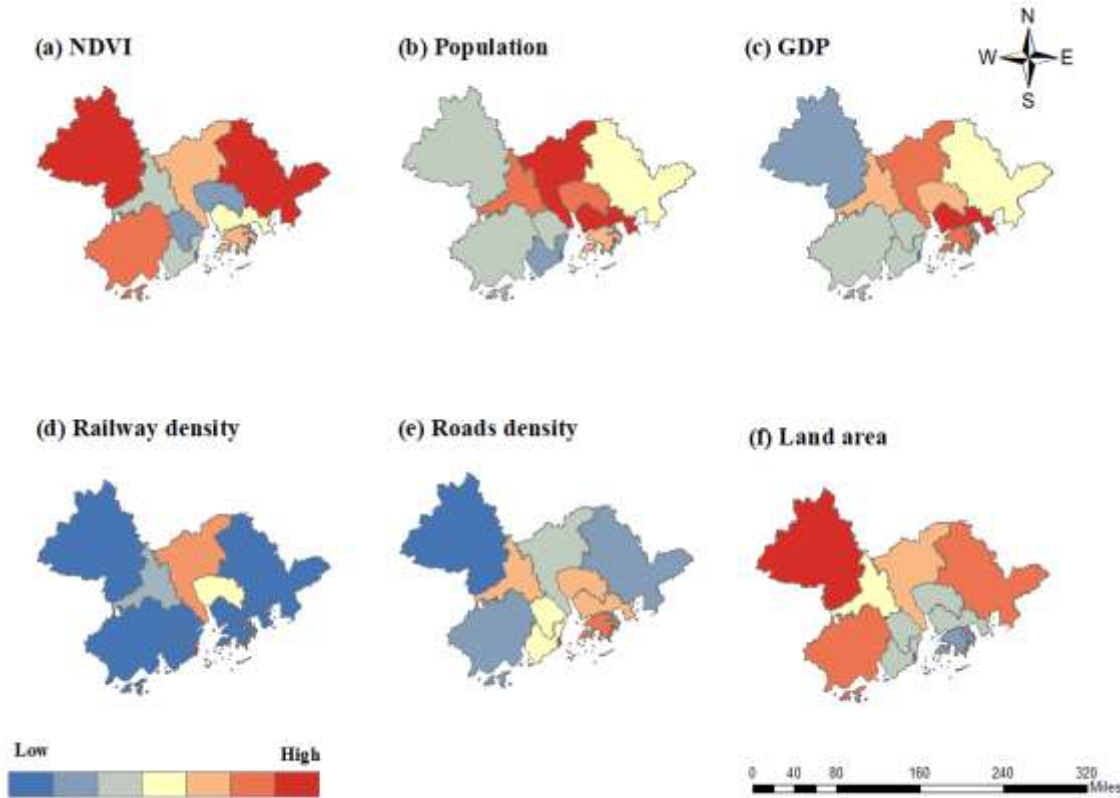


Figure 6. Driving factors correlation regression results

4. DISCUSSION

Based on the LUCC data, road network data, and socio-economic data from 2005 to 2020, this paper examines the distribution pattern of urban spatial development in the Guangdong-Hong Kong-Macao Greater Bay Area. It analyzes the structural characteristics and spatial distribution of land use in the Greater Bay Area, using the land use degree and land use change transfer matrix. The study also explores and analyzes the formation mechanism of urban spatial differentiation in the Greater Bay Area by considering ecological factors, socio-economic factors, and transportation factors using Geodetector. Additionally, it employs the standard deviation ellipse method and spatial regressive model for analysis. This paper studies the evolutionary mechanism of urban space, the differences driven by various factors, and effectively reveals the urban spatial development pattern and its formation mechanism in the Greater Bay Area. The specific results are as follows:

The non-equilibrium ecology of urban spatial development posits that the comprehensive and complex urban ecosystem is a random, open, and self-driven dissipative structure in which land resources and ecological variables play a decisive role in the dynamic development of urban space. In previous studies, it has also been pointed out that the complexity caused by environmental pressures, nonlinearity, and other factors has contributed to the stability of the ecosystem. The non-equilibrium theory is more suitable for quantifying the system's intrinsic dynamics and global stability (Xu, Patterson, Levin, et al., 2023). From 2005 to 2020, the variability of land use types, complex driving factors, and robust interactions in the Greater Bay Area have increased the challenging uncertainty of the urban spatial system in the region. The non-equilibrium theory is

suitable for evaluating the internal dynamics and stability of urban spatial development in the Greater Bay Area.

The phenomenon of decreasing land-use intensity suggests that during urbanization, the conflict between land supply and demand has become more severe. This has led to issues with bottlenecks and ecological constraints on land, which have directly impacted the pattern of urban spatial development. In the analysis of spatial differentiation, the study found a strong interaction between land use and population density, economy, and railway density in the Greater Bay Area in 2020. This highlights the importance of enhancing land conservation and intensification levels and exploring urban spatial patterns in highly urbanized areas. The diversification of land use types, the highest net increase in the construction land area, and the conversion of cultivated land to construction land use indicate that the urban construction process in the Greater Bay Area is accelerating. Urban space exhibits a dynamic expansion process through urban land use (Yao, Chen, Wu et al., 2009). Zhaoqing, Jiangmen, Huizhou, and other cities have extensive ecological land coverage, mainly woodland and grassland, effectively mitigating the climate risks associated with climate change.

The spatial aggregation of non-ecological elements is primarily concentrated in the Pearl River port of the Greater Bay Area. Spatial mobility is robust, evident in the density of intercity public transportation and the spatial interdependence of social and economic development factors. As the fundamental framework of urban spatial structure, changes in transportation methods. Modes of transport play a guiding and facilitating role in the development and organization of urban spaces. The increase in the density of the transportation road network has a significant impact on the succession and organization of urban space in the Greater Bay Area (Wen & Jiang, 2021; Zhao, Yang, Li, et al., 2023). It is noteworthy that the spatial center of gravity of the Greater Bay Area has a specific directionality. The land use pattern has shifted towards the northwest, and the centripetal force of urban spatial development is apparent as it gradually contracts towards the center each year. In the spatial pattern, ecological elements exhibit decentralized development, with a strong interaction between environmental factors and other elements. This interaction significantly enhances the spatial structure, indicating a center-to-periphery integration development in the Greater Bay Area.

5. CONCLUSION

This study examines the pattern of urban spatial evolution and the trajectory of sustainable development in the Guangdong-Hong Kong-Macao Greater Bay Area from 2005 to 2020. It can be summarized in the following conclusions: 1) Urban spatial development significantly correlates with land use. Construction land expansion is concentrated in the central and coastal regions of the Greater Bay Area, while ecological land use in the north remains stable, aiding in climate risk mitigation; 2) in the intrinsic ecological-human mechanism of climate change, the Greater Bay Area is gradually contracting towards the center, and non-ecological factors exhibit significant spatial heterogeneity in urban development. For example, transport and urban land use linkages in the core area of the Greater Bay Area exhibit a different pattern compared to the peripheral areas; 3) The spatial development of cities in the Greater Bay Area remains stable, expanding outward from the core. Spanning southeast to northwest, it forms beneficial buffer zones on both sides. Nevertheless, the spatial aggregation primarily focuses on PRD ports and adjacent coastal regions; 4) The trajectory of urban spatial development in the Guangdong-Hong Kong-Macao Greater Bay Area is characterised by openness and local stochasticity.

Our future research has two main aspects. Firstly, it involves early warning research on unbalanced ecology in the context of urban space development. This involves quantifying the stability of urban space within the non-equilibrium paradigm, upholding the ecological protection red line in the bay area, and expediting the construction of the northern ecological bay area while maintaining a balance between preserving green space and development. The research focuses on the driving factors and evolutionary mechanisms for the clean and sustainable transformation of the Greater Bay Area under land use constraints. This research aims to promote urban development, efficiently utilize converted land for limited expansion, and strategically plan the spatial layout and land use quantity structure.

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54 Assessing Tourism Competitiveness across Hungarian Destinations: Recent Discoveries and Implications

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Abstract

This research evaluates the regionalization of tourism in Hungary, exploring the breakdown of the national tourism gross domestic product (GDP). Additionally, the study delves into the concentration, spatial variations, and characteristics of these two indicators. A multi-modal approach is employed to analyse the competitiveness of Hungarian counties, and the penetration of these tourism regions is discussed through the application of the Tourism Penetration Index. Furthermore, we compute the regional GDP across Hungary.

Keywords

Competitiveness, GDP, Hungary, Tourism Penetration Index, regionalization.

1. INTRODUCTION

An exploration into the competitiveness of various tourism regions raises numerous questions (Lengyel, 2000; Nemes Nagy, 2005). While several studies have pinpointed the attributes that contribute to the competitiveness of tourism destinations (Dwyer & Kim, 2003; Ritchie & Crouch, 2003), the methods available for measuring tourism competitiveness are relatively limited. Nevertheless, there have been studies on this subject. According to Go and Govers (2000), a destination's competitive position depends on its facilities, accessibility, service quality, image, climate, environment, and attractions. Ritchie's (2003) Destination Performance Index facilitates the comparison of destinations by evaluating around 160 indicators related to economic performance, sustainability, visitor satisfaction, and management-related activities.

The competitiveness monitor created by Gooroochurn and Sugiyarto (2004) gauges tourism competitiveness using eight quantitative indicators, including price, trade openness, technological development, state of infrastructure, human resources of tourism, social development, environmental conditions, and general human resources.

The Travel and Tourism Competitiveness Index (WEF, 2008), based on 14 indicators, assesses the tourism competitiveness of 130 countries.

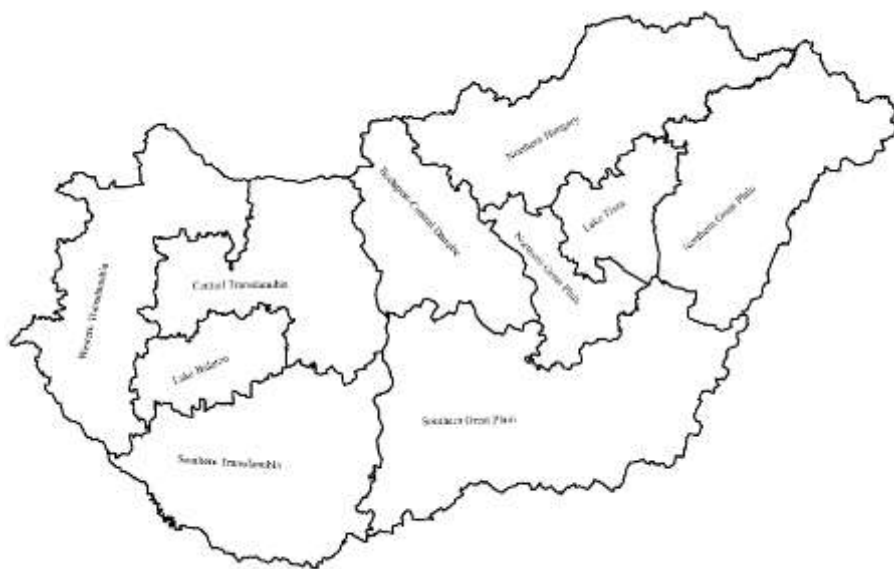
The ESPON (2007) report includes a description of tourism flows and their regional significance, along with a typology of destinations. Spatial impacts are demonstrated through an analysis that discusses the tourism index and typologies alongside data on population development, gross domestic product (GDP), employment, accessibility, and hazards. Spatial differences are analyzed based on the Tourism Penetration Index (TPI).

This comprehensive study explores the competitiveness of tourist destinations in Hungary, incorporating novel aspects such as regionalization, the division of the national tourism gross domestic product (GDP), and the analysis of the competitiveness of Hungarian counties. The research utilizes a multi-modal approach, considering various indicators to provide a nuanced understanding of the current state and future potential of Hungary's tourism landscape. Our article assesses the

regionalisation of Hungary's tourism destinations and investigates the division of national tourism gross domestic product (GDP). Moreover, the concentration, spatial disparities and features of these two indicators are examined. The competitiveness of Hungarian tourism regions is analysed using a multi-modal approach and the penetration of these tourism regions is discussed by applying the Tourism Penetration Index. We also calculate the regional GDP across Hungary. A unique contribution of this research lies in the application of the Tourism Penetration Index to analyse the penetration of tourism regions in Hungary. This multi-modal approach not only offers a holistic view of tourism competitiveness but also provides actionable insights for regional policymakers and stakeholders.

2. METHODOLOGY

We estimated the GDP of various tourism regions in Hungary between 2012 and 2022 (Figure 1) in order to compare this with the actual level of these regions' development. These estimations were identical to those performed on the micro-regions of Hungary, as described below.



Source: own editing

Figure 1. Tourism regions in Hungary

First, we defined the share of settlements of the studied tourism regions calculated from the total taxable incomes of their respective counties, from the volume of local taxes and from the number of registered enterprises. Second, based on the average proportions of these shares, the estimated GDP for all settlements was calculated within the GDP volume of the appropriate county as published by the Hungarian Central Statistical Office. Finally, these calculated GDP volumes were aggregated by tourism region.

Second, the national tourism GDP was then divided into tourism regions by way of an estimation procedure, with which the turnover of each region's accommodation was considered using an evaluation method based on the type of accommodation.

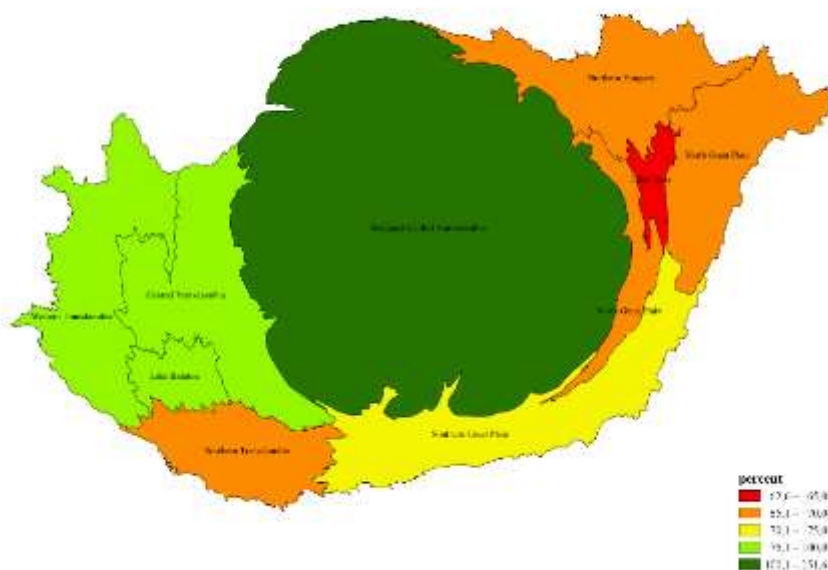
Theoretically, it is possible to define the level of development by applying a complex development indicator. Alternatively, an estimation based on the most widespread indicator, that is, on the GDP of tourism regions, can also be performed. For this analysis, we found the second method to be more appropriate, and the results of those calculations are presented next.

3. RESULTS

We estimated the total GDP of the tourism regions in Hungary and, using these data and the actual values, the respective levels of their development were compared. The highest GDP among the tourism regions of Hungary is produced in the Budapest–Central Danube Region. Western Transdanubia region experienced the biggest increase in share between 2012 and 2022, whereas all other regions showed less increase.

Compared with 2012, the national GDP increased by 128% by 2022. Faster growth was experienced in the Northern Hungary Region (+220%), Tisza-lake Region (+147%), Southern Transdanubia Region (+145%), whereas in other regions growth was slower compared with the national average. The lowest growth was experienced in Western Transdanubia (+111%).

On the graph (Figure 2), we modified the area of the tourism regions with the volume of GDP, while the colouring was based on GDP per capita. I used Scapetoad software to design the figure.



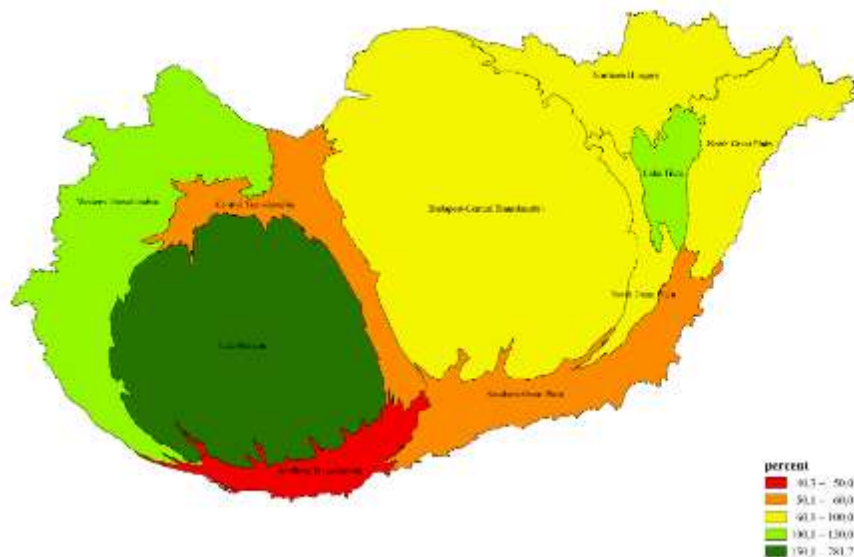
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Figure 2. Topological map of GDP and GDP per capita in tourism regions in Hungary, 2022 (country average=100)

We found that tourism GDP between 2012 and 2022, at the national level, increased by 167%. The most visible growth was in Western Transdanubia (+220%), while the smallest level of growth was in Central Transdanubia Region (+108%). Besides that Northern Hungary, The Lake Balaton and Southern Transdanubia regions experienced below-average growth. Between 2012 and 2022, the ranking of regions for tourism GDP underwent only minor changes. The top four regions were Budapest–Central Danube followed by Lake Balaton, Western Transdanubia and Northern Great Plain. In 2012, fifth place was attained by Northern Hungary Region, but this fell back to seventh position by 2022. In 2012, Central Transdanubia was followed by Southern Transdanubia. The lowest value of tourism GDP during the entire study period was produced in the Lake Tisza tourism region. These results imply that the spatial concentration of tourism GDP in Hungary is significantly higher at the regional level compared with total GDP, with the concentration becoming ever stronger for both. Furthermore, spatial disparities in tourism GDP per capita are far more significant than those of GDP. We conclude that, despite the remission of differences between the most and least developed regions in the field of tourism, the level of spatial disparities in the development level of tourism in Hungary is still significant.

In order to compare regions that have varying areas and populations, (regional) tourism GDP per capita was calculated and used as an index of the level of tourism development. However, the ranking

of tourism regions did not change significantly during the study period, with Lake Balaton, Budapest–Central Danube and Western Transdanubia remaining the first three regions. On the graph (Figure 3), we modified the area of the tourism regions with the volume of tourism GDP, while the colouring was based on tourism GDP per capita.



Source: own editing

Figure 3. Topological map of tourism GDP and tourism GDP per capita in tourism regions in Hungary, 2022 (country average=100)

Applying the method of de-aggregation, we next studied tourism competitiveness and its components in the tourism regions of Hungary. In the first approach, development (GDP per capita), productivity (GDP per employee), employment (active age per employee) and age structure (active age per capita) were taken into consideration as the factors of competitiveness. After some mathematical modifications had been conducted (logarithms of values were applied), the product was transformed into a more manageable sum according to the formula below:

(Equation 1)

$$\log\left(\frac{GDP}{\text{number of population}}\right) = \log\left(\frac{GDP}{\text{number of employed}}\right) + \log\left(\frac{\text{number of employed}}{\text{number of active aged}}\right) + \log\left(\frac{\text{number of active aged}}{\text{number of population}}\right)$$

Using this approach, we found that only the Budapest–Central Danube tourism region may be regarded as competitive in Hungary. However, because of the factor ‘employment’, a multi-factorial competitive advantage can be observed here. Contrary to this, no other tourism regions have a competitive advantage.

In a dynamic analysis, a complex competitive advantage can be seen in the Northern Hungary, Tisza-lake and Southern Hungary tourism regions between 2012 and 2022. A competitive advantage is also present in the Central and Southern Transdanubia tourism regions, but this is the result of advantageous changes in productivity.

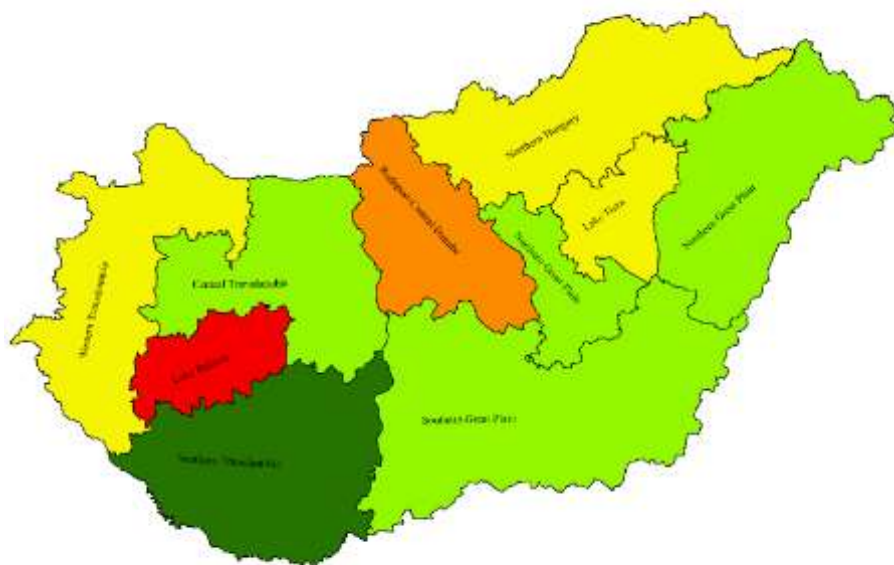
Tourism competitiveness was analysed using two approaches: (i) based on tourism factors and (ii) based on the current tourism situation and its adjustment to the economic structure. In the former approach, tourism competitiveness is modelled by the following tourism factors: tourism development/tourism GDP per capita in the county; tourism efficiency/overnight per capita GDP of county tourism; coverage/per capita commercial accommodations; and capacity utilisation/space per overnight stay.

Based on the examination of statistical tourism factors, the Lake Balaton, Lake Tisza and Western Transdanubia regions can be competitive. In the first case, the competitive advantage is multi-

factorial, with only relative supply lower than average. Although Budapest–Central Danube is in a prominent position in Hungary regarding accommodation, in relation to per capita value it is in a worse position compared with the national average. Based on this, we find that tourism is less significant to the economy of Budapest–Central Danube than it is to Lake Balaton, which shows better than average accommodation values but lower than average efficiency and utilisation values. In other regions, no competitive advantage can be seen.

In case of dynamic analysis In the Northern Great Plain and Central Transdanubia tourism regions, a complex competitive advantage is evident. The Western Transdanubia and Southern Great Plain tourism regions display a multi-factorial competitive advantage, whereas in Budapest–Central Danube, Northern Hungary and Lake Tisza a single-factorial competitive advantage can be seen. Unfortunately, in Southern Transdanubia a multi-factorial competitive disadvantage and in Lake Balaton a complex competitive disadvantage is present.

Tourism is a complex, multidimensional phenomenon, and thus, it is expedient to analyse its impacts by applying a multidimensional indicator. To achieve this, the TPI, which is a complex impact indicator of tourism (McElroy & de Albuquerque, 1998; Sütő, 2007), was developed.



Source: own editing

Figure 4. TPI indices of the tourism regions in Hungary

Because tourism competitiveness does not solely derive from tourism factors alone, our second approach also examines the general level of development and share of tourism in a given county. Thus, tourism competitiveness depends not only on the income per person produced by tourism but also on the role of tourism in the economy and regional development.

Somewhat similar results were obtained in this case too; therefore, it can be concluded that changes taking place in tourism processes can also be observed in the impact of tourism on the economy. Tourism competitiveness was thus analysed from two points of view and finally the tourism penetration of each region was studied by applying the TPI (Figure 4).

For the results of our calculations, we used ESPON (2007) (Table 1) and a map of the natural breakpoints and national territorial differences (Figure 2). In terms of tourism surplus according to this approach, Southern Great Plains is the least and Lake Balaton is the most affected region. Budapest–Central Danube is only in the lead in terms of economic impact, but second in terms of surplus.

Compared to our previous tests, there was a change, as Budapest–Central Danube moved from the Moderately high saturated destination to the Moderately low saturated destination group, while the other regions were in the same group in the previous ones as well.

Table 1. Surplus of tourism regions according to ESPON (2007), 2022

Type of destination	TPI indices	Tourism regions
Mellow destination	0.50 – 1.00	Balaton Region
Moderately high saturated destination	0.25 - 0.49	
Moderately low saturated destination	0.10 - 0.24	Budapest–Central Danube, Western Transdanubia
Low saturated destination	0.00 - 0.09	Northern Hungary, Northern Great Plain, Lake Tisza, Southern Great Plain, Central Transdanubia, Southern Transdanubia

Source: own editing.

4. CONCLUSIONS

Comparing our findings to the previous study on competitiveness, it's evident that Hungary's second-largest destination, Lake Balaton, faces a higher burden in terms of customer turnover than what is justified by the country's domestic tourism competitiveness position. This is attributed to the relatively low success of tourism activities in the Balaton area, reflected in the guest-per-night tourism GDP being below the national average. Consequently, decision-makers must formulate a distinct tourism development strategy.

Conversely, concerning the Budapest–Central Danube Region, improvements can be primarily in the form of green field projects and new investments, considering the region's exceptional effectiveness in competitive factors at the national level. While the region exhibits moderately high saturation in terms of tourism workload, the focus should be on quality enhancements and existing infrastructure transformation.

In Lake Balaton's case, due to the already high workload, the objective shouldn't solely be increasing guest turnover but also enhancing service quality alongside the existing turnover. Although the Budapest–Central Danube Region excels in both economic and tourism aspects, there's potential for quantitative guest turnover increases in other regions, considering their workload.

Apart from the unique situations of the two major tourism regions, attention must be drawn to the possible future challenges in the Northern Great Plains. Economically, this region faces a competitive disadvantage, although its tourism aspect showcases a mixed scenario: while a static test in 2006 indicated a competitive disadvantage, a dynamic test between 2012 and 2022 revealed a complex competitive advantage. Despite the current disadvantageous situation, the level of development in Hungary is remarkable. Decision-makers hold significant responsibility for this region, as tourism can act as a catalyst for development in economically underdeveloped areas.

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64 Creating Shared Value in Urban Agriculture: Focusing on Shanghai, China

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Abstract

A rapid urbanization promotes urban development but also brings about the problems such as food security, environmental pollution, social disparity and urban residents' alienation, etc. Especially for the mega city of Shanghai with its urbanization rate close to 90%, these problems might be challenges to the sustainable development and innovative solutions need to be find out urgently. On the other hand, urban agriculture, as the practice that combines urban life with agricultural production, has great potentials to solve urban problems based on its economic, social and environmental functions. A study conducted by Ge et al. (2022) on the community gardens (CGs) in Shanghai revealed that CGs not only beautify the environment but also play an important role in promoting neighborhood relationships and building a harmonious society. However, the mechanism by which social entrepreneurs solve social issues and create economic value through urban agriculture in Shanghai has not been elucidated until now. On the other hand, new types of women-led urban agriculture projects have emerged in Shanghai.

Therefore, this study aims to explore how female social entrepreneurs implement the strategy of creating shared value (CSV) in urban agriculture through an in-depth analysis on their entrepreneurial process and entrepreneurship development, and how trigger changes in the socio-cultural environment in Shanghai, China. Specifically, we introduced trajectory equifinality model (TEM) to the three selected cases of female entrepreneur. The results clarified that urban agriculture can create both economic and social values by meeting diverse needs of urban residents and solving social problems to contribute to quality of urban life. In addition, the empowerment of female entrepreneurs in urban agriculture not only has a potential to contribute to realizing the gender equality in agriculture and local communities, but also has a positive impact on addressing gender issues at social level.

Keywords

Creating shared value (CSV), Urban agriculture, Trajectory equifinality model (TEM), Social capital, Gender equality.

1. INTRODUCTION

Urban agriculture, as a practice that combines urban life with agricultural production, has great potentials to solve urban problems by its economic, social and environmental functions. The Shanghai's urbanization rate is already nearly 90%, in China. Urbanization has brought about population growth and contributed to significant urban economic growth. However, rapid urbanization also brings problems of food security, environmental pollution, social disparity and urban residents' alienation.

Recently, new types of agricultural practices such as community gardens (CGs), rooftop gardens, organic farms and family farms have emerged in Shanghai's central and peri-urban areas. Ge et al. (2022) on the CGs in Shanghai revealed that as one of the means of urban renovation, CGs not only beautify the environment but also play an important role in promoting neighborhood relationships and building a harmonious society. However, the mechanism by which social entrepreneurs solve social problems and create economic value through urban agriculture in Shanghai has not been

elucidated until now. In addition, Bryant et al. (2016) summarized literatures on roles and challenges on female entrepreneurs in agriculture and rural areas, showed that although new media technologies have facilitated entrepreneurship and knowledge exchange in China, unequal power relations between genders have brought unequal access to capital and social networks, and thus differential use of technology.

Therefore, this study aims to explore how female social entrepreneurs implement the CSV strategy in urban agriculture through an in-depth analysis on their entrepreneurial process and entrepreneurship development, and how trigger changes in the socio-cultural environment in Shanghai, China.

2. LITERATURE REVIEW

2.1. *Creative class and social entrepreneurship*

Florida (2002) proposed the concept of the creative class as an important driver of urban development. As defined by Austin et al. (2006), social entrepreneurship can be characterized as the process of creating innovative social value, and this activity transcends traditional sectoral boundaries to include the nonprofit, business, and governmental arenas. It has been noted that creative classes with high social capital have a high level of social entrepreneurship, and social capital is very important both at the beginning of a social business and during the development process (Kiminami et al. 2020).

Applied trajectory equifinality model (TEM) to three male cases of entrepreneurs in urban agriculture in Shanghai, China, Ge et al. (2023) found that urban agriculture and social entrepreneurs played a crucial role in urban governance and community renovation. A study by Chen and Barcus (2024) discusses women who work in cities due to a variety of reasons returning to rural areas of Guizhou to start their own businesses. These female entrepreneurs have a strong sense of purpose and effectively use empowerment, dissemination of knowledge, action learning, collaboration and networking, and actively integrate and develop available resources, especially the unique cultural resources of local communities, to drive personal change and sustainable community development. More importantly, by transforming themselves through entrepreneurial behavior, they have significantly challenged traditional cultural gender biases and contributed to change in a community level. On the other hand, Zhao (2021) studied entrepreneurship among young women in Shanghai and found that they have a relatively strong sense of entrepreneurship, value and appreciate their learning and social interaction skills. On the other hand, female entrepreneurs face difficulties in financing businesses and in balancing career and family responsibilities, as well as in social prejudice against women. Therefore, it is important to analyze both female and male entrepreneurs in Shanghai's urban agriculture in order to understand what advantages they have, what difficulties they face, and how to achieve their career development.

2.2. *Urban agriculture and creating shared value (CSV)*

According to FAO's definition, urban and peri-urban agriculture is considered to be agricultural production and related processes in or around urban areas. However, it is considered that urban and peri-urban agriculture are easily affected by urban planning and zoning restructuring and are difficult to distinguish accurately. Therefore, in this study, the two are considered as one called urban agriculture. A study analyzed the high-quality development of agriculture in the Yangtze River Economic Belt through the five dimensions of "innovation-coordination-green-openness-sharing" (Cui et al. 2022). The results showed that innovation and green are growing rapidly, and other dimensions such as sharing are showing an upward trend in general. However, Shanghai agriculture is limited by conditions such as small scale and low efficiency, and faces a lack of development momentum.

Kiminami and Kiminami (2007) pointed out that urban agriculture can improve the quality of urban life through multi-functionality and the provision of local public goods. In addition, Kiminami et al.

(2018, 2019) conducted an empirical study on the multi-functionality of urban agriculture in Tokyo and Shanghai and indicated that urban agriculture can attract the creative class, and these people with high social capital are more likely to engage in social business to solve urban social problems. The concept of creating shared value (CSV) defined by Porter and Cramer (2011) proposes that enterprises should create economic value while creating value for society through their core business, and realizing a win-win situation both enterprise and the society. Kiminami et al. (2022) analyzed cases of urban agriculture in Japan and compiled three models of cognitive innovation and CSV for social entrepreneurs. The findings suggested that cognitive innovation is a dynamic growth process that requires a clear sense of problems and an effective organizational learning system. This study will examine social entrepreneurs' journeys of entrepreneurship in urban agriculture and find out how they implement CSV strategies and interact with stakeholders.

3. ANALYSIS FRAMEWORK AND METHODS

3.1. Analytical framework

The analytical framework of this study is shown in Figure 1. Innovative urban agriculture provides a platform and opportunity for social entrepreneurs to implement a strategy of CSV and gives a new solution to solve social problems through the multi-functionality of urban agriculture. The development of social entrepreneurship of creative classes can influence the perceptions of urban residents and motivate them to change their behavior to drive socio-cultural change. In addition, the empowerment of female entrepreneurs in urban agriculture not only has a potential to contribute to realizing the gender equality in agriculture and local communities, but also has a positive impact on addressing gender issues at social level. Since gender equality is relevant to the issues of sustainable urban development and human well-being, we believe women farmers can interact effectively with stakeholders to meet diverse needs of urban residents and solve social problems through innovative urban agriculture, thereby improving the quality of urban life and creating a virtuous cycle of sustainable urban development. Therefore, to realize the purpose of our study, we set the following hypothesis for verification.

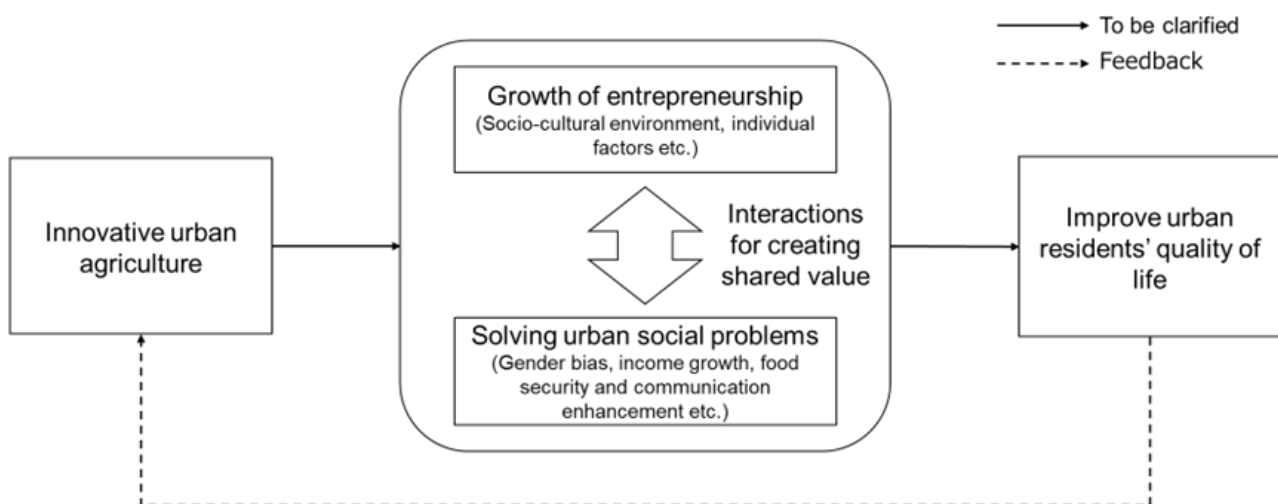
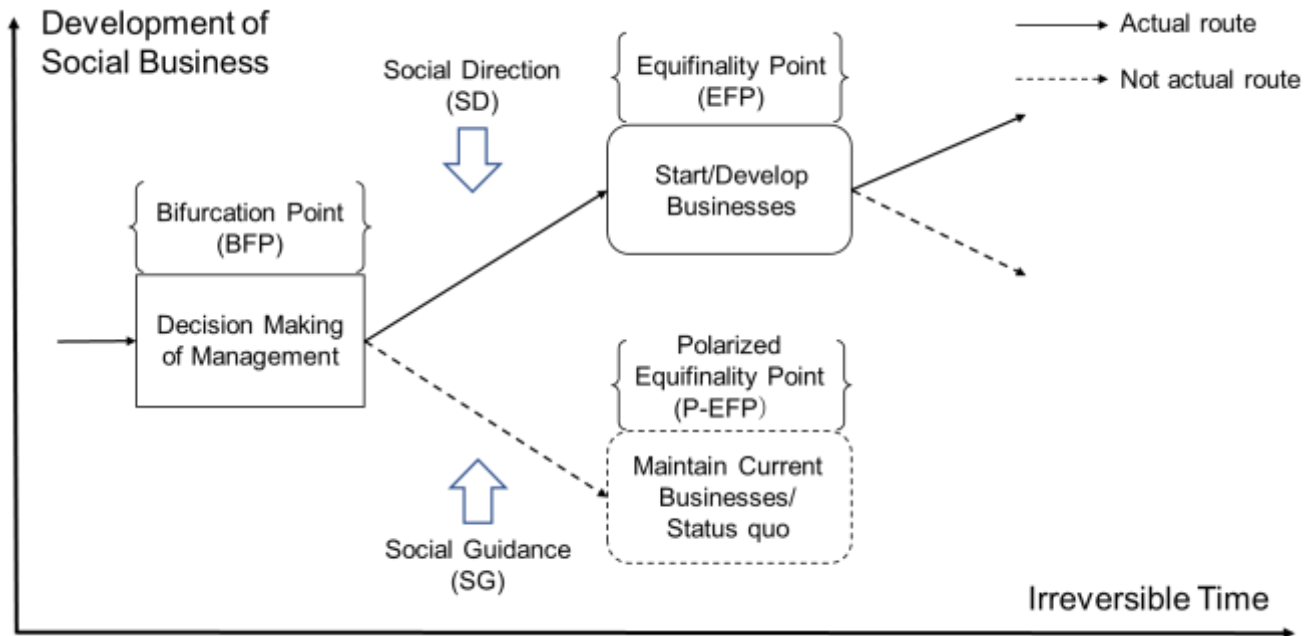


Figure 1. Analytical framework

Hypothesis 1: The development of female social entrepreneurship in urban agriculture can change the socio-cultural environment, mitigate gender bias and improve quality of urban life through creating shared value.

3.2. Analytical Method

For hypothesis verification, we introduce trajectory equifinality model (TEM) to analyze the cases of three female social entrepreneurs. TEM as a qualitative analysis (Yasuda et al. 2015) considers people as open system that allows for a detailed analysis of various factors in social environments how influence pathways to achieve specific goals and the trajectory of a person's development in an irreversible time. Figure 2 shows a conceptual model of TEM analysis. And Table 1 shows descriptions of terms used in this analysis.



Source: Reference to Kiminami et al. (2020) for diagrams

Figure 2. Conceptual model of TEM analysis

Table 1. Description of terms used in TEM analysis

Terms	Description
Equifinality Point (EFP)	The point at which the different trajectories of a person's life converge over time.
Polarized Equifinality Point (P-EFP)	Point of alignment of the EFP
Bifurcation Point (BFP)	A person's path (behavior) diverges to varying degrees after making some choice at some stage.
Social Guidance (SG)	Power to encourage moving toward EFP
Social Direction (SD)	Power blocking move toward EFP
Irreversible Time	It is not an objective time, but a qualitative time that flows through a person life. Introducing this concept makes it possible to describe different paths within a single framework

Source: Summarized with reference to Yasuda et al. (2015).

In this analysis, the vertical axis and horizontal axis are set to “development of social business” and irreversible time. And equifinality point (EFP) is set as “Start-up and development of urban agri-businesses”. Because this study focuses on roles played by social entrepreneurs in urban agriculture and their developing entrepreneurship, it does not specify polarized equifinality point (P-EFP) in detail, but rather focuses on their perception changes as well as on entrepreneurial and managerial processes. Meanwhile, bifurcation point (BFP) is identified as an important choice or decision that affects “social entrepreneurship and development of innovative urban agri-businesses”. In addition, influences or factors from external socio-economic environment are defined as social direction (SD) and social guidance (SG). In this study, SD is viewed as a force that inhibits personal actions and choices towards EFP, while SG is viewed as a force that facilitates personal actions and choices towards EFP.

4. ANALYSIS RESULTS OF TEM

4.1 Summary of basic situations of three cases

We selected three female social entrepreneurs based on the advancement of urban agriculture programs, detailed information on individual decision-making and business context in Shanghai. Three cases have different operations and stages of development, but they are all successful and have a number of stakeholders in their development process. The sources of TEM analyses in this study are based on open access information (Appendix).

Table 2. Summary of basic situation of female entrepreneurs in urban agriculture in Shanghai

	Ms. S	Ms. N	Ms. P
Location	Shanghai suburbs	Shanghai suburbs	Shanghai suburbs
Business	Family farms/ Agricultural cooperative	Agricultural cooperative	Hydroponics business/ Agricultural Cooperative
Management structure	Family-owned/ Cooperative organization	Cooperative organization	Limited Company/ Cooperative organization
Business strategy	Branding and Business diversification	Cooperation and integration of agriculture with other industries and technologies	Develop and promote advanced technologies and effectively use EC
Networks	Local farmers, governments, institutions (agricultural technicians), urban residents, families, etc.	Governments, institutions, urban and local residents, enterprises, etc.	Enterprises, experts, urban residents, governments, families, etc.
Social values	<ul style="list-style-type: none"> • Emphasis on food safety and quality • Support local farmers • Enhance interaction with consumers by open farms to public and use Internet 	<ul style="list-style-type: none"> • Use of unused farmland in the suburbs • Provide residents with safe, fresh produce • Build a system of interaction with urban communities and a trusting relationship with the residents • Establish systems for human resource development and employment support for disabled people 	<ul style="list-style-type: none"> • Emphasis on agricultural product safety. • Create employment in the local community • Emphasis on development and spread of new technologies • Support other agricultural entities and households
Changes in Social entrepreneurship	Rising	Rising	Rising

Table 2 shows a summary of basic situations of Ms. S, Ms. N and Ms. P. Ms. S inherited and operates her father's family farm and she is also actively introducing new technologies, crop varieties and machines. In her farm operations, she focuses on branding and business diversity, offering a variety of agricultural products and services. And, she has also established an agricultural cooperative to support local farmers.

Ms. N established an agricultural cooperative by using unused local farmland and focusing on linking and integrating agriculture with other industries. Ms. N's cooperative can not only provide fresh agricultural products to consumers, but also build a trusting relationship with urban residents and a system of interaction with urban communities. Moreover, Ms. N has created a system of human resource development in agriculture and employment support for disabled people. Ms. P has used her experience in e-commerce (EC) business to develop a hydroponic business. She has created employment opportunities for local communities by her business. In addition, Ms. P has established

a cooperative to provide technology and equipment to other agricultural small and medium-sized companies and households.

4.2. Results of Ms. S

The analytical results of TEM on Ms. S are shown in Figure 3. And each BFP, SG and SD in the figure are summarized in Table 3.

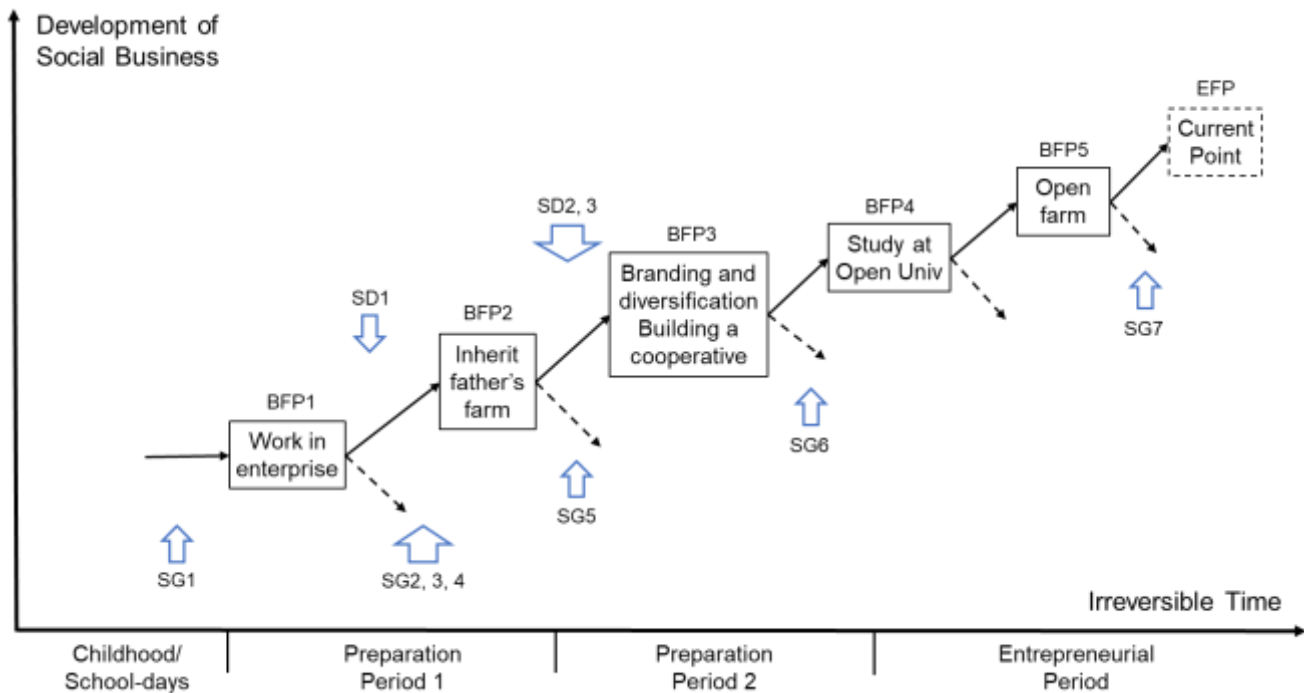


Figure 3. TEM diagram of Ms. S

Table 3. List of Ms. S's BFPs, SGs and SDs

BFP	1	Worked in enterprise
	2	Inherited father's farm
	3	Branding and diversification, Building a cooperative
	4	Studied at Open University
	5	Opening her farm
SG	1	Rural origins, father was one of the first family farm contractors in local area
	2	Shanghai introduced policies for promoting family farms
	3	Frequent food safety and security issues
	4	decline in earnings of companies that worked
	5	Local government provided agricultural trainings
	6	Promotion policies for family farms in China
	7	Promotion of rural China
SD	1	Family opposition
	2	Big difference compared to previous lifestyle
	3	Understanding of agriculture was limited to father experience

Ms. S was born in Shanghai rural area, and her father was one of the earliest contractors of family farm in Songjiang District, Shanghai (SG1). Ms. S firstly worked in a foreign enterprise (BFP1). At this time, her attention was drawn to food safety issues that were frequently reported in media (SG2). Meanwhile, Shanghai was piloting to develop new agricultural entities, such as family farms, and ensure land concentration and transfer, while limiting age of contract farm owners to below 60 years old (SG3). When the company that Ms. S worked for was hit by an international financial crisis (SG4), she resigned her job and inherited her father's farm (BFP2) despite her family's opposition (SD1). The farming lifestyle was very different compared to Ms. S' previous lifestyle (SD2), and her understanding about agriculture was dependent on her father's experience (SD3), which caused a

bottleneck in farm development. Ms. S realized that farm development required scientific production, management branding and business diversification. She actively participated in the training courses provided by local government and communication activities with local agricultural technicians (SG5). In addition, Ms. S has applied trademarks in her name, sells various high-quality agricultural products from farm, and she has established an agricultural cooperative (BFP3). Moreover, China has begun to promote family farms as a new type of agricultural entity, which has supported development of Ms. S's farm (SG6).

Ms. S went to Shanghai Open University Songjiang campus for classes (BFP4), she actively promotes her farm through SNS and introduced EC into her business. Furthermore, she has opened her farm to public to provide crop-growing experiences (BFP5). Under the Chinese government policies on rural development (SG7), Ms. S has overcome operational challenges from the Covid-19 pandemic. Now, she not only sells special agricultural products and processed foods, but also provides services and facilities to visitors, including fruit orchards, rice paddies, small zoo and a cafe through webcast about farm life and produce production to customers.

4.3. Results of Ms. N

The analytical results on Ms. N are shown in Figure 4 and Table 4 summarizes her each BFP, SG and SD.

Ms. N was born in Chongming District (island), Shanghai, and went to Lanzhou City lived with her parents at childhood. While in Lanzhou, Ms. N rarely saw green vegetables. However, Ms. N returned to Chongming Island for the first time at age 7, she was inspired to grow vegetables when she saw them (SG1).

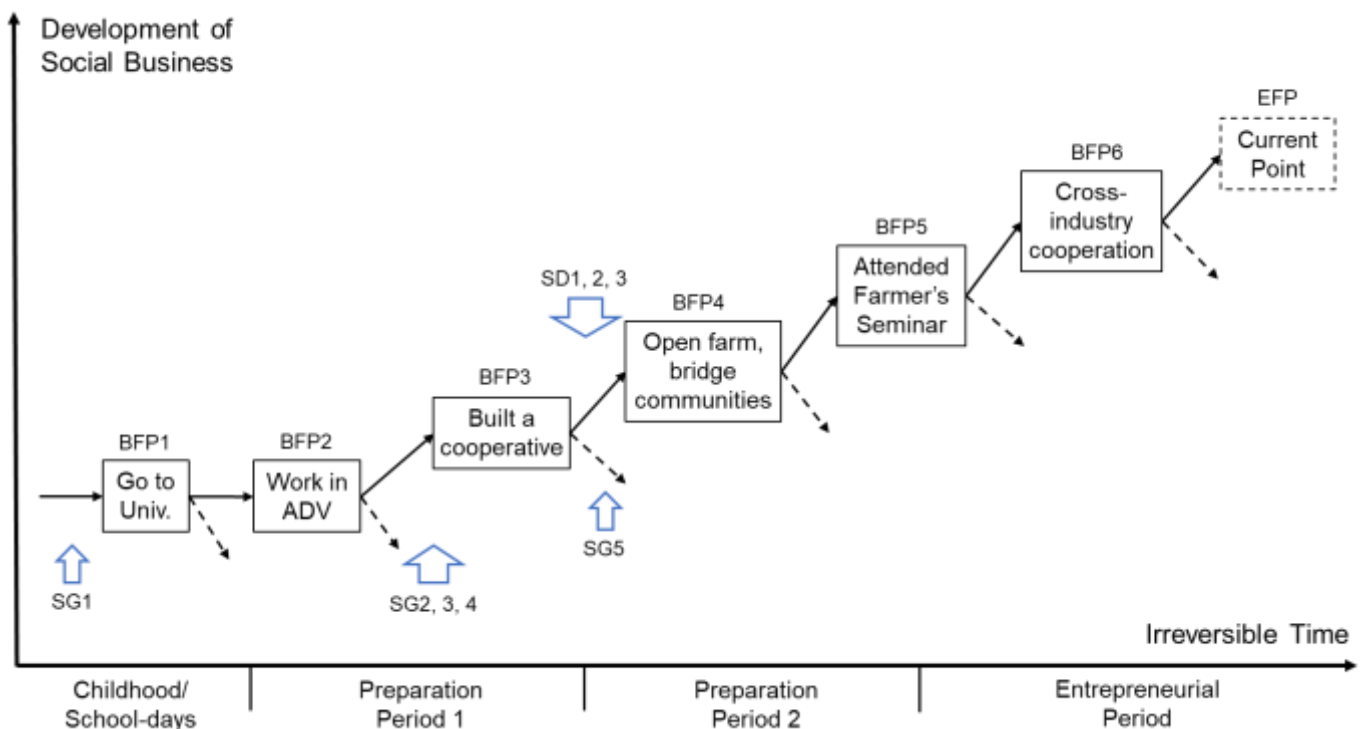


Figure 4. TEM diagram of Ms. N

Table 4. List of Ms. N's BFPs, SGs and SDs

BFP	1	Studied at DH University
	2	Worked in advertising
	3	Built a cooperative
	4	Opening farm, bridging communities
	5	Attended Farmer's Seminar
	6	Emphasizing industrial integration and cooperation
SG	1	Interested in growing vegetables as a child
	2	Caring for elderly at home
	3	Food safety and security attracts attention
	4	Local area is planned as an eco-zone
	5	Participation in government agricultural trainings and supported by institutions
SD	1	Low understanding of agriculture
	2	Villagers don't look their operation well
	3	Produced vegetables not sold

Ms. N studied fashion design at DH University in Shanghai (BFP1). After graduation, she started an advertising agency (BFP2). Due to taking care of her family elderly (SG2), Ms. N returned to hometown in Chongming District, Shanghai, and became more and more food safety concerning (SG3). At that time, Chongming Island was planned as an ecological zone due to inconvenient transportation, and many local residents migrated to urban areas of Shanghai for work. This caused a large amount of vacant land (SG4). Ms. N leased around 13.34 ha of land and set up a fruit and vegetable cooperative (BFP3). Due to Ms. N was new to urban agriculture and knew very little about it (SD1), local people did not appreciate her business (SD2), and the vegetables produced by her farm did not sell well. (SD3).

Ms. N actively participated in agricultural trainings organized by Shanghai government at each level, and supported by Shanghai Academy of Agricultural Sciences (SG5). She adjusted vegetable varieties to make them acceptable by markets. Also, Ms. N's cooperative was one of the first in Chongming District to enter urban center to sell agricultural products to residents directly. Moreover, Ms. N has set up a farm within her cooperative to show their production process for public to have confidence with agricultural products (BFP4). In this way, Ms. N has created communications between communities and farms by selling produce directly, and established supply systems with many residents.

Ms. N attended the Young Farmer Training at Shanghai Agricultural Radio and Television School (BFP5). For cooperative development, she and her cooperative adhere to a concept of "agriculture plus" (linkages and integrations of agriculture with other industries and technologies), introducing Internet of Things (IoT) for modern agriculture and promoting leisure agriculture (BFP6). Furthermore, Ms. N. pays attentions to human resource development and engages experts to conduct training seminars, while offering employment training and opportunities for disabled persons.

4.4. Results of Ms. P

The analytical results on Ms. P are shown in Figure 5. And Table 5 summarizes her each BFP, SG and SD.

Ms. P studied at SH University (BFP1) in Shanghai. Since graduation, she worked in law over ten years (BFP2). Ms. P and her husband started an EC business about baby care products (BFP3), they are very concerned about children's food safety (SG1), and met a business partner who is also concerned this issue (SG2). Ms. P's husband is from a rural area in QingPu District, Shanghai (SG3) and business partner is also involved in agriculture and food industry. They both have a few understandings on agriculture.

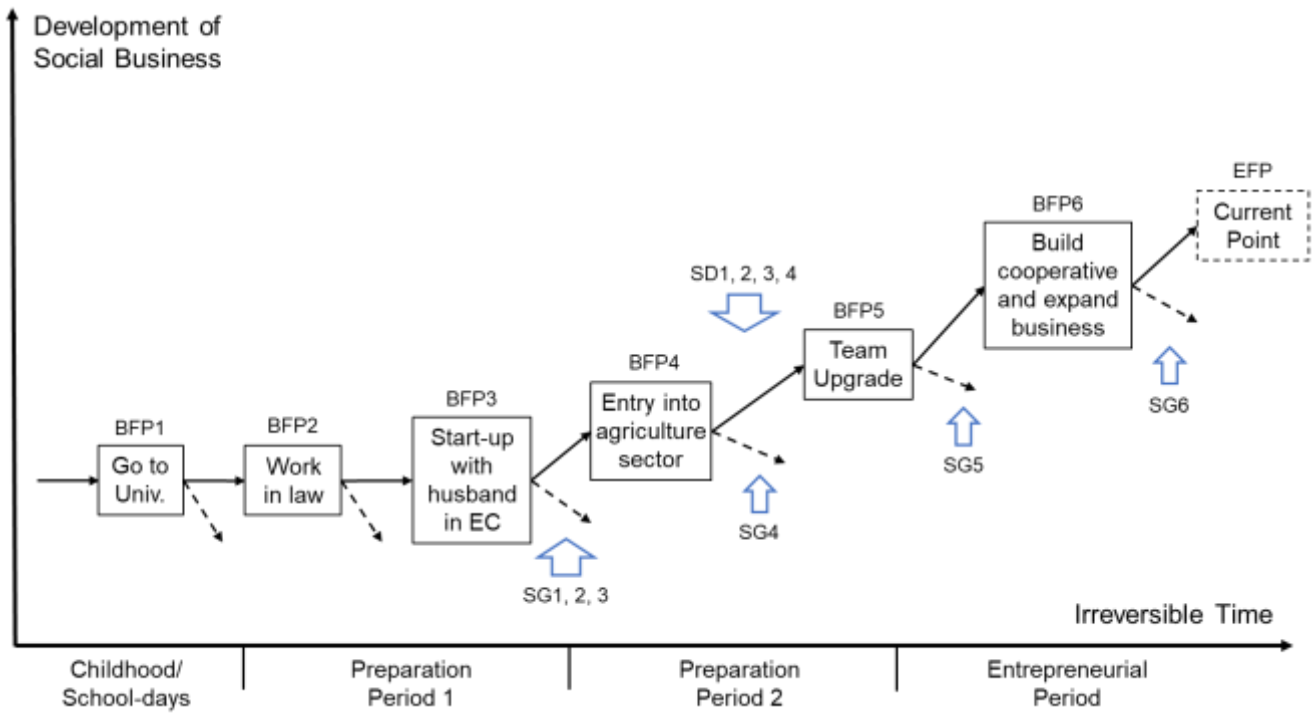


Figure 5. TEM diagram of Ms. P

Table 5. List of Ms. P's BFPs, SGs and SDs

BFP	1	Studied at SH university
	2	Worked in law
	3	Start-up with husband in EC
	4	Entered into agriculture sector
	5	Full team completed
	6	Built cooperative and expanding business
SG	1	Concern for children's food safety and security
	2	Business partners with the same idea
	3	Husband is from a rural area
	4	Family participation in business
	5	Successful hydroponics of fruits
	6	Entrepreneurial projects awarded and highly valued
SD	1	Lack of family support
	2	Poor understanding of agriculture and high technical barriers to hydroponics
	3	Huge investment required for hydroponics
	4	Operations were at a loss

Ms. P started her agri-business (BFP4) with hydroponic vegetables. However, Ms. P and her team did not know enough on agriculture and she was not fully supported by her family (SD1). And hydroponics had a high technical barrier (SD2), developing hydroponic production and technologies requires huge investments (SD3). Ms. P faced a problem of balancing her agricultural project with other businesses. In the early years of running her hydroponics business, Ms. P suffered a deficit (SD4). However, Ms. P obtained expert advice, adapted equipment and gradually explored a suitable hydroponic model. Her team also asked for help from family members (SG4) and rationalized team division of labor (BFP5) to make her husband and business partners focusing on market research and development. Ms. P sought people who had successfully researched and developed the technology (SG5) to expand hydroponic crops, and finally hydroponics project team has completed and established an agricultural cooperative (BFP6).

Currently, Ms. P has built relationships with food suppliers in Shanghai and has integrated agritourism into her business. She has directly and indirectly driven the employment of hundreds of people in local area through EC and enhanced farm operations in strawberry industry.

5. CONCLUSION

Based on the above TEM analysis, we obtained main 3 findings. First, female social entrepreneurs are able to accurately identify the diverse needs of urban residents and effectively use their personal experience and know-how in their businesses. They are not only focused on providing safe, healthy food, but also are committed to improving a quality and efficiency of agricultural production through innovations and technological applications, such as hydroponics and organic farming. Secondly, social capital plays a crucial role in urban agri-businesses for female entrepreneurs. They put a lot of attention on keeping good relationships, communication and collaboration with stakeholders (including urban and community residents, other companies and governments, etc.), supporting local employment and contributing to local development. And a network that connects stakeholders helps women farmers to continue learning and refreshing their cognition. Thirdly, although female entrepreneurs face many challenges, they built excellent capabilities and innovations in urban agri-business, also triggered a social innovation in gender equality both in rural and urban areas in China. Therefore, hypothesis 1 of this study “The development of female social entrepreneurship in urban agriculture can change the socio-cultural environment, mitigate gender bias and improve quality of urban life through creating shared value” was verified. Although, gender inequality in China have been eased, they have not been fundamentally addressed and women continue to face high pressures. These pressures come from traditional expectations and perceptions of women’s role in the family, local community and society. Therefore, urban policymakers should pay more attention to improve the socio-cultural environment in a comprehensive approach, focusing on women’s empowerment in urban agriculture, such as providing female entrepreneurs with necessary resources (education, training and financial support) for business development, more importantly, encouraging women participation and leadership in urban agriculture innovations.

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APPENDIX

Appendix 1: Sources of the TEM Analysis

Cases	Sources
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94 The Impact of Sustainable Investments on the Effectiveness of Companies

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Abstract

The climate protection and sustainability issues cover all companies on a global level. Companies must also bear in mind the sustainability issues formulated by the European Union, not only in Hungary, but also in other countries. In EU countries, it is necessary to adapt to environmental changes and shape the operation and attitude of companies, to operate as efficiently and environmentally friendly as possible in the long term. Therefore, the issue of energy investments is significantly important, but in addition, companies have other additional environmental investment opportunities. Such investments can be, software, which facilitates automation, for example, less scrap during production or even the development of the digitalization level at a given company. For the sake of sustainable development, investments are extremely important and necessary. In the course of my research, I examine to what extent the realized environmental investments have developed in Hungary and in the European Union. Highlighting Germany and France, where the development was the greatest. Also, I present the most important Key Performance Indicators (KPI), what can measure the effects of sustainability.

Keywords

Green investments, green KPIs, regional investments.

1. INTRODUCTION

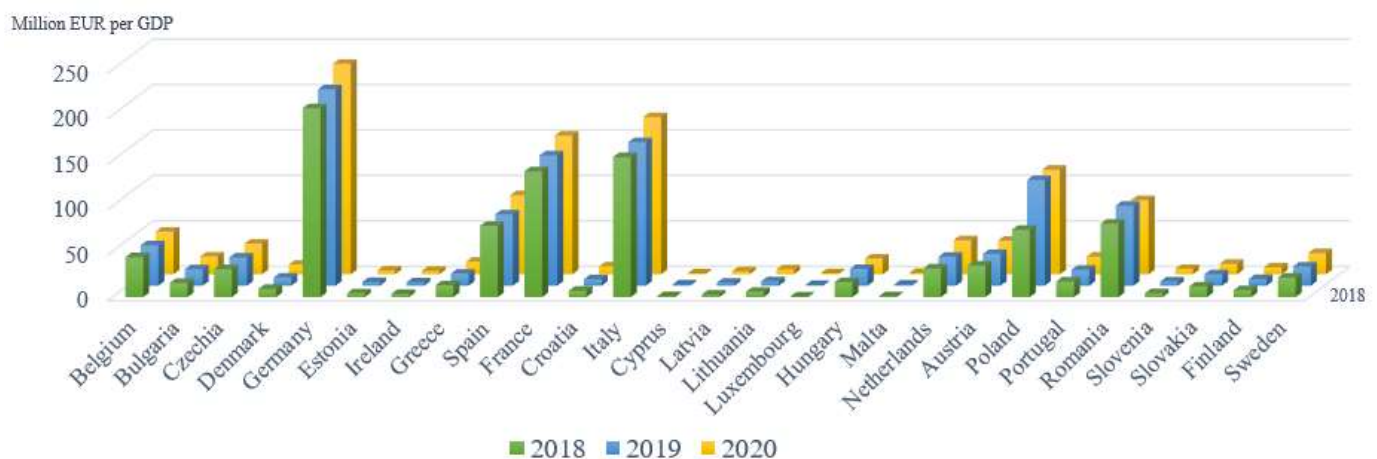
As soon as the world was shaken by the COVID 19 crisis, another extremely important area came to the fore, the long-term management of climate change and sustainability. This research issue affects all countries worldwide. As a result, sustainability and climate neutrality play a decisive role nowadays. This affects not only the everyday lives of individuals, but also small, medium and large companies. For continuous environmental changes and the appearance of new challenges and problems, humanity needs to implement new solutions. In all countries, it is necessary to adapt to environmental changes, and the operation and approach of companies must be shaped in such a way that they can operate as efficiently and environmentally friendly as possible in the long term. Therefore, the question of energetic (green) investments is crucial. [1]

I think it is important to clarify what we mean by being environmental investments and what we mean by being investments supporting sustainability. An environmental investment is considered to be any expenditure whose primary purpose is to prevent, reduce and eliminate any other environmental damage. These investments arise because of an environmental task and can be clearly assigned directly to this task. The basic purpose of environmental investments is to improve the condition of the environment, to prevent future environmental damage, to minimize harmful effects. In my research I focus on the environmental investments. In addition, however, assets that support sustainability are no longer necessarily related to environmental protection but only serves long-term operating purposes for a company. Measurement of these values gives the KPIs the opportunity to present in the next chapter in more detail. [2]

2. THE LEVEL OF INVESTMENTS IN THE PAST FEW YEARS IN THE EU

Countries must protect themselves from continuous environmental pressures. The Figure 1 clearly illustrates the national environmental protection expenditures based on the GDP distribution of the European Union member states in 2018, 2019 and 2020. The amounts in the table are in millions of Euros per GDP capita. It is clear that Germany spends a huge amount in this area year by year. In Germany spent 74,164 million EUR in 2018, 77,699 million EUR in 2019, and more than 80,000 million EUR in 2020. It was followed by France, which spent an average of 46,000 million EUR annually during the 3 years. Furthermore, the Figure 1 shows that only a few countries have very high expenditures, and most countries have relatively lower expenditures. What is also striking is that there is no drastic difference in spending between the 3 years. [3]

Both Germany and France have achieved outstanding values in recent years, In France, environmental protection has been receiving increased attention since 2010. That's when they launched their investment for the future program, which focuses on energy renewal and the preservation of our ecology. Within the framework of this program, the state supports innovative green investments of various company sizes and industries. During the years, more and more programs were launched, during which sustainable cities were supported, for example smart networks or electric cars, renovation and modernization of buildings, high-speed railways, or even the development of eco-ships. In order to be able to move forward as efficiently as possible, the Energy Transition Act was adopted in 2015, the primary goal of it is to reduce carbon dioxide emissions and moderate energy consumption. In this law, different sectoral areas were formulated, such as eco-buildings or clean transport. In order to achieve these goals, various tax incentives have been defined, with which small and medium-sized enterprises can be greatly supported. [4]



Source: Own editing based on EU-stat (2024)

Figure 1. National expenditure on environmental protection of GDP proportionally

Germany has also formulated similar steps for development. They basically distinguished 4 pillars.

- ✓ The inevitable ecological changes must be connected with the economic opportunities and the responsibility of the society
- ✓ During the development of resources, attention must also be paid to our global responsibility
- ✓ Alternative solutions for primary sources must be sought in order to depend on them as little as possible
- ✓ The use of long-term, sustainable solutions must be ensured during social involvement

Among these sub-principles, Germany provides a lot of support for all private individuals, small and medium-sized enterprises who want to develop and invest in the spirit of sustainability over the years. [4]

If we examine the environmental protection investments of the entire economy, then we can pay attention to similar results. The expenditure for the environmental protection is achieved in Germany, France, Italy and Spain. During the planning of every green project, we have to take into account the capital and the fact that this is a long-term investment, the return on which will not be realized immediately within 1-2 years and sometimes it cannot be measured in monetary unit. In

many cases the financial resources are not available for small and medium-sized enterprises. There German Public Financial Institutions (PFI) is a very good example in Germany, which is publicly available. These institutions are excellent loan collateral in the fields of energy efficiency, renewable energy or even sustainable transport (or other green investments as well). One of the big advantages of PFI green financing compared to private funds is that it has a stable, fixed interest rate, the best example of which is the German KfW. [5]

3. PERFORMANCE VALUE OF INVESTMENTS IN HUNGARY ON REGION LEVEL

Encouraging investments is a key issue in Hungary too. A company has the possibility of many types of environmental investment. This includes solar energy, biomass, wind energy, water energy, or geothermal energy. The main goal is to reduce greenhouse gases as much as possible. Hungary has also taken a number of steps in order to comply with the climate policy defined and prescribed by the EU. For this Hungary established the Ministry of National Development, whose main areas are climate policy, renewable energy carriers, and increasing energy efficiency. In order to encourage various sustainable investments, the government has formulated various grants and tenders. For example, discounted loan program, operational support (solar settlement, installation of a heat pump system), electric car purchase support, charging installation support, green bus program, corporate tax discount, electric bicycle tender, family house renovation tender (heating modernization, roof replacement, window replacement etc.). These support options are not only available for businesses, but also for individuals and families. [6]

4. SUSTAINABILITY PERFORMANCE INDICATORS

Key Performance Indicators (KPI) means key or main performance indicators, which is a time based, quantifiable measure of a result for a given objective. Today, sustainability and environmental protection, as well as their social impact, are receiving more and more attention. Not only individuals have a significant role in this area, but also companies as they contribute greatly to the emission of harmful substances. As a result, the environmental KPIs include the amount of energy investments, or CO2 savings, the proportion of the green car fleet, paper usage indicators, energy consumption and production indicators, or even waste production indicators. Among the social KPIs are the use of local resources at companies, the education of sustainability issues and problems for both employees and partner companies (Table 1). These issues do not only affect different regions of Hungary, and not only Europe, but also the whole world. [7]

Table 1. General and Sustainability Performance Indications

General Operational KPIs	Economic KPIs	Environmental KPIs	Social KPIs
<ul style="list-style-type: none"> • Turnover • Customer satisfactions • travel costs • Employee satisfaction • supplier certification • employee commitment • occupational safety • compliance indicators • employee and customer loyalty • innovation indicators 	<ul style="list-style-type: none"> • annual sales revenue after tax • profitability indicators • liquidity • inventory turnover • income-expenditure ratio • innovation indicators • R&D expenditures 	<ul style="list-style-type: none"> • energy classification of realized investment • harmful emissions • CO2 savings • degree of carbon neutrality • proportion of green car fleet • forest statistics • waste production and treatment indicators • waste water quality • paper usage indicators • environmental impact indicators • energy consumption and production indicators • chemical use indicators 	<ul style="list-style-type: none"> • amount spent on social charity • job security for career starters • use of local resources • participation in education • honesty and honor • number of sustainability programs • ethical aspects towards partners • social responsibility (CSR) activity • employee equality and welfare indicators

Source: <https://journals.lib.uni-corvinus.hu/index.php/vezetetestudomany/article/view/1062/999> (2023).

During a research based on 808 company questionnaires, it was revealed that there is a close relationship between sustainability and the effectiveness of companies. More than 85% of the respondents made environmental investments in the last 3 years. Slightly more than half of these investments were financed from their own resources. The research also reveals that within this, the investments pay off in the long term and promote the profitability, competitiveness and development of companies. The use of different KPIs within a company helps to ensure that these data can be measured and further developed. [7]

During my research I had a primary consideration to examine the relationship between environmental KPIs with economic KPI. Such as the impact of realized energy investments on the extent of research development expenditure, or how the share of the green car fleet increases or decreases the rate of return, CO2 savings cause a liquidity problem or how environmental load rates work on innovation indicators. Does all environmental KPI affect the annual tax revenue.

5. CONCLUSION OF THE RESEARCH

Every day we live in an accelerated world where the impact on the environment is extremely important to everyone in the long run. That is why any investment that can reduce our ecological footprint is very important. Companies have a key role to play in this regard. Several countries, in Europe have already taken steps to this end, but Germany and France in particular. Various KPI indicators help all companies. Based on several previous research we can say that there is a significant relationship between these KPIs, primarily in the focus of economic and environmental KPI.

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116 Regional Innovation Ecosystem, Urban Development, Industry 5.0 – Learning Factory as an Enabler

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Abstract

The recognition of the transforming relationship of industry and city, re-discovering the value of industrial value chains, advanced manufacturing and services, as provider of high-quality services and opportunities for individuals and communities, with impact on regional competitiveness and social cohesion on the one hand and on structure and usage of urban spaces on the other are especially important. The main drivers of this transformation are customization and personalization, convergence between production and services; iterative, “simultaneous” engineering and innovation; emerging of value (incl. circular) networks; increasingly shorter technology, product and factory life cycles; and the proximity of talent as major factor to choose locations for key operations and strategic collaborations.

For understanding the changing landscape of regional “mission-driven” interventions and development tools, the paper introduces the main features of the Industry 4.0 and 5.0 concepts, including the modules and layers of the technologies, also impacts on business models and partnerships. Since the Industry 5.0 (I5.0), according to the European Union (EU) definition (and even more to the Japanese model of Society 5.0) are essentially social concepts, the three main areas of I5.0 – sustainability, human-centricity and resilience – will be discussed, highlighting that I5.0 goes beyond technological modernization. It promotes fair and diverse employment opportunities; circular integrations along the material streams; co-design with customers and final users; hyper-flexible engineering and operational capabilities and short supply networks; cross-sectoral collaborations and community embeddedness. The aggregated transformation impacts local business models and regional value networks as well. It changes how manufacturing innovation, engineering, and design of implementation and widespread adoption of deep-tech based solutions is managed and supported by businesses, and by ecosystem providers and support organizations. E.g. the new European Digital Innovation Hub (EDIH) concept of the EU highlights the role of orchestrators, the provision of test-before-invest services, the coordination between training, testing and incubation, across organizational boundaries and sectoral silos. In addition to that, open technology platforms and open urban spaces with customizable services are gaining momentum.

“Learning Factory” (LF) is one of the archetypes of the next-generation instruments in regional and local development. Learning Factories ensure open urban spaces and affordable testing and learning environment in these facilities, in particular for SMEs; but they may also offer complex support – training, consulting, assessment, R&D, engineering, matchmaking – for digital transformation as well. And beyond individual support, Learning Factories organize regional entrepreneurial communities; it is also capable coordinating collaborations along value chains and circular material streams. Learning Factory is a technology-driven integrative development model to create the confidence needed for comprehensive change among a wide range of (industrial) enterprises, and to offer a transparent customer journey for them.

Keywords

Regional Ecosystem Development, Industry 5.0, Learning Factory.

1. INTRODUCTION: INDUSTRY 4.0 AND 5.0 AS TRANSFORMATIVE SHIFTS IN INDUSTRY

More and more companies in the European Union have recognized the importance of implementing Industry 4.0 (I4.0) solutions with the application of key enabler technologies (e.g. IoT, big data, 5G, AI). On the other hand, several factors are still hindering the exploitation of new opportunities, e.g., the uncertain return on investment and the significant individual investment required as well as the disruption to business continuity (Görzig et al., 2019); furthermore the lack of employee competences as well as new industry standards and certifications ("Über uns," n.d.) ("standards_and_your_business.pdf," n.d.).

Digital transformation also gained momentum as a human-centered concept, thanks to major framing policies all around the world (Empirica et al., 2021). The elaborated interventions aim to improve general and sector-specific digital skills and competences of businesses and workers, promoting the widespread use of novel technologies ("Digital Europe Programme - European Commission," 2024) (Empirica et al., 2021) and European policies regarding the 2021-2027 EU MFF framework emphasize it, too ("Digital Education Action Plan (2021-2027) | European Education Area," n.d.) ("Digital skills and jobs coalition | Shaping Europe's digital future," 2024). In particular, re-industrialization, together with sectoral targets and industrial excellence also emphasize the importance of the human factor and the renewal of the industrial innovation ecosystem ("Digital Education Action Plan (2021-2027) | European Education Area," n.d.), as a prerequisite for rapid development and application of new technologies. It fits into the vision of the European industry "5.0" as - "sustainable, human-centric and resilient European industry" ("Industry 5.0 - European Commission," 2022). It should be noted therefore that the transformative shift of the focus from technology to the human, from business to the social is indeed a transformative perspective, but also continuity and additionality are also highlighted in Industry 4.0 and 5.0 comparisons (summarized in Table 1). Consequently, the evaluation of the subject of systemic change is rather controversial, (e.g. lean management is essentially a human-centric concept). The publications on Industry 5.0 therefore often discuss strategic factors, scenarios and roadmaps, including the particular role of the stakeholders together with entrepreneurship and competition, (re-)locations of business (Ghobakhloo et al., 2023). On the other hand, a few papers describe the level and scale of the predictable change in industrial and economic structures, impacts on the factors of production and cross-sectoral relations.

Table 1. Comparison of main aspects of Industry 4.0 and 5.0 (own compilation)

Industry 4.0	Industry 5.0
Efficiency through digital connectivity and artificial intelligence	Competitiveness based on people-centered design, sustainability and resilience
Cyber-physical objectives	Sustainability and resilience
Optimizing business models within existing capital market dynamics and economic models	Indicators express progress towards prosperity, resilience and sustainability in general

Industry 4.0 has already employed all the technologies that are behind Industry 5.0 as enablers, including artificial intelligence, as well. Optimization of the different processes, however, requires computational resources that are available only now with the newest technological solutions. The advances in different technologies often call for an increased level of automation that cannot be handled without the utilization of artificial intelligence. (Haas, 2019) defined this scenario as new development of Industry 4.0 based on advances in communication and connectivity which are marked by breakthroughs in emerging technologies in the in fields of robotics and artificial intelligence, coupled with nanotechnology, quantum computing and biotechnology. It also brings

change in the different segments of society and economy by applications like the Industrial Internet of Things, 3D printing and fully autonomous vehicles.

Although I4.0 has already affected the spatial distribution, the concept of 'place-based' development has been introduced into sectoral policies with Industry 5.0, therefore, the need for more comprehensive approach on networks and collaborations has been expressed in accordance with the emerging S3 principles. Spatial dynamics - the need for density and proximity - also accelerated together with convergence and synergies in deep tech. Competences also increased the need for more coordinated policies therefore I5.0 can be described as a convergence between policies as well (governance), like twin transition AND urban renewal, inclusive development, reskilling and upskilling, and synergies between manufacturing and smart or circular urban initiatives.

2. URBAN MANUFACTURING WITH INDUSTRY 5.0

Industry 5.0 created a renewed attention on researches regarding 'urban manufacturing' or 'urban production' ("Urban Production," n.d.) because human-centricity, sustainability and resilience made even more explicit the need for embeddedness of the manufacturing activities into the regional and local societies, emphasizing more diverse interactions between the respective communities and industrial value chains. This was a rather smooth transformation, as the Industry 4.0 model already improved operational efficiencies, reduced externalities and decreased the size of the batches and scale of operations.

I4.0 also increased the demand for talents and for advantages of the density of businesses, economies of scope and the proximity of the customers – agglomeration benefits – as well. The shrinking life cycles of manufacturing technologies, products, orders and even factories highlighted phenomenon, like 'simultaneous engineering', and 'through-engineering' or "end-to-end engineering" (Camarinha-Matos et al., 2019) as prerequisite processes for achieving even more agility and collaborations. Due to these ongoing trends, the spatial dynamics of the manufacturing operations and value chains changed, and even more the perception in regards to manufacturing in cities – as a source of diversity, sustainability and engine of social inclusion – became popular themes in urban design.

Regional development concepts, like the 'place-based' development, also created an increased need for more complex approaches for describing networks and collaborations, well outside the traditional sectoral and supply chain boundaries, like the quadruple helix model, or the S3 smart specialization, with emphasis on the need for local level strategies and interventions. Due to this convergence, urban concepts and smart city flagship projects put Industry 4.0 into the core of the urban design, highlighting the synergies between technologies and applications, digital transformation, inclusivity, place making and cross-sectoral initiatives. Aspern City in Vienna ("Industry 4.0 | aspern Die Seestadt Wiens," n.d.), AS-Fabrik in Bilbao ("AS-Fabrik -Bilbao Alliance for smart specialisation in advanced services towards the digital transformation of the industry (Closed)," 2017) or the EU Digital Cities Challenge (DCC, 2017-2019) initiative are exemplary narratives. The DCC final report made it clear, that for Industry 4.0, a specific chapter should be introduced, because manufacturing is an enabler of increased digital maturity, new forms of collaboration and skillset; but also promotes to shift towards closer proximity between factories and citizens, in accordance with sustainability trends (reduced resource consumption). Recommendations included the applications of I4.0 technologies in other sectors; improved social responsibility; clustering of partners; effective engagement of SMEs; open standards as a facilitator of collaborations; and the need to upgrade skills and competences for Industry 4.0.

One can conclude that manufacturing patterns are being revised at every territorial level (CoM, n.d.) and new topics are being highlighted, like ultra-efficiency ("Urbane Ultraeffizienzfabrik," n.d.), reskilling and upskilling, holistic and mixed neighbourhood design and usage, and the city as a living laboratory (Veeckman and van der Graaf, 2015); and as a consequence, the complexity of de-industrialization and re-industrialization altered governance at local level. ("MISTA – Metropolitan Industrial Strategies & Economic Sprawl," 2019) (Rissola and Haberleithner, 2020). Even the DCC report defined the future of manufacturing by human-centric development. Yet, Industry 5.0 model became a milestone in the ongoing transformation. The reason for this is that I5.0 integrated all the

main pillars for one specific concept. The first one is the already mentioned human-centricity, but with more explicit details on external – flexible and diverse – collaborations along the value chains and in the neighbourhood to reach and engage talented persons, to design customized HR and organizational improvements, and to involve final customers directly into the design, manufacturing and delivery of products and services. The second factor is circularity, and the prospective developments of new material flows, which increases complexity in collaborations between quadruple helix partners, including the local community; via implementing circularity, the interaction between the sustainability initiatives of the manufacturing and the city is becoming direct and close (Tsui et al., 2021). The third pillar is resilience, which emphasize hyper agility and flexibility in delivering products, in regards to batches and supply chain linkages, capacities and capabilities, with additional impact on how to exploit local synergies, complementarities – and deep tech enablers (like artificial intelligence) for that. So, in a way, I5.0 realizes the convergence between smart and urban manufacturing complete (Sajadieh et al., 2022) (Hearn et al., 2023) and became the connection between I5.0 and e.g. sustainable development goals (SDGs) more explicit (“Sustainability | Free Full-Text | Realization of Sustainable Development Goals with Disruptive Technologies by Integrating Industry 5.0, Society 5.0, Smart Cities and Villages,” n.d.). In this new policy framework, the role and composition of technical assistance, support services have been changed, and the concept of multilevel governance were highlighted. Participatory design and stakeholder engagement, integrated customer journey became imperatives in designing policy instruments (“D3.4_Specifications_and_Design_of_DIH-CC_Services_2.pdf,” n.d.) and the need for orchestration of the regional ecosystem became a starting point of the interventions. The European Digital Innovation Hub network is a good example for this, and the increasing attention on locality (being place-based) in the implementation of the EU Horizon Programme as well, especially in regards of the several coordination and support actions, including the Regional Innovation Valley, or the ERDF I3 instruments (“Interregional Innovation Investments (I3) Instrument - European Commission,” 2023).

3. INDUSTRIAL TRANSFORMATION BY THE LEARNING FACTORY

Learning Factories have huge experience in supporting continuous development, e.g. by the implementation of lean principles, the introduction of digital solutions, and realizing even vertical integration: modularity, flexibility, the inclusion of additive manufacturing into the workshops etc. In Learning Factories, several potential solutions for actual industrial challenges can be tested and managed step-by-step, based on carefully executed experimentations. Indeed, this is the core of the value proposition of the Learning Factory (LF) centres (Gyulai et al., 2023).

The Learning Factory has set out mutually reinforcing industrial objectives in four areas (Gyulai et al., 2022):

1. Entrepreneurship development, strengthening technological and business competences.
2. Developing and testing AI-based, Industry 4.0 technologies and services.
3. Demonstration and testing of the application and implementation of AI-based, Industry 4.0 technologies and services.
4. Rapid and effective implementation and application of the results of international, in particular, European, initiatives.

The Learning Factory operates within an integrated business model (in a set of business models) to achieve its objectives. The unique value proposition of the Digital Learning Factory for clients is that it offers the opportunity for step-by-step, systematic engagement, digital readiness improvement and project development (Gyulai et al., 2022).

The operation of the Learning Factory is based on 3 main pillars.

- Pillar “A”: Regional and market connections: Simultaneously regional and global demands and trends have to be followed continuously,
- Pillar “B”: implementation and operation of the physical and virtual Learning Factory: One of the main functions of the Learning Factory is to provide a venue (physical and virtual),

- Pillar "C": development and delivery of customised Learning Factory services: A Learning Factory is a well-known expression, however, according to our viewpoint it is a Pilot Factory as well. It means that it has to support and realize matching direct production and indirect production support services.

The operation of the planned Learning Factory can be structured into 11 Work Packages (WPs) as its main activity fields. The structure of the Learning Factory is shown in Figure 1, with these 11 WPs the Learning Factory serves as a facilitating tool satisfying both the Industry 4.0 and Industry 5.0 expectations (Gyulai et al., 2023).

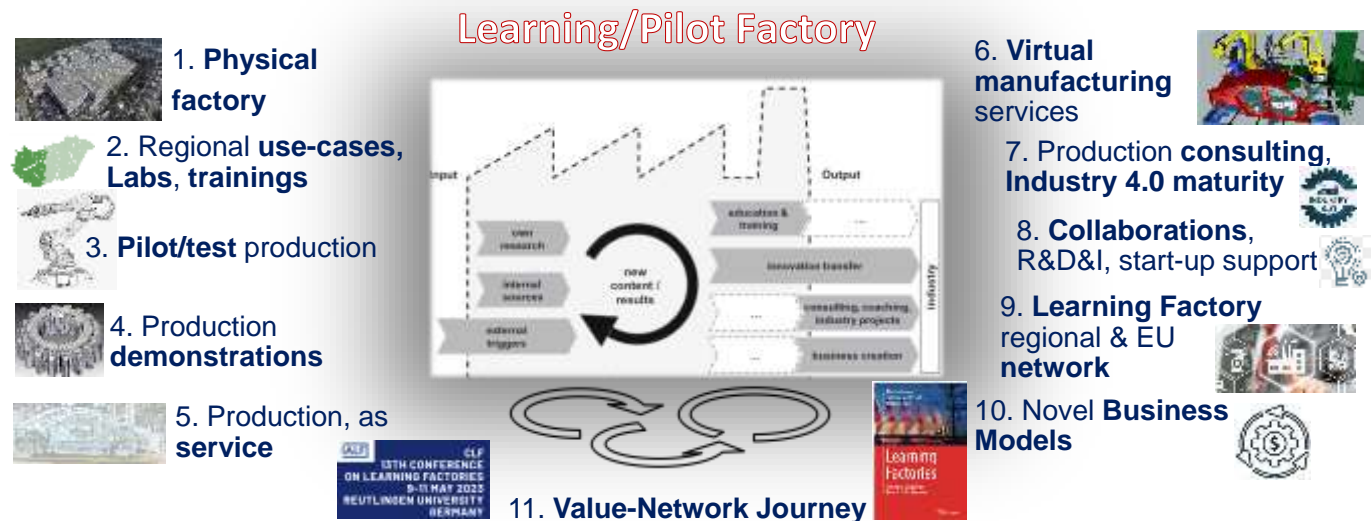


Figure 1. Main, extended Work Packages of the developed Learning Factory concept [IMEKO 2023]

4. LEARNING FACTORY AS A TOOL FOR REGIONAL AND URBAN DEVELOPMENT

4.1 Rethinking 'local' development

An universal consequence of the emerging aspects of the regional – place-based – developments is the revision of non-financial support programs, based on comprehensive technical support services, technical assistance activities. The best example for this is the European Digital Innovation Hub initiative, as a kind of a standardized model for developing benchmarks for synergies and complementarities between the four pillars of training, incubation, network and test-before-invest activities; and last but not least, for emphasizing local communities and local-level interventions in digital transformation, including industry 4.0 and 5.0. Smart specialization (S3) was another main source of inspiration in the EU for rethinking the connection between technology, innovation and regional development, and not just at NUTS2 level, but NUTS3 and municipal level as well ("In Focus," 2016).

Due to these activities, the impact of twin transition on local society built and green environment has become more tangible and transparent for the local communities, hence it may become inclusive as well in the future if – only if – a specific organization elaborate these activities and provide the necessary technical support, technical assistance services at regional and local level. The main activities of this service portfolio are the provision of open spaces, open and affordable R&D infrastructure, consultancy; project management; business and technology intelligence and partnership building; talent management; attractiveness and branding in particular attention to the SMEs and municipalities. Stakeholder engagement and cross-sectoral connection between culture, education, business and innovation are core elements of these local strategies.

4.2 Learning Factory as 'Local': the Emergence of the Value Networks

Industry 5.0 creates additional opportunities for the Learning Factories in local and regional development. The main reason for this is the transformation of the value chains, the emergence of the value networks. Human-centricity e.g. increases the demand for a much more complex collaborations around human resources and workers, including ergonomics of the collaborative workplace, reskilling and upskilling, talent recruitment, and also collaboration with final customers, end-users. Circularity is another main area of interest, as emerging new material streams, synergies and complementarities may multiply the complexity of supply chains and value chain collaborations, need to be maintain, monitor and optimize by using deep tech (AI) solutions. The same is true for resilience, as the planning, design and management of more flexible and 'shorter' supply chains, and more agile, variable and adaptable capacities may create a push for renewed local, regional and 'Q Helix' collaborations.

An additional factor is the increasing information asymmetry – the lack of transparency - due to the issues with standardisation in times of accelerated transformation, and issues with measuring maturity, readiness and validation. Industry 5.0 increased the need for integration and dynamic validation based on use cases, trusted local partnerships and dedicated collaboration processes, instead of static, rigid taxonomies, standards and regulations. Learning Factories – as open, trusted testbeds – are really good at developing collaborations around impactful, trendsetter use-cases, ensuring proper framework and processes for Industry 5.0 assessments and validation. As such, the learning factory – or a main strategic partner of the facility, like a 'Mittlestand' centrum, or an 'EDIH' – can be in a unique position to accumulate knowledge and to develop use cases for integration and initiate impactful activities as a 'value network orchestrator'.

There are several features, which are unique, and differentiate LF centers form other 'orchestrators' (e.g. tech brokers, innovation management, technology transfer organizations) as shown in Table 2:

Table 2. Features and related actions by Learning Factories (own compilation)

Features	Main content	Specific actions
Deep tech (or key enabler) technologies	artificial intelligence, IoT, additive manufacturing, advanced material, autonomous systems etc.	transformation of complete value chains and even cross-sectoral transformation (e.g. smart manufacturing vs. smart city).
Placemaking	dedicated spaces for collaboration, test-before-invests, training and competences development	social inclusion can be improved, value proposition (Stucki et al., 2024) of the manufacturing and social impact can be promoted
Efficient S3, smart specialization activities	stakeholder engagement and community building;	specific focus areas in local economic activities and industries, and new value chain linkages; material streams and circular linkages
local activities for restructuring the local labour market	reskilling and upskilling activities;	local forum for creating consensus in delivering trainings and capacity building for SMEs ("Q-Guide," n.d.); promoting social inclusion and cohesion; promoting new perspectives for talents

For developing complex flagship strategic initiatives, the LF model can be an adequate basis for developing an urban living lab / urban test bed e.g. in the local healthcare (infrastructure, organization, and processes), smart energy, smart mobility or urban circular systems; or to develop competences for using open cloud services like dataspace, federated AI. It can help in promoting competencies and good practices related to interoperability, cybersecurity and data protection; and how to avoid 'lock-in' in sourcing. Last but not least, the collaboration with a local LF may help to understand new opportunities in urban planning and neighbourhood design outside the traditional toolkits – e.g. zoning – by capitalizing the insights what LF centers can deliver on advanced manufacturing operations and supply chains, to promote mixed usage and clustering, and cross-sectoral initiatives in urban context. The purpose of the LF model is, first and foremost, to ensure an open, validated, trusted space for experimentation and for collaboration, and it can be located in

various places, like at university campuses, vocational schools, in neighbourhoods with mixed usage, or in urban centres with multiple usage.

5. CONCLUSIONS

The phenomenon of Industry 5.0 revealed new aspects of advanced manufacturing and digital transformation, outside of the realm of the traditional industrial policies and KPIs (like quality, lead time, and productivity) requiring interdisciplinary initiatives to be managed, including even spatial planning, and local and regional level development policies. Although the idea has been conceptualized in the EU at macro-level - as a representation for the new European vision of 'mission-driven' innovation, and human-centred, sustainable and resilient manufacturing -, the comparison of the I4.0 and I5.0 provided enough evidence on how deep and comprehensive the industrial modernization might be. Industry 5.0 may impact the core of the manufacturing business models: value proposition (product-service portfolio), strategic partnerships and customer relationships, cost structure and revenue-stream, as human-centricity and circularity may alter fundamental processes, hence the topography of the value chains.

The second part of the study presented the multiple connections between I5.0-led modernization and spatial dynamics. Urban (re-)manufacturing is not a new research topic, it has already been described and discussed during the past decades, as one of the main engines of urban renewal. However, Industry 5.0 made the connection explicit. Due to the introduction of Industry 4.0 the scale of operation and negative environmental externalities have reduced, and the need for proximity to talents and customers has increased (simultaneous engineering).

For delivering a proper governance, there is a need for improved development instruments and for a more comprehensive instrument portfolio and impact pathway. To ensure the wished impact - to accelerate digital transformation of SMEs and public authorities; and to increase additional social added-value -, S3 smart specialization that has to be local, and development programs have to provide interlocked services for a 'transformation journey' for building up trust, experimentation and collaborations.

Learning Factories have been developed for ensuring the space and testbed for experimentation in an open, realistic environment as part of training and education. The possible improvement of the LF model highlights the importance of the local level instruments in regional development and industrial modernization: stakeholder engagement, capacity building, open discovery process and S3 integration, and the opportunity of new types of strategic collaborations for inclusion and sustainability, based on cross-sectoral initiatives. In addition to that, LFs can be leaders in developing value networks for flagship (e.g. circular) projects, and to develop competencies in deep tech, digital transformation, including assessments, and to improve transparency, by highlighting impactful, trendsetter use-cases. The presence of enabler - deep tech - technologies, the connection to place-making and to the local labour market, and the diversity of collaborations are unique patterns.

However, the LF model is just natural in promoting R&D collaborations, and in delivering engineering and incubation services. Hence the operational model - delivered by the core LF organization or strategic partner, e.g. an EDIH can be expanded to ensure further services: networking, business and technology intelligence, assessment and validation, increasing the maturity of transformational projects, consultancy for introducing new business models and orchestrating value networks (like circular). By focusing on Industry 5.0 domains, the extended learning factory model can play a central role in local and regional developments to accelerate urban and regional transformation in a more sustainable and inclusive way.

ACKNOWLEDGEMENT

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118 Beyond GDP: Wealth and Sustainability of Developing and Developed Economies

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Abstract

The capital approach to sustainability broadens the conventional measure of economic performance “beyond GDP”, with a long-term view. Wealth, the totality of capital assets available for the socio-economic system, is the source of income today and in the future. This article presents a comparative analysis of changes in wealth vis-à-vis changes in income, globally and in various country income-groups, with a research question focused on the outlook of economic growth and convergence in developing countries. In the literature, it is broadly argued that, over the past several decades, accumulation of capital assets has lagged behind income growth, which is a major concern regarding long term economic growth and sustainability. In fact, the renewable component of natural capital, i.e. ecosystems, which is the critical factor of economic growth, has been reducing globally, both in developed and developing economies. Using World Bank data, our findings highlight that both in developed and developing countries, long term economic growth face serious risks.

Keywords

Sustainability; wealth economy, economic growth, GDP, renewable natural capital.

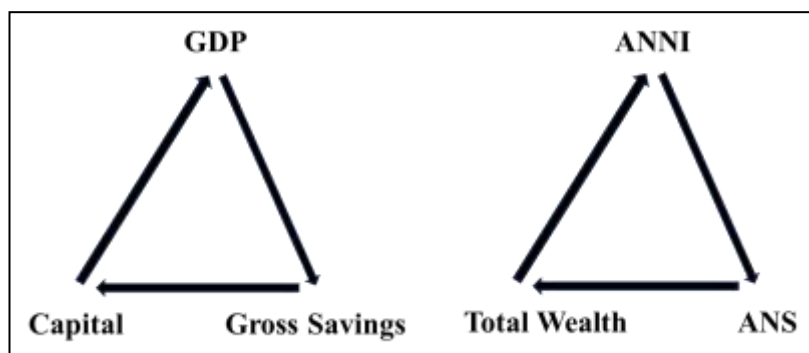
JEL Classification

Q01; Q51, Q56;

1. INTRODUCTION

Wealth is the source of income and benefits today and in the future, therefore, changes in wealth over time is a sustainability indicator that should be used to measure economic progress or its absence. (Arrow et al., 2010; Dasgupta, 2021). The totality of wealth of a nation is composed of the elements of produced (fixed), human and natural capital. The *weak criterion* of sustainability requires that the overall capital base does not decline, while *strong sustainability* does not allow the depreciation of any ‘critical’ natural capital assets, i.e. ecosystems. From the sustainability perspective, reductions in the non-renewable elements of natural capital (minerals, oil and gas reserves) can be compensated by increasing other types of capital, for instance produced, or human capital. As ecosystems provide the primary input to the economy, losses in biodiversity, or the functioning of ecosystems cannot be compensated by the increase of other types of capital. This is the essence of the strong criteria of sustainability.

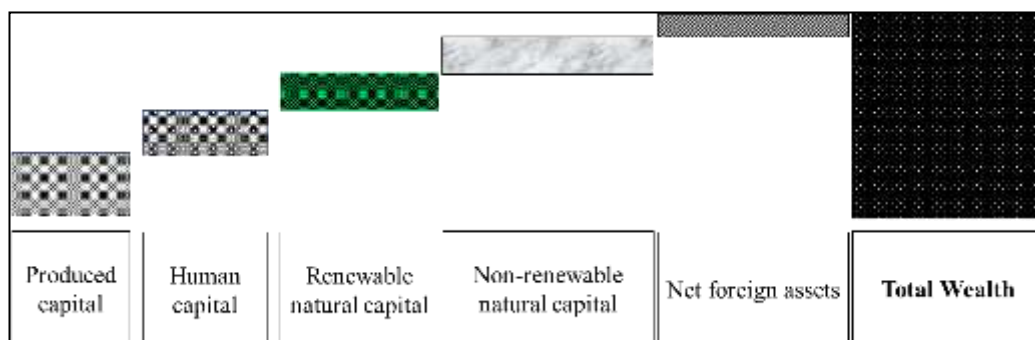
The interrelations between various forms of capital and the performance of the economy is traditionally researched in the growth accounting framework (Barro and Sala-i-Martin, 2004). Within this framework, the interlinkages between three variables: *output*, *savings* and *capital* (Figure 1.) are explored using production functions and various stock-flow equations, with conventional indicators, i.e. *GDP*, *Gross National Savings* and fixed capital assets, shown in the figure with the left side the triangle. In the wealth accounting framework, research focuses on the interactions between sustainability indicators, shown in the sustainability triangle, on right side of Figure 1. These indicators, the amended versions of the three conventional indicators, account for changes in various components of wealth.



Source: own construct

Figure 1. Macroeconomic cycle, traditional and sustainability framework

Total Wealth, on the lower left side of the sustainability triangle, in addition to fixed, or *produced capital*, includes *human and natural capital*, too. *Adjusted Net National Income* (ANNI), an income indicator, accounts for the amortization of fixed assets, as well as the depletion in various components of natural capital. *Adjusted net savings* (ANS) is calculated as gross national savings minus depreciation of fixed capital (machinery, building, infrastructure) plus education expenditure, and minus the depletion in mineral and energy resources, net forest depletion, as well as damages due to carbon dioxide and particulate emissions. The composition of *Total Wealth* is shown in 0. , as defined in the World Bank Wealth Accounts database. All components are, by definition, positive, except for Net Foreign Assets, which may increase or decrease *Total Wealth*, depending on whether the country is a net lender or borrower.



Source: (Kovács, 2023) based on (World Bank, n.d.)

Figure 2. Composition of Total Wealth, Wealth Accounts database, World Bank

Hereinafter, an earlier research paper is referenced, which, using World Bank data, presented a comparative analysis of wealth and its components and the testing of the sustainability of nations against the weak and the strong criteria, in different country income-groups (Kovács, 2023). The contribution of this paper is to provide empirical evidence that, over the past three decades, the growth rate of wealth accumulation lagged significantly behind GDP growth in every country income-group, based on which serious risks are foreseen regarding future economic growth and the convergence of developing countries.

The article is organized as follows: Section 0 provides a brief review of the literature, including the previous research paper on the wealth of nations. Research methodology, data and research result are presented in Section 0, followed by Discussion in Section 0, respectively.

2. LITERATURE REVIEW

The framework of the wealth perspective of sustainability is theoretically well established by several key publications (Arrow et al., 2010; Dasgupta, 2021; Hamilton and Naikal, 2014; Lange et al., 2021a). Also, the literature on wealth economy has grown rapidly over the past few years. For example, in

2023, the keywords of “wealth and sustainability” resulted in more than 15 thousand hits by Google Science.

By definition, development is weakly sustainable if, over time, the overall capital base, or wealth does not reduce (Pearce and Atkinson, 1993) :

$$0 < \frac{dW}{dt} = \frac{dK}{dt} + \frac{dH}{dt} + \frac{d(R+E)}{dt},$$

where W is the practical approximation of the totality of wealth, K, H, R and E are produced, human, renewable and non-renewable natural capital, respectively. In practice, the per capita monetary values of the capital elements are used.

The strong criteria of sustainability does not allow reductions in the renewable component of natural capital:

$$0 < \frac{dE(t)}{dt}.$$

(Kovács, 2023) tested the sustainability of nations in different country income groups⁷⁵, using Eq.0 and Eq.0 and World Bank data. It was found that over the 1995-2018 period 20 of the 142 countries, for which data is available in the World Banks Wealth Accounts database, did not meet the weak criteria of sustainability, shown in 0. The ratio of non-sustainable countries in the different income groups differ: it is the highest among Low-income countries (7/20), followed by Upper-middle income countries (6/40). In the Low-middle income and High income group the number of unsustainable countries is relatively low, (3/38 and 4/44, respectively). Overall, the number of non-sustainable countries is 20/142 (about 14%).

Table 1. Number of unsustainable countries, weak criteria, World Bank country income-groups, 1995-2018

	Income group				Global
	1	2	3	4	
TWpCg*<0	7	3	6	4	20
Wealth Accounts database*	20	38	40	44	142
World Bank full database	27	55	55	80	217

Source: (Kovács, 2023), World Bank Open Data (World Bank, n.d.)

TWpCg – geometric growth rate of Total Wealth per Capita between 1995 and 2018

0 shows the statistics of non-sustainable countries against the strong criteria. The ratio of non-sustainable countries is the highest in the Low-income group (14/20) and the lowest in the High-income group (21/44). Altogether 83/142 countries do not meet the strong criteria of sustainability, which is 58% of the countries in the database.

Table 2. Number of unsustainable countries, strong criteria, World Bank country income-groups, 1995-2018

	Low income	Lower-middle income	Upper-middle income	High income	Total
NCpCRg*<0	14	23	25	21	83
Wealth Accounts database*	20	38	40	44	142
World Bank full database	27	55	55	80	217

Source: (Kovács, 2023), World Bank Open Data (World Bank, n.d.)

NCpCRg – geometric growth rate of the renewable component of natural capital over the 1995-2018 period.

The most recent report of The World Bank’s series on the wealth of nations (World Bank, 2021) is a major source of theoretical and empirical studies on the wealth of nations, globally. In the report, Lange and Naikal (Lange and Naikal, 2021) discuss issues related to measuring wealth, as well as the

⁷⁵ Country income groups, according to the World Bank nomenclature, GNI per capita:

- 1- Low income: less than US\$1,135
- 2- Lower middle income: US\$ 1,136-4,465
- 3- Upper middle income: US\$4,466-13,845
- 4- High income: higher than US\$13,845

recent methodological improvements of the Wealth Accounts database of the World Bank, which in the literature is often referenced as the CWON (Changing Wealth of Nations) database. In the same volume, Lange et al. (Lange et al., 2021b) focuses mainly on geographic regions and specifics of countries in various income groups. A main finding of the report is that the growth in the renewable natural capital component of wealth globally lag behind that of other wealth components, and markedly behind GDP. This is likely to pose growing risks concerning the ecological foundations of future economic performance of the overall socio-economic system.

3. RESEARCH METHOD, DATA AND RESULTS

Our goal is to provide a comparative analysis between the growth rates of income and wealth globally, aiming at demonstrating empirically the differences between growth the rates of income and wealth, over the 1995-2018 period. The applied income indicator is GDP (constant 2015US\$), sourced from the World Development Indicators database. Regarding wealth, the analysis is focused on Total Wealth, the change of which is relevant regarding the weak criteria of sustainability, as well as the renewable component of natural capital, the change of which is critical concerning the strong criteria of sustainability. For the analysis, the geometric growth rates of the per capita figures (constant 2015US\$ and constant 2018US\$ for GDP and the capital variables, respectively) of the variables are calculated and averaged for each country income-group. Then these averages of income and wealth growth rates of income-groups are compared. The recent renewed version of the Wealth Accounts database in World Bank Open Data (WBOD) includes yearly time series data of Total Wealth and its components for 146 countries from 1995 through 2018.

In the Wealth Accounts database, Total Wealth is defined as the sum of produced, natural and human capital, as well as net foreign assets (World Bank, n.d.). Values of Total Wealth are calculated at market exchange rates in constant US\$ 2018, using a country-specific GDP deflator. Data for the different capital components are sourced from national statistics. Values for produced capital and net foreign assets are generally derived based on observed transactions. In the absence of international standards, the values of natural capital and human capital components are based on estimates. The approach to asset valuation is based on the concept that the value of an asset should equal the discounted stream of expected net earnings (resource rents or wages) that it earns over its lifetime. The discount rate used for the valuation is 4%.

Descriptive statistics for the growth rates of GDP, Total Wealth and the renewable component of natural capital is shown in 0.

Table 3. Descriptive statistics, growth rates of capital and income, global, 1995-2018

Variable	Observa-tion	Mean	Min.	Max.
TWpCg	145	0,016	-0,030	0,074
NCpCRg	145	-0,006	-0,121	0,030
GDPpCg	185	0,023	-0,022	0,039

Source: authors' analysis, World Bank Open Data (World Bank, n.d.)

TWpCg – Total Wealth per Capita growth between 1995 and 2018

NCpCRg – geometric growth rate of the renewable component of natural capital over the 1995-2018 period.

GDPpCg – geometric growth rate of GDP per capita over the 1995-2018 period

According to the sample of 145 countries, representing about 90% of global GDP, during the 1995-2018 period the country average the global growth rate of Total Wealth per Capita, (TWpC), the renewable component of natural capital per capita (NCpCR) and GDP per Capita (GDPpC) was 1,6%, minus 0.6% and 2.3%, respectively. (Minimum and maximum values are shown in the table.) It is striking that the accumulation of wealth lagged about 30% behind income growth, renewalbe natural capital actually reduced.

Table 4. Averages of income and capital growth rates, country income-groups, 1995-2018, %

	Income group				
	1	2	3	4	Global
GDPpC	2,09%	3,12%	2,37%	1,57%	2,32%
TWpC	1,52%	2,23%	1,39%	1,00%	1,60%
NCpCR	-0,24%	-0,94%	-0,39%	-0,83%	-0,55%

Source: authors' analysis, World Bank Open Data (World Bank, n.d.)

TWpCg – geometric growth rate of Total Wealth per capita between 1995 and 2018

NCpCRg – geometric growth rate of the renewable component of natural capital over the 1995-2018 period.

GDPpCg – geometric growth rate of GDP per capita over the 1995-2018 period

0 shows the country average growth rates of per capita GDP, wealth and the renewable component for each country income-group: Average GDP growth varies between 1,57% in the High income group and 3.12% in the Lower middle income group. Average Total Wealth growth rates are positive in each income group, but about 30% lower than GDP growth. However, the averages of the renewable natural capital growth rates in every income group are negative, ranging between – 0,94% and – 0,24%.

4. DISCUSSION

The wealth perspective of sustainability is a theory based, solid framework to assess the sustainability of nations. While GDP measures income with a short-term view, a year, it is a flow; wealth and its components are stocks, with a long terms view, being the source of income, goods and services today and in the future. Our research presented the divergence between the trends of the growth rates of income, measure with GDP and wealth, measured with Total Wealth. Over the period of 1995-2018, the growth rate of wealth was found significantly lower than GDP growth. The gap implies that GDP growth has been attained at the expense of wealth. As wealth, the base of future income reduces, also reducing income can be predicted in the future in every country income group. The renewable component of the natural capital asset has actually reduced during the period, which means unsustainable economic development, against the strong criteria, in every income group. Also, regarding the economic outlook in middle and low income countries, the slowing down of economic development can be foreseen, which also signals serious risks regarding economic growth on a longer term and, therefore, a reducing potential of economic convergence.

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119 The changing role of the university

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Abstract

The study analysed the transformation of universities in the age of the knowledge economy. Using the example of Hungarian higher education, we show that there is adaptation to the new era of globalisation, but there is also a significant lag. The most important of these is the problem of talent retention. A shift towards partnership in the joint design of the career model would be essential.

Keywords

Circular economy, tertiary education, talent attraction, graduate retention.

1. INTRODUCTION: THE NEW ERA OF GLOBALISATION

In the first quarter of the 21st century, a new era of globalisation will begin, the most important context for this from an economic policy perspective being the expansion of the knowledge economy and the transformation of production culture. This new development path is set by industrial policy. The industrial policy that is developing today is not protectionism or a blocking of development, but the development of the skills and capabilities needed to absorb and create knowledge, and the provision of the necessary technical infrastructure. The aim of industrial policy is therefore threefold: a) sustainability, i.e. the long-term safeguarding of natural conditions and circumstances, b) the maintenance of employment and c) the continuous expansion of knowledge (Csontos, 2023). This anomaly has been well pointed out by Hufbauer and Jung (Hufbauer - Jung, 2021), but the study also shows that industrial policies organised around R&D have been successful in the US and should be relied upon in the new industrial policy era.

Today, knowledge is becoming a driving force, one of the institutional frameworks for which is the university, and industrial policy aims to strengthen the link between universities and the region. Encourage universities to participate in solving the economic policy problems of the region. The main focus is no longer on creating elite universities, but on reducing inequality between universities and strengthening networking (Mihele, 2021). The role of the university is to integrate the economic policy problems of the region into global processes and to transmit the norms of globalisation to its own region. This is the concept of the circular economy, since circularity can only be maintained on the basis of the universality of knowledge.

This role of universities has also been referred to as a service function (Polónyi, 2020), complementing the teaching and research roles. In the era of the circular economy, this service role is the overarching one, and it also defines the teaching and research activities. In the sense of service, the university is involved in production, since without knowledge transfer it is not possible to maintain even the rudimentary level of reproduction. The university is not only the driving force behind innovation, but also needs to be supported in order to keep the business running.

2. THE TALENT ATTRACTION AND RETENTION CAPACITY OF HIGHER EDUCATION IN HUNGARY

Catching up with the knowledge economy requires universities to attract and retain the talent, the human capital that will help the region and the university develop, and to offer a career path that

offers long-term prospects. In terms of talent attraction, the problem of Budapest's predominance is a problem that is common to the Hungarian economy as a whole. In the third part of the study, we examined how effective higher education institutions in Budapest are in attracting and retaining talent, and how rural institutions perform in this respect.

3. SOURCE OF DATA

The source of the data used for the analysis is the Graduate Career Tracking System (GCTS) maintained by the Educational Authority. The GCTS has a data integration module, Integration of Administrative Databases (IAD), which anonymously links data stored in the Higher Education Information System (HIS) to data stored in other government systems. In effect, this allows a more detailed analysis of the labour market situation of students with a degree. The most recent version of the database is for 2023 and contains information on students graduating between the academic years 2014/15 and 2020/2021 for all levels of education, including tertiary vocational education. The data was provided by the Educational Authority in Microsoft Excel format, but there is also an interactive interface at www.diplomantul.hu where one can browse the available indicators for each field of education, institution and training.

4. THE DATA

In our analysis, we have analysed graduates in higher education according to the following criteria: field of study, county of place of study, academic year of end of study, number of graduates and the proportion of graduates at a given point in time (December 2022), classified into four groups based on their place of residence.

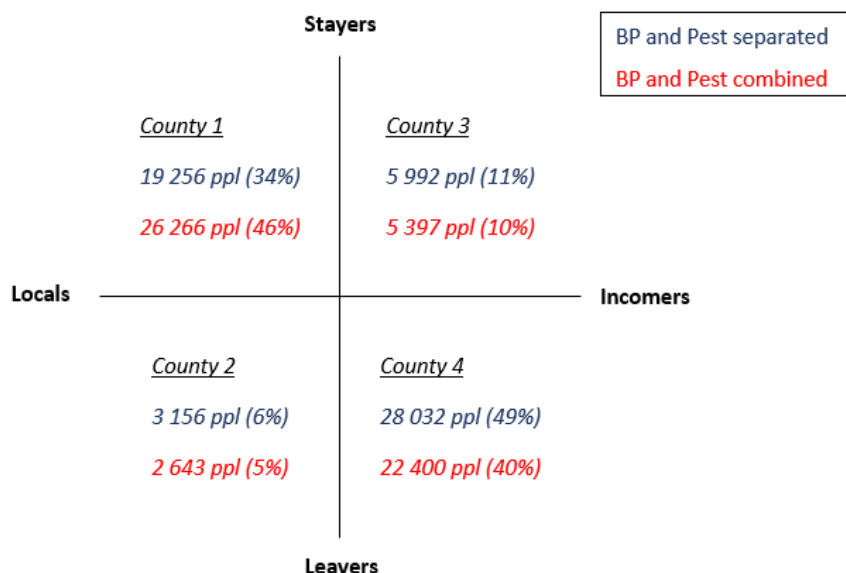
County 1 - Coming from and staying in the county of the training place during the survey period

County 2 - Coming from the county of the training place but staying in another county during the survey period

County 3 - Coming from a county other than the county of the training place but staying in the county of the training place during the survey period

County 4 - Coming from a county other than the county of the training place and staying in a county other than the county of the training place during the survey period

For the data on place of residence, the 19 counties of Hungary and the capital, Budapest, are the default range of interpretation. In order to get a more complete picture, we have also requested a version of the data where the capital and the surrounding agglomeration, in our case the whole Pest County, are treated as one. It is important to note that there is no merging of the county of the place of study, and that in the case of institutions in Budapest, we continue to treat those in Pest County as locals, while in the case of institutions in Pest County, and we treat those in Budapest as locals and everyone else as commuters. In addition, it should be pointed out that the migration of graduates is not fully known. For the pre-enrolment period, the database only includes information on whether or not they came from the county of the place of study, i.e. whether they were 'local' or 'incomers'. And for the post-graduation period, we have data on whether they were in or had left the county of the place of study in December 2022, i.e. 'stayers' or 'leavers'. The distributions between counties 1-2-3-4 can be plotted along two axes as follows:



Source: EA GCTS IAD 2023

Figure 1. Distribution of the graduates of the 2020-21 academic year by category in each county

The number of "locals", i.e. the number of students who graduated in the county of the place of education other than the county of their residence, can be produced as the sum of the sets County 1 and County 2. In the same way, the number of 'incomers' is obtained by summing the Categories County 3 and County 4. The x-axis itself thus provides information on the talent attraction. And the y-axis will be used to plot graduate retention in our subsequent graphs. The set of 'stayers', i.e. graduates who are in the county of their study location at the time under consideration (December 2022), is represented by those in categories County 1 and County 3, and the set of 'leavers' is represented by those in categories County 2 and County 4.

Important notes on the interpretation:

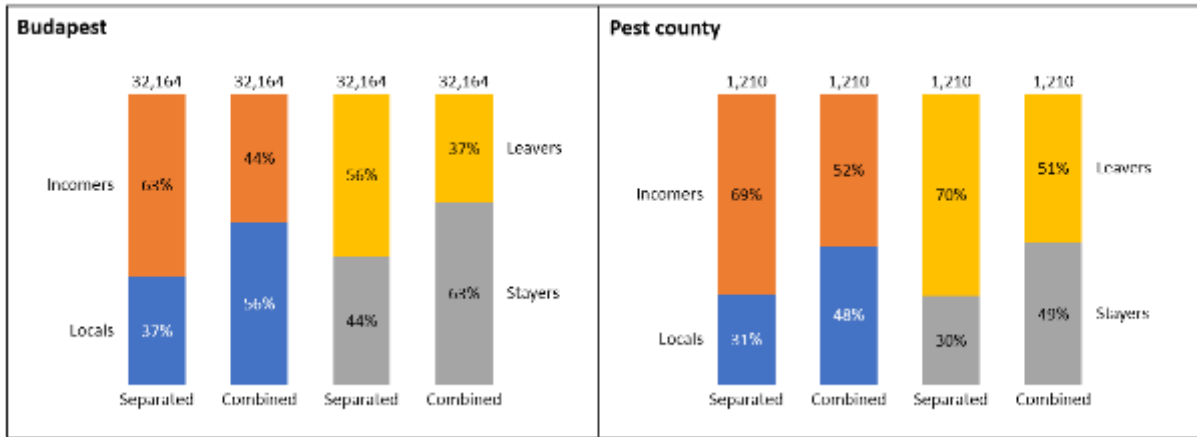
- Lack of proper administration can distort results. Perhaps most notably, for those in the County 4 (going and staying) set, a person may not transfer to the county of the study location during and after graduation. Failure to register an address is not misdemeanour, so students often transfer after, for example, a first property purchase, even though they have lived there for many years. This could also mean that those with lower incomes are likely to be excluded from the analysis, as they are not guaranteed access to housing by their family.
- The group of "leavers" who do not stay in the county of their place of study may also include those who have settled abroad rather than in another county in Hungary. In this case, too, the practice is to keep their original address because they consider the stay abroad to be temporary.
- There were no significant number of graduates in Nógrád county, the University of Óbuda had one higher education part-time programme, where only 5 students graduated in 2018/19.
- We are looking at the graduates of the 2020/21 academic year in most cases. We have not examined time trends for 4 points in time, but it will be interesting to examine the effects of major institutional changes at national level in the future.

5. METHODOLOGY

In our study, we used simple mathematical and statistical operations (frequency series, relative frequencies) to transform quantitative data into a form that is easier to interpret and supports representations that are suitable for drawing conclusions. The time interval covered by the GCTS database (2014-2021), given as 4 discrete time points, is considered too short to perform a proper time series analysis on the data. Therefore, we selected the most recent available date for the end of the academic year 2020-2021 and subjected it to a cross-sectional analysis.

6. FIGURES AND CONCLUSIONS

As mentioned above, two versions of the county categories were requested. In the base case Budapest and Pest county are treated separately, in the corrected case they are treated together. The difference between the two versions is illustrated in the figures below.

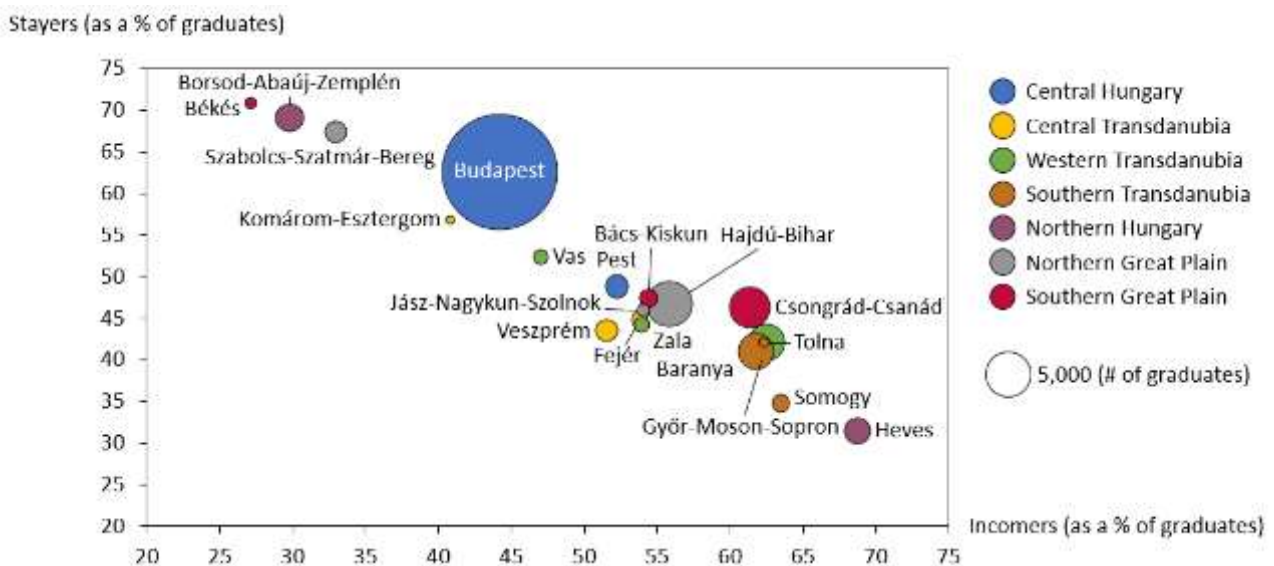


Source: EA GCTS IAD 2023.

Figure 2. Distribution of 2020-21 graduates in Budapest and Pest County (headcount)

The discrepancy is significant. If the proportion of graduates from the capital's institutions who are local is included in the population of Pest county, the proportion of locals jumps from 37% to 56%, an increase of more than 6000 in absolute terms. The percentage effect is similar for places of study in Pest County, with the proportion of locals rising from 31% to 48%. When looking at graduate retention, the proportion of stayers jumps from 44% to 63%. More than 17 percent of the 2020-2021 graduates in Budapest, or 5,923, stayed in Pest County during the period under review. We have opted to use the corrected version in the remaining plots. Regarding the residence of graduates, Budapest and Pest County are shown combined.

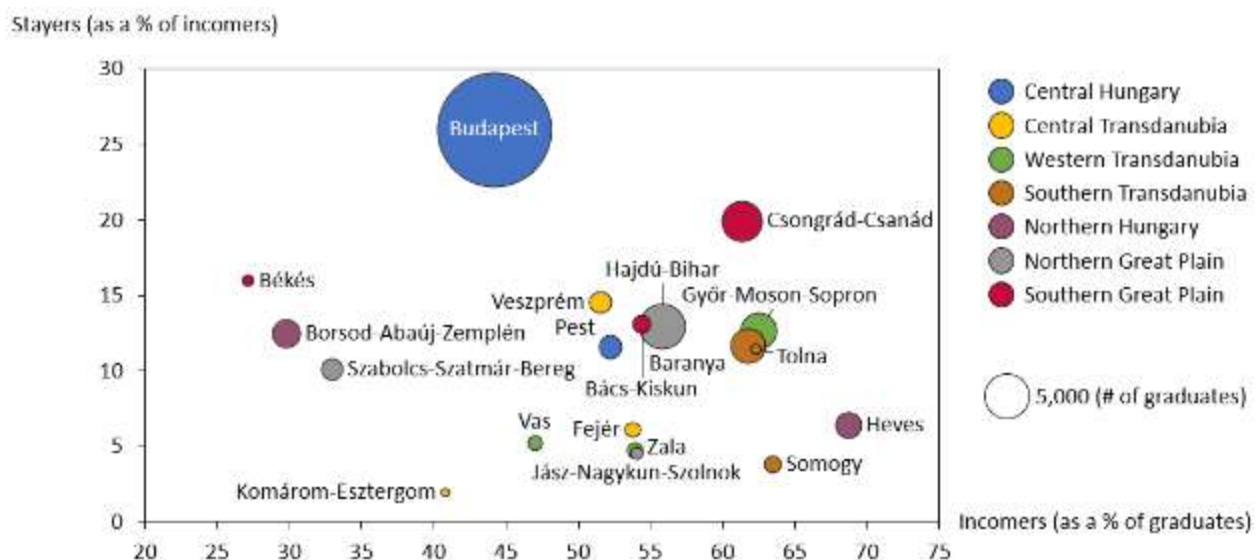
First, we look at the territorial results. The two main indicators we look at are the share of those who go there as a percentage of graduates and the share of those who stay after graduation as a percentage of graduates and those who go there. The location along these two axes will give us a picture of the talent attraction and graduate retention in a given area.



Source: EA GCTS IAD 2023.

Figure 3. Talent attraction and retention of 2020-2021 graduates, by county I

The area covered by the bubbles shows the number of students graduating from universities operating in the county. The x-axis shows the proportion of graduates who went there and the y-axis shows the proportion of graduates who stayed after graduation. The first striking observation is that Budapest attracted orders of magnitude more students than the other counties. Budapest: 32 164 students, the other 19 counties a total of 24 542 students. It is interesting to note that although Budapest graduated the highest number of students who came from elsewhere, the percentage of students who went to Budapest was not the highest. This may be partly due to the fact that most applicants already live in the central region (Budapest + Pest County) and enter a university in the capital from there. However, the talent attractiveness of the other counties is also worth highlighting. The proportion of students who go there is above 60% in Heves (EKKE, MATE), Somogy, Tolna, Baranya (PTE), Csongrád-Csanád (SZTE) and Győr-Moson-Sopron (SZE). In Heves, the main attraction is the teacher training in Eger, already mentioned in the analysis of the educational structure, and in the southern counties the University of Pécs and the University of Szeged. In the counties of Békés, Borsod-Abaúj-Zemplén and Szabolcs-Szatmár-Bereg, the proportion of people from other counties is less than 35%, i.e. the highest proportion of locals. At the same time, the share of those who stayed after graduation is the highest in these three counties, above 65%.

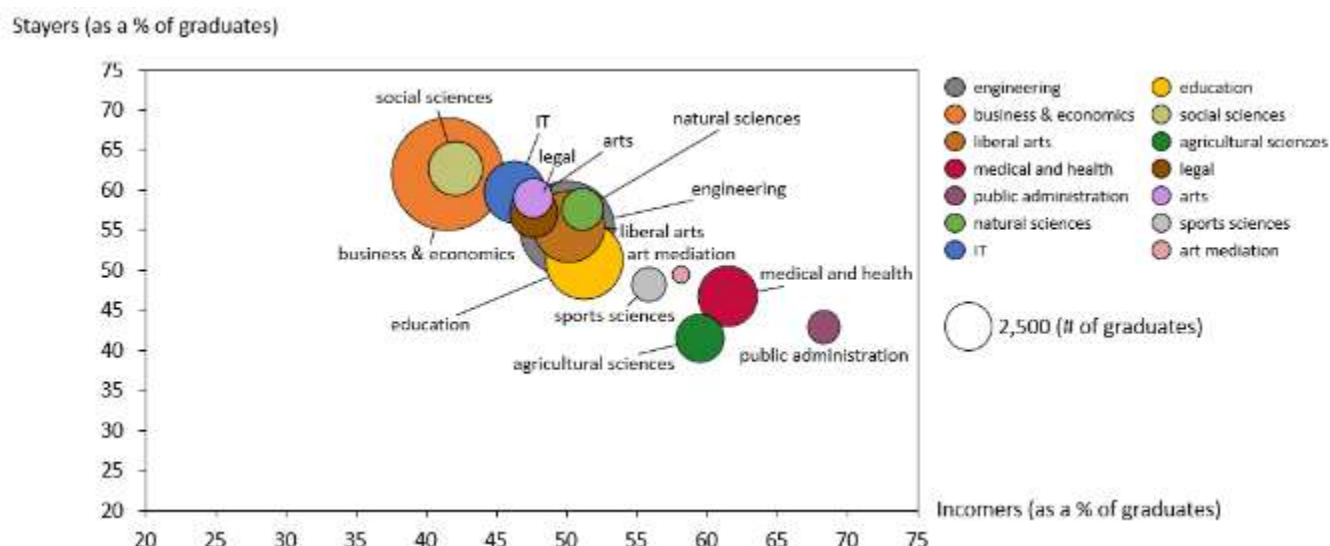


Source: EA GCTS IAD 2023.

Figure 4. Talent attraction and retention of 2020-2021 graduates, by county II

If we show those who stay after graduation on the y-axis as a percentage of those who go, rather than as a percentage of those who graduate, we are filtering out the local stratum of those who stay. So if we only consider the incomers, Budapest has the highest retention rate of graduates. Besides Budapest, Szeged can still attract and retain 20% of the students who go there from a different county. At the same time, retention rate is below 5% for Komárom-Esztergom (EDUTUS, PPKE), Somogy (MATE, PTE), Jász-Nagykun-Szolnok (DE, EKKE) and Zala (MATE, PE). Where many people go to study (>65% of those who go there) but relatively few stay (<10% of those who stay there) Heves (MATE, EKKE), Pest (MATE, AVKF). It is important to note that the database can only take into account the declared place of residence or address, these rates may actually differ.

The comparison between disciplines is illustrated in the following graph. Again, the area covered by the bubbles is proportional to the number of graduates. The x-axis shows the percentage of graduates who go there and the y-axis shows the percentage of graduates who stay after graduation.



Source: EA GCTS IAD 2023.

Figure 5. Talent attraction and retention of 2020-2021 graduates by field of study

The most popular field of study is economics, with 13 359 students, and the lowest proportion of graduates is 41.5%. In contrast, the proportion of incomers is the highest in the field of public administration. Only one institution, the National University of Public Service, offers programmes in this field with Budapest as its place of study. The attractiveness of medical and health sciences and agriculture is also high. Graduates from agricultural sciences have the lowest graduate retention, with 42% of graduates staying in the county where they studied. This is followed by public administration with 43% and medicine and health with 47%.

Overall, there is also a significant disparity in talent attraction in favour of Budapest. At the same time, it is difficult to quantify how successful Budapest is in retaining talent due to the uncertain counting of young people working abroad.

The data show that two universities have a significant retention rate, the University of Nyíregyháza and the University of Miskolc. This is an important message for the region's development policy and is part of the universities' performance. In terms of fields of study, the strongest retention is in economics and IT, both of which may be due to the fact that the universities are embedded in the business environment.

If the aim is to strengthen the talent retention capacity of universities, strengthening the career guidance system could be essential. Following Western models, it would be important to continuously monitor students' careers, follow their interests and provide support in the first years and decades of their professional careers. This would help to avoid major hiccups and unnecessary detours due to inexperience. Institutions of this kind exist in universities, but their work is unfortunately not yet sufficiently embedded in the functioning of universities.

7. SUMMARY

In the study, we argued that the university world is changing. They are catching up with the demands of the knowledge economy, participating in globalisation and global knowledge sharing, linked to the culture of the region. This is a break with the internationalisation strategy of the last 30 years, because the share of foreign students is only effective if it is integrated into the development strategy, and the participation in the international academic scene is also aimed at helping local community development. Of course, universities will remain part of the international academic community, but there will be greater harmony between local community attachment and international expectations. In this respect, Hungarian higher education is performing inconsistently. A reorganisation of the training structure has started, which is likely to be better adapted to local requirements, but progress will be needed in the relationship with the business world, as the current model of dual training is no longer sufficient to move forward. However, we are also lagging behind the region in terms of

innovation. This is closely linked to talent management and talent retention. The figures show that domestic institutions are underperforming in this area. We believe this is due to the low level of career guidance. Unfortunately, this is not yet given its due importance in the functioning of institutions, and there is little understanding of how the motivation of the student, career planning and career expectations can be harmonised with societal goals.

It is not primarily the career guidance organisations that have this attitude gap, but it is the university management that is unsure about the need to see the student as a partner, as someone who will work with the university in the long term in some form, as a researcher, as an alumnus. Rather, they are seen as providing a source of funding for the university's operations.

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ABBREVIATIONS USED IN THE STUDY:

EKKE: Eszterházy Károly Catholic University

PTE: University of Pécs

MATE: Hungarian University of Agricultural and Life Sciences

SZE: Széchenyi István University

SZTE: University of Szeged

DE: University of Debrecen

PE: University of Pannonia

EDUTUS: Edutus University

PPKE: Pázmány Péter Catholic University

AVKF: Apor Vilmos Catholic College

134 Fair Transition and Environmental Tax Avoidance. The Issue of Carbon Leakage and Regional Competitiveness

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Abstract

This study undertakes a comprehensive exploration of the far-reaching consequences of uneven environmental regulations across global regions. With the escalating significance of environmental policies, concerns have emerged regarding their potential influence on global competitiveness, particularly as stringent regulations may compel businesses to seek "refuge" in regions with less rigorous environmental standards. In a bid to unravel the intricate dynamics of these regulatory landscapes, we employ a sophisticated Dynamic Stochastic General Equilibrium (DSGE) model to scrutinize various environmental policy scenarios.

Motivated by empirical evidence spotlighting the unintended consequences of pollution taxes in the European Union (UE) 2017, this research aspires to extrapolate insights that transcend regional boundaries and resonate across diverse global contexts. Our investigation reveals that the asymmetric application of environmental policies can lead to counterintuitive effects, where the drawbacks may, at times, outweigh the intended benefits.

Through meticulous scenario analysis, we endeavor to shed light on the nuanced interactions within and between economies subject to varying degrees of environmental regulation. The findings of this study serve to challenge preconceived notions, suggesting that the uneven implementation of regulations may not always yield positive outcomes. Instead, our results underscore the need for a more holistic and coordinated approach to environmental policymaking on a global scale.

One key revelation from our analysis is the potential for competitiveness issues arising from disparities in environmental regulations. The fear of economic repercussions may prompt businesses to engage in evasive actions, relocating to regions with laxer environmental standards. This phenomenon could result in a race to the bottom, where countries strive to attract businesses by lowering their environmental standards, ultimately exacerbating global environmental challenges.

In conclusion, this research contributes to the ongoing discourse on the global governance of environmental issues. It also offers insights to the debate about a fair and equal ecological transition to avoid a inequality distribution of the costs. It underscores the importance of adopting a comprehensive and harmonized approach to environmental policymaking, acknowledging the interconnectedness of economies and the potential for regulatory asymmetry to yield counterproductive outcomes. By doing so, this study aims to inform policymakers and stakeholders about the intricate challenges posed by environmental regulations in a globalized world and advocates for a collaborative and coordinated effort to address these challenges effectively.

Keywords

DSGE model, Carbon leakage, Green transition, Regional competitiveness, Tax avoidance

JEL Classification

E24, E32, H30, Q54

1. INTRODUCTION

The discourse surrounding the contrast to tax avoidance has garnered significant attention from both scholarly circles and policymakers. Hanlon and Heitzman (2010) delineate tax avoidance as a comprehensive repertoire of tax planning strategies employed by firms to mitigate their tax liabilities through investment initiatives and the structuring of business operations. Conversely, Dyreng et al. (2008) define tax avoidance as encompassing all transactions geared towards diminishing a company's tax obligations. Within this spectrum of strategies, both illicit methods (evasion) and legal maneuvers (avoidance) are discernible. Tax avoidance (TA) is characterized as the practice whereby firms curtail their reported tax liabilities without transgressing domestic tax statutes, with the aim of enhancing corporate performance (Khuong et al., 2020). Strategies such as "offshoring" are frequently deployed to exploit more favorable business conditions. Despite its inherent risks, tax avoidance can yield substantial returns for businesses (Badertscher et al., 2013). Consequently, the juxtaposition to tax avoidance presents a formidable challenge, with mere enforcement of legal statutes proving insufficient as a panacea (Frank et al., 2009).

Research findings by Frank et al. (2009) suggest a positive correlation between tax avoidance and the assertiveness of financial reporting, while Edwards et al. (2016) highlight that firms facing heightened financial constraints are inclined towards greater tax avoidance. Over the past few decades, the academic discourse on tax avoidance has evolved from inquiries into its determinants (Shackelford and Shevlin, 2001) to examinations of its economic ramifications. Zucman (2014) contend that tax avoidance merits scrutiny as a matter of social sustainability, given its potential to undermine regulatory compliance and organizational integrity, particularly concerning the proclivities of companies more predisposed to engage in such practices.

Augmenting the tax avoidance framework entails considering the costs associated with environmental policies, notably through the lens of the pollution haven hypothesis (PH). This hypothesis posits that when major industrialized nations extend their operations overseas, they often prioritize cost efficiencies, even at the expense of environmental considerations (Arik and Taylor, 2008). This frequently entails establishing operations in developing countries with lax environmental regulations, as compliance with stringent standards elsewhere would be cost-prohibitive. Consequently, companies frequently opt for jurisdictions with lenient enforcement or minimal environmental standards when expanding abroad (Millimet and Roy, 2016). Notably, the escalating relocation of production processes from developed (low carbon intensity) to developing (high carbon intensity) nations exacerbates global emissions (Steen-Olsen et al., 2012; Li and Hewitt, 2008), challenging the notion that the purported dematerialization process may be merely illusory. This paper endeavors to expand existing models of offshoring practices by incorporating the phenomenon of production shifting towards countries with less stringent environmental regulations, termed "carbon leakage." While longstanding debates persist regarding the magnitude of environmental costs relative to other variables (Ryan, 2006; Birdsall et al., 2013), recent empirical studies indicate the applicability of the PH to EU countries, given the stringent environmental regulations therein. The advent of a new Eurostat database facilitating the mapping of emissions by production and by emission sources promises more robust verification of the hypothesis (Caro et al., 2016). Given the policy significance of the issue and the European Commission provides efforts to counter carbon leakage (Commission, 2013). Production shifting to evade environmental tax burdens poses a formidable challenge to the efficacy of environmental policies and overall sustainability.

This paper contributes to the ongoing discourse by employing a two-country Dynamic Stochastic General Equilibrium (DSGE) model incorporating environmental tax avoidance. Our findings not only deepen comprehension of the phenomenon and its attendant consequences but also afford insights into potential policy interventions. The subsequent sections of this paper are structured as follows:

2. BACKGROUND

The issue of tax avoidance has been extensively studied, encompassing estimations of the tax amounts evaded and the characteristics of those engaging in avoidance practices. Alstadsæter et al. (2022), focusing on individuals, empirically evidenced a substitution between evasion and tax avoidance within the wealth tail of the income distribution. Regarding corporations, prominent entities like Apple, Starbucks, and Facebook have been implicated in employing tax avoidance strategies (Berard et al., 2006). It has been observed that larger firms and multinational corporations tend to engage more significantly in tax avoidance practices (Lisowsky, 2010; Rego, 2003; Hope et al., 2013). However, recent scholarly attention has shifted from mere characterization to understanding the drivers and consequences of tax avoidance. While tax avoidance entails inherent risks, it also holds the potential for yielding substantial returns for businesses (Badertscher et al., 2013). Consequently, the juxtaposition to tax avoidance presents a formidable challenge, with mere enforcement of legal statutes proving insufficient as a panacea (Frank et al., 2009; Edwards et al., 2016).

The focus has shifted towards green taxation, which represents an additional burden for firms. Offshoring practices and production relocation are employed not only to exploit tax regimes and reduce labor costs but also to circumvent environmental constraints, thereby gaining competitive advantages. This strategy aligns with the Pollution Haven Hypothesis (PH), stemming from the Environmental Kuznets Curve (EKC). Consequently, the analysis of drivers and consequences gains heightened importance due to the practical implications in terms of pollution (Caro et al., 2016).

Despite empirical evidence supporting the existence of the Pollution Haven Hypothesis (PHH), a longstanding debate persists due to the relatively minor magnitude of its impact compared to other variables (Ryan, 2006; Birdsall et al., 2013). One challenge lies in determining an appropriate measure of regulatory stringency, denoted as R , which entails assessing the extent to which production costs are heightened in a given jurisdiction relative to others due to its environmental regulations. Moreover, the introduction of higher environmental standards in a country often prompts larger multinational firms to advocate for stricter enforcement, diminishing the cost advantage of smaller local firms. This dynamic challenges the conventional notion that countries with stringent environmental standards serve as havens for larger companies, potentially implicating smaller enterprises as the primary polluters (Birdall and David, 1993).

Refinement within the European context has seen stringent regulations regarding carbon emissions, leading the Commission to address the phenomenon of Carbon Leakage. This phenomenon involves the shift of economic activities or changes in investment configurations that result in greenhouse gas (GHG) emissions being redirected from jurisdictions with GHG constraints to those with fewer or no constraints. Notably, the sudden increase in carbon prices following decisions by the EU Council in February 2017 altered the composition of CO₂ emissions sources consumed within European borders, favoring non-EU countries.

Globally, various countries have implemented or are considering carbon emission pricing measures to internalize negative externalities and reduce emissions in line with climate change mitigation pathways. These measures, such as emissions trading systems and carbon taxing, aim to address carbon leakage and trade competitiveness concerns while prioritizing climate change mitigation. However, the adoption of such measures remains limited, and their effectiveness is subject to regular assessment and refinement. Carbon leakage, characterized by shifts in economic activities and investments to jurisdictions with fewer GHG constraints, underscores the need for comprehensive and well-designed policies to tackle climate change mitigation and maintain global competitiveness.

3. EMPIRICAL EVIDENCE AND MOTIVATIONS

It is worth noting that EU countries produce 8 of the world's total amount of CO₂ and consume 9 of it (in 2020). In other parts of the world, the EU relies on external sources to meet CO₂ demand (for 1) (Table 1).

Table 1. CO2 emissions in the world by consumption in EU and by source of production. 2020

	serving consumption EU's (final demand)		serving consumption (final demand) in the non-EU rest of the world		Total produced	
produced in EU	2,3	7%	0,5	2%	2,8	8%
produced in the non-EU rest of the world	0,9	3%	30,7	89%	31,7	92%
total consumed:	3,2	9%	31,2	91%	34,4	100%

Moreover, this ratio is quite stable from a historical perspective. Over the last decade, the amount of emissions mapped by source exceeds emissions by consumption (final demand). In other words, the EU consumes about 1 billion tonnes more than it produces. The trend in the two-time series is decreasing, but the difference has slightly increased in recent years (Figure 1).

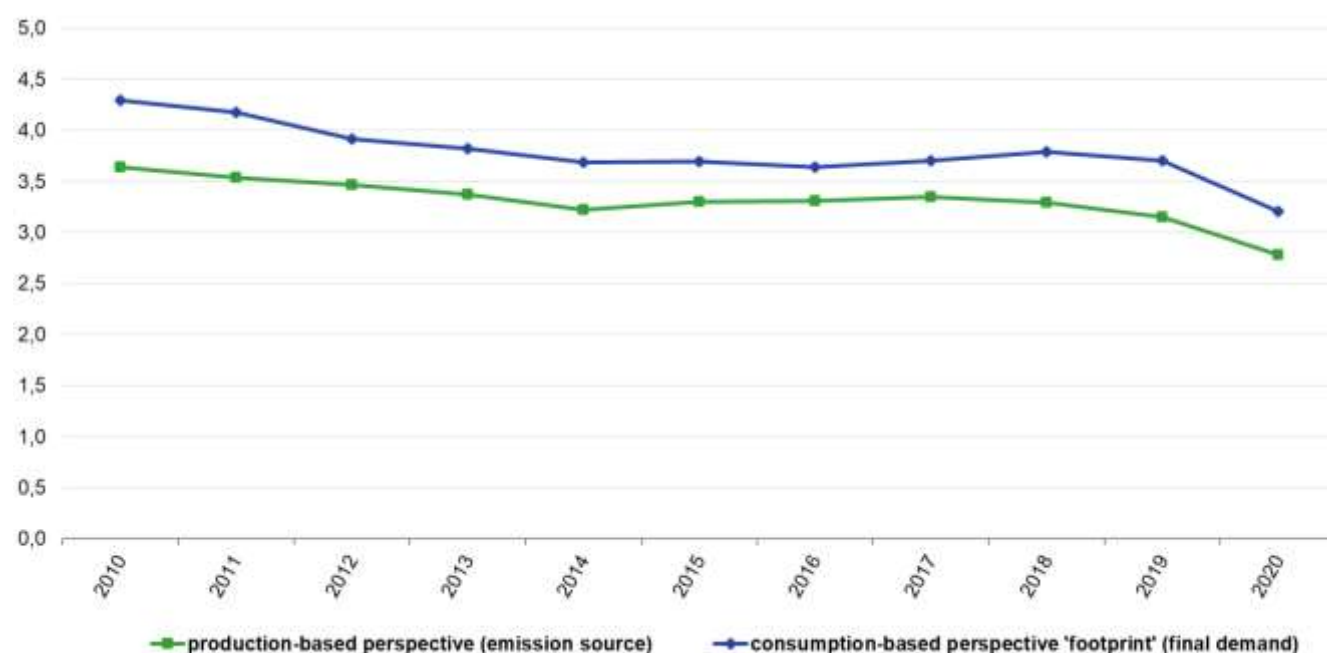


Figure 1. CO2 emissions by production and by consumption in EU countries

The mapping of external sources of CO2 (consumed in the EU) enriches the above picture. The largest source is China, which accounts for over 6 of external production. It is followed by Russia, India and the United States. Less important is the contribution of Turkey, Canada, and the United Kingdom and a marginal role is played by South America, Africa, and Australia. Except for a few important trading partners (USA, Canada, UK), the source distribution pattern starts in countries where production costs are lower (both labour and environmental).

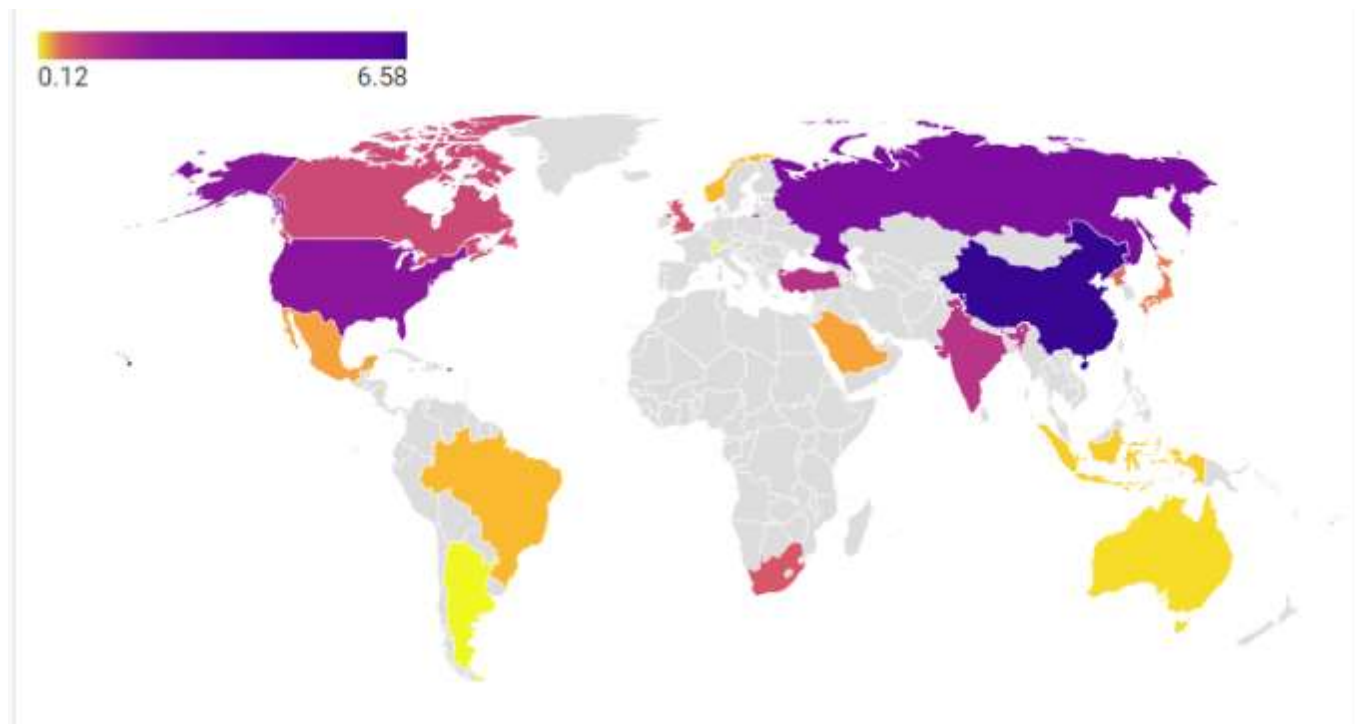


Figure 2. Origins of CO₂ emissions consumed in EU in 2020 (percentage)

Focusing on recent years, the emerging pattern indicates that environmental costs play a significant (and growing) role in determining production location choices (in line with PH framework). In particular, after the sudden and significant increase in carbon prices following the decisions taken by the EU Council on 28 February 2017, the source composition of the CO₂ consumed within the EU borders has changed. Dividing the total amount of CO₂ consumed in the EU by production source (domestic or foreign) shows that until 2016 the foreign source exceeded the domestic one by +35 (in a decreasing trend). After 2017, the proportion expanded rapidly to 45 (Figure 2). One reason for this is that, due to rising costs, part of the production has moved outside the EU borders.

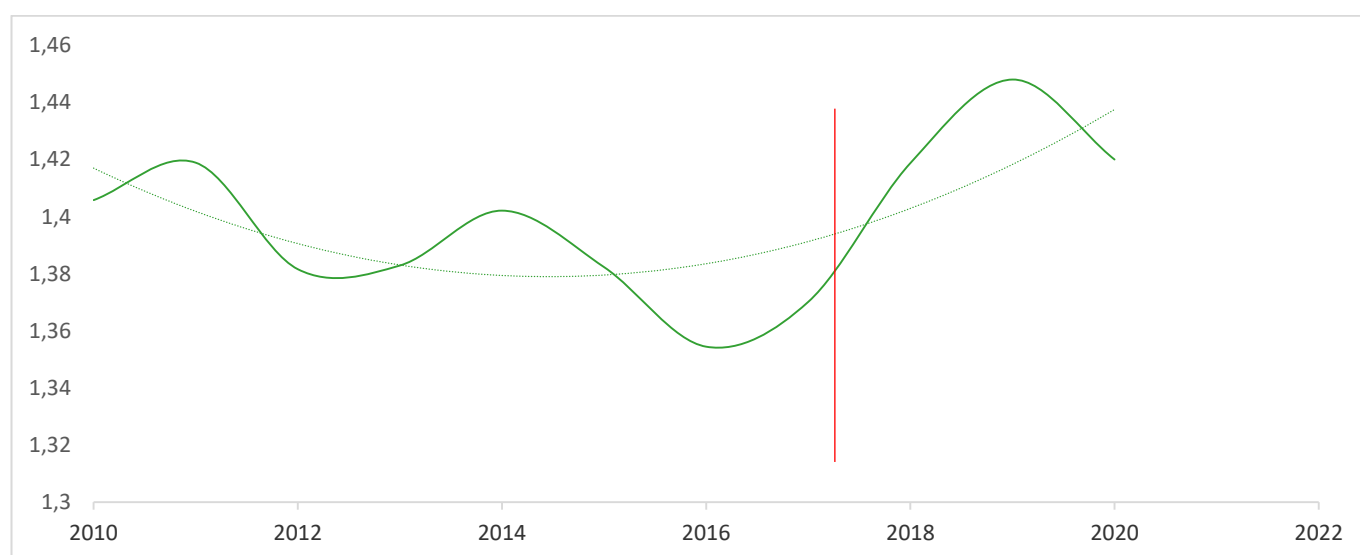


Figure 3. CO₂ emissions consumed in Europe. Time series of composition (foreign product/domestic product)

4. THE MODEL

This section presents the main feature of the DSGE model, which is an extension of the model proposed by Zlate (2016). In detail, the model consists of two countries: the North and the South. Each country presents the following agents: (i) a representative household, (ii) a continuum of

monopolistically competitive firms, (iii) and heterogeneous labor productivity. In the Northern region, firms have many options for their production activities. They can produce domestically or offshore for their domestic market, creating a diverse range of goods. On the contrary, firms in the South produce exclusively domestically for their home market due to the higher effective labor costs in the North. Some firms in both regions also locally produce goods for export markets. Furthermore, we augment the model proposed by Zlate (2016) by introducing an additional layer of heterogeneity between the two regions. This is embodied in the differential stringency of environmental policies. For the sake of simplicity, we consider that environmental policies are imposed exclusively by the government in the Northern region on firms that produce domestically. This assumption allows us to focus on the implications of heterogeneous environmental regulation, thereby simplifying our analysis. In this section, we will concentrate exclusively on the innovative aspects of the model, specifically within the realm of the production sector.

4.1 Production Sector

In this model, upon deciding to enter the market, firms are confronted with a broad range of choices. The first decision is related to entering the market. The second represents the choice between domestic production or offshoring. Finally, when firms enter the market, they can decide to produce a good for exportation.

4.1.1 Firm Entry

According to Ghironi and Melitz (2005), firms enter the market in both the North and the South in every period. In the North, the entry of a firm necessitates a sunk entry cost, denoted by f_E , which is equivalent to the units of Northern effective labor and represents the activities of the firm's headquarters in the country of origin. Upon payment of this sunk entry cost, each firm is assigned a unique labor productivity factor, z , drawn independently from a common distribution $G(z)$, which spans the interval $[z_{min}, \infty)$, and this factor remains constant throughout the firm's lifespan. Consequently, NE_t new firms are established in each period t and commence production in the subsequent period, $t + 1$. However, all firms, including the newly established ones, face a random exit shock at the end of each period, which occurs with a probability d , regardless of their unique productivity. The number of active firms in the next period, N_{t+1} , is determined by the equation: $N_{t+1} = (1 - \delta)(N_t + N_{E,t})$. Potential entrants anticipate their expected post-entry value, denoted by v_t , which is contingent upon the expected future profit stream \tilde{d}_s , the stochastic discount factor, and the exogenous probability δ of exit in each period. The forward iteration of the Euler equation for stocks, as given in Equation (4), yields the following expression for the expected post-entry value of an average firm:

$$v_t = E_t \left\{ \sum_{s=t+1}^{\infty} [\beta(1 - \delta)]^{s-t} \left(\frac{c_s}{c_t} \right)^{-\gamma} \tilde{d}_s \right\} \quad (5)$$

In every period, the unbounded pool of potential entrants grapples with a trade-off between the sunk entry cost and the expected stream of monopolistic profits. In equilibrium, firms enter the market until the expected value of an average firm equals the sunk entry cost:

$$v_t = \frac{f_E}{w_t Z_t} \quad (1)$$

4.1.2 Firms market choice

In each period, active firms, denoted by N_t , endogenously decide on their target markets and production locations. The decisions are as follows: (i) all firms target their domestic market; (ii) Northern firms have the option of producing both domestically and offshore. Offshoring offers the advantage of lower production costs (e.g. lower labor costs and absence of environmental policies) but involves fixed and commercial costs in each period. The choice between domestic production and offshoring only concerns production for the domestic market and is not influenced by access to foreign markets; (iii) a subset of firms in each economy also target the foreign market. Since

offshoring via horizontal FDI is outside the scope of this paper, firms serving the foreign market produce domestically and export, incurring a fixed cost as per GM05. Domestic vs Offshore In each period, a Northern firm with idiosyncratic productivity z has two potential production strategies to serve its domestic market. First, domestic production, with the following output:

$$y_{D,t}(z) = Z_t z l_t(z), \quad (2)$$

The production function is a function of aggregate productivity Z_t , firm-specific labor productivity z , and domestic labor $l_t(z)$. Offshore production is teh following:

$$y_{V,t}(z) = Z_t^* z l_t^*(z) \quad (3)$$

In this case, the firm uses Southern labor $l_t^*(z)$ and is subject to the aggregate Southern productivity Z_t^* , but it carries its idiosyncratic labor productivity z abroad. Under monopolistic competition, the firm with idiosyncratic productivity z solves the profit-maximization problem for both domestic and offshore production scenarios:

$$\max_{\rho_{D,t}(z)} d_{D,t}(z) = \rho_{D,t}(z) y_{D,t}(z) - \frac{w_t}{Z_t z} y_{D,t}(z) - \frac{p_{E,t} e_{D,t}(z)}{Z_t z} - \frac{a_{D,t}(z)}{Z_t z}, \quad (4)$$

$$\max_{\rho_{V,t}(z)} d_{V,t}(z) = \rho_{V,t}(z) y_{V,t}(z) - \frac{\tau w_t^* Q_t}{Z_t^* z} y_{V,t}(z) - \frac{f_V w_t^* Q_t}{Z_t^*} \quad (5)$$

where $(\rho^D t(z))$ and $(\rho^V t(z))$ denote the prices correlated with each production approach—domestic and offshore respectively, (w_t) and $(w^* t)$ represent the real wage levels in the North and the South, and (Q_t) signifies the real exchange rate. Consequently, the expenditure of fabricating a singular unit of product through domestic or offshore means fluctuates not only due to the effective labor costs, expressed as $(\frac{w_t}{Z_t})$ and $(\frac{w^* t Q_t}{Z_t^*})$ respectively across nations, but is also dependent on the variable labor productivity (z) inherent to individual firms. Moreover, Northern firms that produce offshore incur a fixed cost equivalent to f_V units of Southern effective labor. This cost represents the construction and upkeep of the offshore production facility. Additionally, there is an iceberg trade cost $t > 1$ associated with transporting goods produced offshore back to the home country. Contrary to previous studies such as Zlate (2016), we incorporate heterogeneity in the stringency of environmental policies. Specifically, the domestic firm in the North is subject to a carbon tax, denoted by $p_{E,t}$. Each firm is taxed for every unit of emission (e_t) it produces. The equation representing carbon emissions is as follows:

$$e_{D,t}(z) = (1 - \mu_{D,t}(z)) \xi y_{D,t}(z) \quad (6)$$

where ξ is the emission intensity parameter, and $\mu_{D,t}$ is the firm abatement effort. In detail, firms have the opportunity to enhance their production process and make it more environmentally friendly by investing in abatement activities. These abatement activities, however, come with a cost, denoted as $ac_{D,t}$. The equation representing these activities is:

$$ac_{D,t} = \theta_1 \mu_{D,t}^{\theta_2} y_{D,t}(z) \quad (7)$$

where θ_1 and θ_2 are technological parameters. The demand for the variety of firm z produced either domestically or offshore is given by $y_{D,t}(z) = \rho_{D,t}(z)^{-\theta} C_t$ or $y_{V,t}(z) = \rho_{V,t}(z)^{-\theta} C_t$ respectively, where C_t is the aggregate consumption in the North.

Profit maximization leads to the equilibrium prices:

$$\rho_{D,t}(z) = \frac{\theta}{\theta-1} mc_{D,t} \quad (8)$$

where $mc_{D,t}$ are the marginal cost of producing in the domestic market, and are equal to:

$$mc_{D,t} = \frac{w_t}{Z_t z} + \frac{\theta_1 \mu^{\theta_2}}{Z_t z} + \frac{p_{E,t}(1-\mu_{D,t}(z))\xi}{Z_t z} \quad (9)$$

and

$$q_{V,t}(z) = \frac{\theta}{\theta-1} t \frac{w_t^* Q_t}{Z_t^* z} \quad (10)$$

for the alternative scenarios of domestic and offshore production. The corresponding profits are given by the following equations:

$$d_{D,t}(z) = \frac{1}{\theta} q \rho_{D,t}(z)^{1-\theta} C_t \quad (11)$$

and

$$d_{V,t}(z) = \frac{1}{\theta} \rho_{V,t}(z)^{1-\theta} C_t - fV \frac{w_t^* Q_t}{Z_t^*} \quad (12)$$

Every period, when deciding on the location of production, the firm with productivity z compares the profit $d_{D,t}(z)$ that it would obtain from domestic production with the profit $d_{V,t}(z)$ that it would obtain from producing the same variety offshore.

In a specific case, the productivity cutoff level $z_{V,t}$ is defined on the support interval $[z_{min}, \infty)$ such that the firm at the cutoff obtains equal profits from producing domestically or offshore. This is represented by the following equation:

$$z_{V,t} = \{z | d_{D,t}(z) = d_{V,t}(z)\} \quad (13)$$

The model implies that only the relatively more productive Northern firms find it profitable to produce their varieties offshore. Despite the lower cost of effective labor in the South, only firms with idiosyncratic productivity above the cutoff level ($z > z_{V,t}$) obtain benefits from offshoring that are large enough to cover the fixed and iceberg trade costs.

Furthermore, the productivity threshold $z_{V,t}$ adjusts in response to changes in the relative cost of effective labor between countries, thereby influencing the broad margin of offshoring throughout the economic cycle. Given a certain level of firm-specific productivity, a comparatively lower cost of effective labor overseas (which could be due to higher domestic labor costs and a higher emissions tax) results in reduced prices, increased revenues, and greater offshoring profits. Consequently, this leads to a larger proportion of firms offshoring in equilibrium. This inference aligns with the empirical findings on the factors influencing offshoring in the study by Hanson et al. (2005), which indicates that U.S. multinational corporations garner larger portions of their foreign affiliates' sales when the latter enjoy lower trade costs and wages overseas. In a state of equilibrium, the existence of a productivity cutoff, denoted as $z_{V,t}$, necessitates an asymmetry in the cost of effective labor across countries. This asymmetry ensures that certain Northern firms are incentivized to produce offshore. Accordingly, we rewrite the per-period profits from domestic and offshore production as follows:

$$d_{Dep,t}(z) = M_t \left(\frac{w_t}{Z_t z} + \frac{\theta_1 \mu^{\theta_2}}{Z_t} + \frac{p_{E,t}(1-\mu_{D,t}(z))^\xi}{Z_t} \right)^{1-\theta} z^{\theta-1} \quad (14)$$

$$d_{V,t}(z) = M_t \left(\frac{\tau w_t^* Q_t}{Z_t^*} \right)^{1-\theta} z^{\theta-1} - fV \frac{w_t^* Q_t}{Z_t^*} \quad (15)$$

where $M_t \equiv \frac{1}{\theta} \left(\frac{\theta}{\theta-1} \right)^{1-\theta} C_t$ is a function of demand in the North.

In the case of no environmental policy, the period profits from domestic production is:

$$d_{D^{nep},t}(z) = M_t \left(\frac{w_t}{Z_t} \right)^{1-\theta} z^{\theta-1} \quad (16)$$

Figure 4 plots the three profits as functions of the idiosyncratic productivity parameter $z^{\theta-1}$ over the support interval $[z_{min}, \infty)$. The vertical intercept is zero for domestic production; it is equal to the negative of the fixed cost for offshoring $-\frac{fV w_t^* Q_t}{Z_t^*}$.

In this framework, the productivity cutoff $z_{V,t}$ exists in equilibrium if the profit function from offshoring is steeper than the profit function from domestic production ($\text{slope}\{d_{V,t}(z)\} > \text{slope}\{d_{D^{nep},t}(z)\}$). When this condition is satisfied, firms with idiosyncratic productivity z that lies in the upper range of the support interval ($z > z_{V,t}$) find offshoring to be more profitable than domestic production. Furthermore, the implementation of environmental policies increases the marginal cost for firms in the North, thereby reducing the slope of the profit function ($\text{slope}\{d_{D^{nep},t}(z)\} > \text{slope}\{d_{Dep,t}(z)\}$). Consequently, the level subset of idiosyncratic productivity z along the upper range of the support interval increases ($z_{V_t}^{ep(\theta-1)} < z_{V_t}^{nep(\theta-1)}$), providing greater incentives for offshore production.

The inequality of profit slopes is equivalent to $\tau TOL_t^* < 1$, with the "terms of labor" in the presence of environmental policy:

$$TOL_t^* = \frac{Q_t w_t^* / Z_t^*}{\left(\frac{w_t}{Z_t} + \frac{\theta_1 \mu^{\theta_2}}{Z_t} + \frac{p_{E,t}(1-\mu_{D,t})^\xi}{Z_t} \right)} \quad (17)$$

and equivalent to $\tau TOL_t < 1$ without environmental policy:

$$TOL_t = \frac{Q_t w_t^* / Z_t^*}{\left(\frac{w_t}{Z_t}\right)} \quad (18)$$

These two equations define the ratio between the cost of effective labor in the South and the North expressed in the same currency. This condition implies that the effective wage in the South must be sufficiently lower than in the North, such that the difference covers the fixed and iceberg trade cost ($\tau > 1$), thereby providing an incentive for some of the Northern firms to produce offshore. The denominator of Equation 17 includes the dynamics of carbon leakage, which occurs when there is an increased incentive to produce offshore if a more stringent environmental policy is imposed by the government in the northern region. This phenomenon poses significant challenges for global efforts to reduce carbon emissions and mitigate environmental impact.

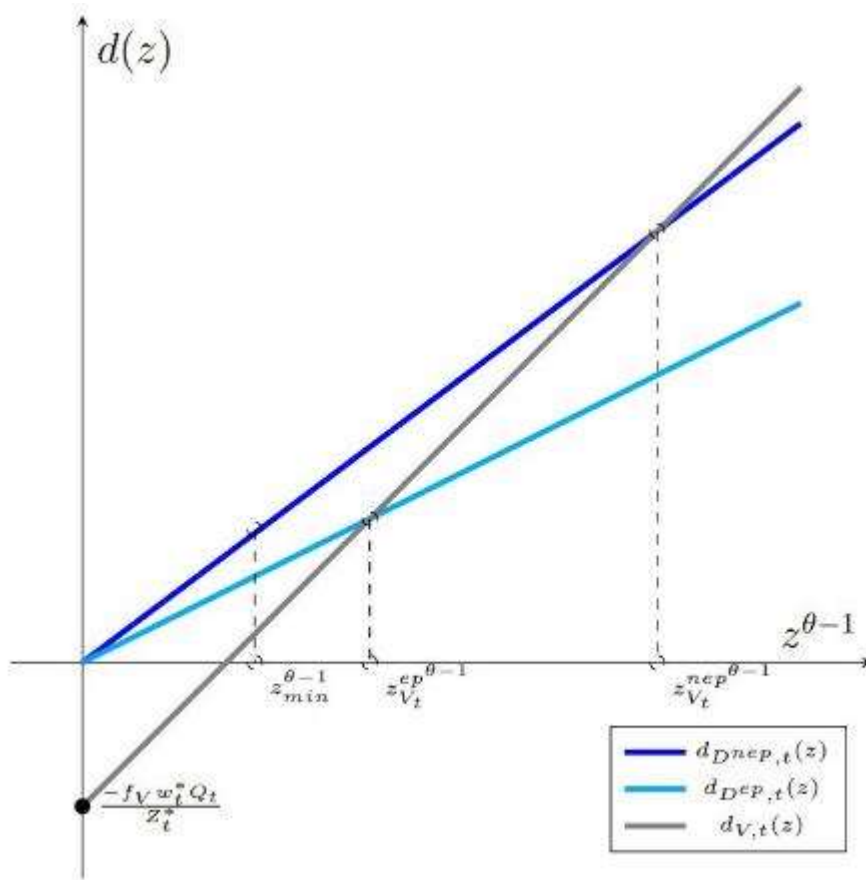


Figure 4. The offshoring productivity cutoff with Environmental policy

5. POLICY IMPLICATIONS

The impact of environmental policy, particularly in the North, can critically affect the incentives for firms to offshore production. As Northern countries might impose stricter environmental regulations, these policies can lead to an increase in the cost of domestic production. Factors such as a higher emissions tax or environmental compliance costs effectively raise the cost of production for Northern firms. Such policies may inadvertently increase the attractiveness of offshoring to countries with less stringent environmental regulations, where the effective labor cost—after adjusting for the real exchange rate—is lower. This differential in regulatory environments can create a competitive disadvantage for domestic firms, making it more cost-effective to produce in regions with laxer environmental standards. The resulting offshoring can therefore be seen as a response to environmental policy disparities between countries. From a policy standpoint, this suggests that unilateral environmental regulations can generate economic externalities by shifting production to jurisdictions with weaker environmental standards. Policymakers should be aware of the potential

for regulatory arbitrage and consider collaborative international efforts to maintain environmental standards without disproportionately incentivizing offshoring. The model articulated by the profit equations indicates that while lowering the Southern effective labor costs encourages offshoring, incorporating stringent environmental policies in the North could further modulate these incentives. By recognizing the interplay between environmental policies and firms' location decisions, policymakers can craft strategies that balance the objectives of environmental protection and economic competitiveness. This may include measures such as carbon border adjustments or international agreements ensuring a level playing field, which would mitigate the risk of offshoring due to unilateral environmental policies.

6. CONCLUSIONS

This paper represents an effort to incorporate issues related to offshore production and carbon leakage into the Environmental Dynamic Stochastic General Equilibrium (DSGE) framework. These additions mark a significant advancement towards a more comprehensive understanding of the intricate interactions between economic activities and environmental policies within a globalized economy. By integrating these factors, this model not only elucidates the potential implications of offshore production on carbon emissions but also provides critical insights into the efficacy of environmental policies in mitigating these effects. The enhanced framework thus offers a robust tool for analyzing the dynamic interplay between offshore production and environmental regulations. In particular, this model allows for a nuanced exploration of how shifting production activities to offshore locations can influence global carbon leakage, where emissions reductions in one country may lead to increases in another due to the displacement of production. This dynamic is crucial for understanding the true global impact of national and regional environmental policies. By simulating various scenarios, the model can help predict potential unintended consequences of these policies and suggest more effective approaches to achieving global carbon reduction goals. Moving forward, this framework can serve as an invaluable resource for policymakers and researchers dedicated to developing more targeted and effective environmental strategies. By addressing the global dimensions of carbon emissions and production practices, this approach facilitates the creation of policies that better account for the complexities of international economic and environmental interactions. Additionally, it provides a basis for assessing the long-term sustainability of different policy interventions and their capacity to foster international cooperation in combating climate change. Overall, this enhanced Environmental DSGE framework not only contributes to the academic literature but also offers practical applications for designing policies that can more effectively address the challenges of offshore production and carbon leakage. This holistic perspective is essential for creating a sustainable future in which economic growth and environmental preservation are balanced on a global scale.

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136 Establishing Start-Up Companies in Central and Eastern Europe: The Role of Institutions

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Abstract

This article examines how institutions can encourage start-up companies in Central and Eastern Europe. The assumption is that start-ups are more likely to be successful in countries with higher quality institutional systems.

The statistical data of EU member states are compared using comparative analytical methods, followed by tests using econometric models for evaluation.

Furthermore, the article aims to illustrate the similarities and differences between Western and Central and Eastern European countries from the perspective of start-up establishment.

On the one hand, the World Governance Indicator, Human Development Index and International Property Rights Index of the examined European countries, and on the other hand the eu-startups.com online industry database are used to answer the puzzle.

The hypothesis is that institutions and the quality of governance play an important role in the success of start-up companies in Central and Eastern Europe.

Keywords

Central-Eastern Europe, quality of institutions, start-up companies.

1. INTRODUCTION

Start-up companies have a determining role in the economic growth of the world. The value of start-up companies was 3 trillion USD in 2019. If we compare the industrial sectors from the number of start-ups point of view it turns out that the transportation and logistics sectors are ranked third after the technology and communication sectors and the finance and insurance and real estate sectors in North America in 2020.

In this article we aim to find evidence how many start-up companies have been established in the EU member states in the various geographical regions. As start-ups are fast created and intellectual property, such as patents and statutes are key determining factors of the establishment and the successful implementation of these companies, we analyze whether the quality of governance, HDI and the level of property rights have any influence on the number of start-ups in a country.

The hypotheses are as follows:

1. The quality of formal institutions has positive influence on the number of start-ups.
2. In those countries in which the quality of governance, the HDI and the level of property rights are higher, the number of start-ups is also higher.
3. In Eastern Europe there are less start-ups and the quality of institutions have influence on this result.

2. INSTITUTIONS MATTER

North (1991:97) defines institutions as follows: *"Institutions are the humanly devised constraints that structure political, economic and social interactions. They consist of both informal constraints (sanctions, taboos, customs, traditions and codes of conduct), and formal rules (constitutions, laws, property rights)".* This definition suggests that institutions have a role in the political, economic and

social action. In this article we examine a segment of the whole political, economic and social era of the European Union Member States. We focus on how institutions have an influence on start-up companies.

The informal and formal institutions differ in characteristics. Informal institutions are norms, customs, beliefs, traditions and religion. They are spontaneously created and embedded into the actors' beliefs and norms. The roots of the informal institutions are in the actors' individual preferences. These types of institutions change in an endogenous way very slowly (100–1000 years). They cannot be modified by top-down formal rules. If formal rules are not in harmony with the informal institutions, then the formal ones won't become part of the actors' norms and beliefs, so institutional stickiness does not function properly. *Pejovich* (1999:171) describes this phenomenon in his Interaction Thesis:

"If changes in formal rules are in harmony with the prevailing informal rules, the interaction of their incentives will tend to reduce transaction costs in the community (that is, the cost of making an exchange and the cost of maintaining and protecting the institutional structure) and clear up resources for the production of wealth. When new formal rules conflict with the prevailing informal rules, the interaction of their incentives will tend to raise transaction costs and reduce the production of wealth in the community."

Boettke et al. (2008) also emphasizes the importance of the harmony of informal and formal institutions. They create a model to demonstrate the connection between these two types of institutions. *Boettke et al.* categorizes the formal institutions into three groups (*Figure 1*).

IEN institutions are indigenously-introduced endogenous institutions. IEN institutions are those we associate primarily with spontaneous orders. These embody the local norms, customs and practices that have evolved informally over time in specific places. Language, for instance, is an IEN institution (2008:5).

IEX institutions are indigenously-introduced exogenous institutions, those we associate with the internal policies created by national governments. For example, federalism in the United States is an IEX institution. Federalism represents a state-constructed institution designed by Americans. Similarly, the British Parliament constitutes an IEX institution. It is a designed institution of British construction for example (2008:5).

FEX institutions are foreign-introduced exogenous institutions. FEX institutions are those we typically associate with development community policy. For instance, a legal system change introduced by the development community in a reforming nation would constitute a FEX institution. Although the decision regarding such a change ultimately lies in the hands of the indigenous government, the policy change is chiefly the creation of outsiders and the institutional change is constructed (2008:5). The supranational level rules of the European Union are examples of these types of institutions.

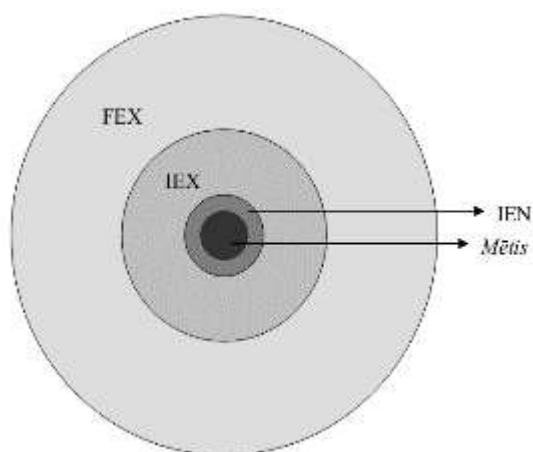


Figure 1. Institutional Stickiness, Source: Boettke et al. (2008:16)

The *metis* symbolizes the most embedded traditions, norms and beliefs of the society. The further the formal institutions are from the *metis*, the lower the stickiness of institutions is.

This model also emphasizes if there is harmony among institutions, the political, economic and social life performs better, in one word the society's welfare is higher.

Williamson, C. R. (2009) also examines and describes the role of institutions on economic performance. The findings of the article suggest that the presence of informal institutions is a strong determinant of development. In contrast, formal institutions are only successful when embedded in informal constraints, and codifying informal rules can lead to negative unintended consequences.

All the previous literature referred to suggests that the harmony of institutions is determining in economic development and performance as well. Based on the findings we assume that institutions have a determining role in the economic performance such as the establishment of start-ups.

Williamson, O. (2000) uses a different model on the one hand to show how various types of institutions depend on each other and on the other hand how fast institutions can change or can be modified by external effects (Figure 2.).

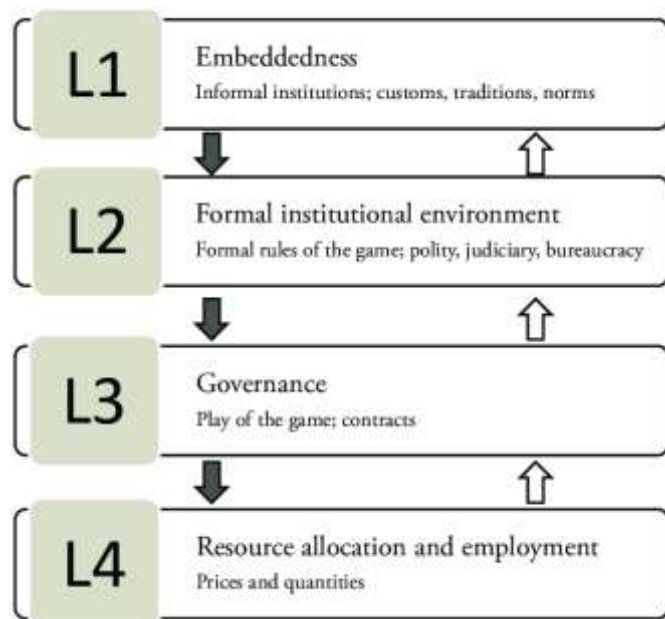


Figure 2. Four Levels of Social Analysis, based on the source: Williamson, O. (2000:597)

In this research our focus is on the L4 (Company) and L3 (Governance) levels as we analyze whether the quality of formal institutions such as the quality of governance have influence on the successful establishment of start-up companies.

3. METHODOLOGY

In this section of the article first the used methodology, then the compared variables are introduced. The main methodology is the comparative analysis, which approach puts institutions into its focus (see previous chapter).

We cover in the research the data of all the EU member states. The examined variables are as follows: *Human Development Index* (HDI) is a measure of average achievement in key dimensions of human development, including longevity and health, knowledge, and a decent standard of living. HDI represents the geometric mean of normalized indices for each of the three dimensions.

The health dimension is measured by life expectancy at birth, and the education dimension by mean years of schooling for adults over 25 years of age and expected years of schooling for children entering school. Gross national income per capita is used to measure the standard of living dimension. A logarithm of income is used in the HDI in order to reflect the diminishing importance of income with increasing GNI. In order to produce a composite index, the three HDI dimension indices are aggregated using geometric means.

HDI can be used to question national policy choices, asking how two countries with the same level of GNI per capita can end up with different human development outcomes. These contrasts can stimulate debate about government policy priorities.

Worldwide Governance Indicators (WGI) index covers individual governance indicators for over 200 countries and territories for six dimensions of governance: Voice and Accountability; Political Stability and Absence of Violence/Terrorism; Government Effectiveness; Regulatory Quality; Rule of Law; Control of Corruption. In this research we use only the government effectiveness in our analyses.

International Property Rights Index: in a free society based on the creation of a citizenship that controls their own destiny and controls their own lives, property rights are an important institution. The following are the three core components of the IPRI:

- Legal and Political Environment (LP)
- Physical Property Rights (PPR)
- Intellectual Property Rights (IPR)

The Legal and Political Environment (LP) component provides information about the strength of a country's institutions: the respect for the 'rules of the game' among citizens. This component has a significant influence on the development and protection of physical and intellectual property rights. The other two components of the Index, Physical Property Rights (PPR) and Intellectual Property Rights (IPR), reflect the two kinds of property rights unequivocal for countries' socio-economic development. The items included in these two categories provide quantitative and qualitative information regarding de jure rights and de facto opportunities in each country. *Figure 3.* demonstrates the structure of the IPR index in details.

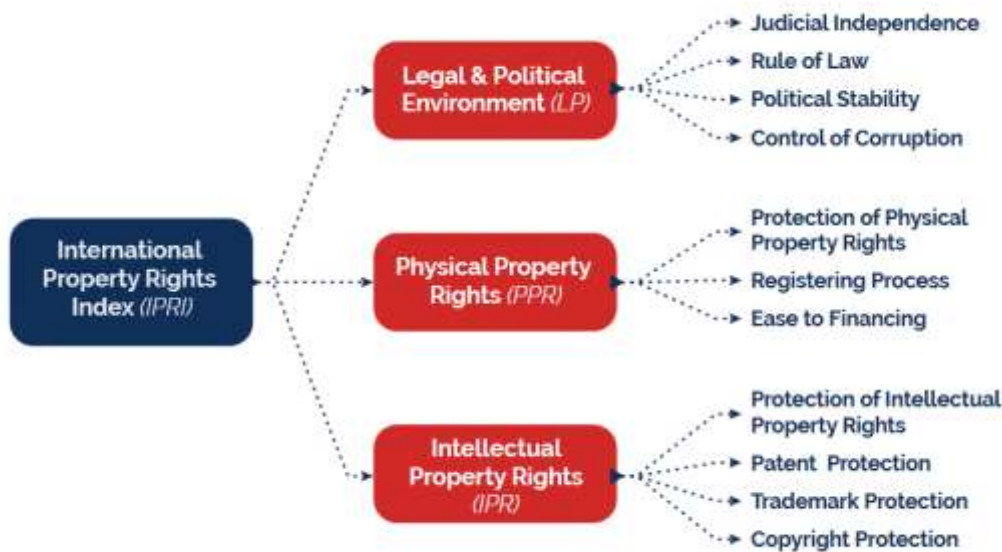


Figure 3. International Property Rights Index Structure, Source: Sary (2023:6)

Start-up database on EU27+ countries online database was also useful to get data about how many start-up companies were founded in the EU 27 countries in 2023.

All these data are summarized in *Table I.* and based on the data we created 4 clusters.

- *Western European countries:* Austria, Belgium, France, Germany, Ireland, Luxembourg and the Netherlands.
- *Eastern European Countries:* Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Slovakia and Slovenia.
- *Mediterranean Countries:* Cyprus, Greece, Italy, Malta, Portugal and Spain.
- *Scandinavian countries:* in the comparative analysis based on the data it turned out that the results of the Baltic countries (Estonia, Latvia, Lithuania) show stronger correlation and similarities with the Scandinavian countries (Denmark, Finland, Sweden) so the Baltic and Scandinavian countries are categorized into one group for further analysis.

Table I. The statistical data of EU27 countries on institutions and start-ups (own editing)

Country	HDI (UNDP) 2022	WGI Government effectiveness (World Bank) 2022	IPR 2022	Nr. of startups (eu-startups.com) 2023
Western European Countries (average)	0,93	90,57	7,45	27,71
Austria	0,916	91,51	7,77	14
Belgium	0,937	84,91	7,28	18
France	0,903	83,02	6,78	41
Germany	0,942	88,21	7,47	67
Ireland	0,945	93,40	7,20	14
Luxembourg	0,93	97,64	7,89	2
Netherlands	0,941	95,28	7,78	38
Eastern European Countries (average)	0,86	65,33	5,52	4,63
Bulgaria	0,795	42,92	4,97	4
Croatia	0,858	70,28	4,92	3
Czech Republic	0,889	81,13	6,40	1
Hungary	0,846	68,87	5,42	5
Poland	0,876	61,79	5,41	16
Romania	0,821	53,30	5,48	5
Slovakia	0,848	63,68	5,58	2
Slovenia	0,918	80,66	6,00	1
Mediterranean Countries (average)	0,89	73,98	5,76	15,50
Cyprus	0,896	75,47	5,84	7
Greece	0,887	66,51	4,81	6
Italy	0,895	66,98	5,66	21
Malta	0,918	76,89	5,78	4
Portugal	0,866	80,19	6,21	13
Spain	0,905	77,83	6,25	42
Skandinavian Countries (average)	0,91	89,07	7,05	10,83
Denmark	0,948	98,58	7,806	7
Estonia	0,89	89,62	6,73	19
Finland	0,940	96,70	8,173	10
Latvia	0,863	75,00	5,94	9
Lithuania	0,875	79,72	6,05	9
Sweden	0,947	94,81	7,601	11

4. COMPARATIVE ANALYSIS

In this chapter of the article the focus is on the comparative analysis of the EU27 member states. The first step was to calculate for each cluster the averages of the statistical indices examined. Then we ranked the clusters for each index from the highest to the lowest scores. The ranking color code scheme is the following (*Table 2.*):

Table 2. Ranking color code scheme (own editing)

Rank 1
Rank 2
Rank 3
Rank 4

It is a robust result based on the ranking that the *Western European countries* perform the best in all the indices.

All three indices on institutional quality (HDI, WGI, IPR) are the second strongest in the *Scandinavian countries*. However, the number of newly established start-ups in 2023 are the second lowest among the compared clusters.

The *Mediterranean countries* have weaker institutional system, than the Scandinavian and the Western countries. However, this cluster performs better than the Scandinavian one in terms of newly established start-ups. This cluster have half of the start-ups than the Western countries even with a rank 2. Despite the lower institutional quality these countries perform better than the Scandinavian and the Eastern European ones. It is an interesting result, which should be examined in more detail such as the Scandinavian case.

The *Eastern European countries* perform the weakest in all indices. So the Western- and Eastern country clusters fully prove the assumption, that the quality of institutions have determining role on the number of newly established start-up companies.

However, the Scandinavian and Mediterranean cases need to be further analyzed (this is the plan of the authors in another article). The assumption is that location factors such as Land, Labor, Transportation, Costs, Risk, Accessing Market, Taxation, Infrastructure, Hegemony and Economic Ascendency or the Ease of Entering the Market may have positive effects on start-up establishment. To check the results of the comparative analysis a correlation analysis was ran on the data. The results are as follows (Table 3.):

- the most significant correlation is among the three institutional indices, so if the government effectiveness is higher, than the level of property rights and human development are also higher,
- the HDI index, followed by IPR and Government Effectiveness have moderate, but positive influence on the number of newly established start-ups in 2023.

Table 3. Correlation Analysis of the examined Indices (own calculations)

	HDI (UNDP) 2022	WGI Government effectiveness (World Bank) 2022	IPR 2022	Nr. of startups (eu-startups.com) 2023
HDI (UNDP) 2022	1			
WGI Government effectiveness (World Bank) 2022	0,9486	1		
IPR 2022	0,90709	0,974429077	1	
Nr. of startups (eu-startups.com) 2023	0,85994	0,687148819	0,70106	1

5. CONCLUSIONS

In this article we aimed to test, whether the quality of institutions as a macro-economic driver has influence on the number of newly created start-ups among the EU27 member states. In the first chapter of the article, we reviewed all those literatures, which demonstrate the importance of institutions for the development of the economy. An overview of the methodology used in this article and the indices that were examined is presented in the second section. In the main chapter we created clusters, then compared the data of the countries and the clusters. The main findings of the research are:

- the most significant correlation is among the three institutional indices exist (HDI, WGI and IPR),

- the HDI index, followed by IPR and Government Effectiveness have moderate, but positive influence on the number of newly established start-ups in 2023, so the three hypotheses of the article are tested and verified.

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145 The Logic of Local and Global Identities, as Seen in the Comparative Science of Ideologies

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Abstract

The first point of effective conflict management is the precise identification of the positions of the disputants (individuals and/or communities), which requires an independent, therefore universal, philosophical worldview that can integrate all possible positions. In the second step, after the identification, we can try "fine-tuning", i.e. approximating the positions. Now we mainly deal with the problems of ideological conflicts, debates in a comparative way. We will talk about their philosophically grounded techniques, mainly about the more local interested national consciousnesses and its relation to the globalist neoliberalism. At the end, the sustainable regional/local economic and the global geopolitical interests has to have a compromise.

Keywords

Ideologies, national identity, national self-consciousness, global interests, sustainable compromise.

1. INTRODUCTION

In terms of their construction and growth, local and global identity groups can be approached from two directions. Organized from below and organized from above, i.e. in the latter case, from the point of view of an idea. The regional/local identities have a natural formation, an organic development from smaller groups to larger ones, for example, in the course of history, tribes have formed alliances and then state confederations, or historical churches have emerged from smaller religious communities through cultural expansion, peacefully and/or by conquest. However, it is also possible that an already given ideology, a philosophical book written as a response to a problem, finds global representatives, spreading locally and then forming a network in the name of an idea.

Global ideologies are active, such as neocommunism and neoliberalism, but the regional identities nowadays react more locally to the challenges facing them, and their goal is pragmatic sustainability and world trade. In their old name, they are the conservatives, or to clarify the name, in the 21st Century, in the course of the description, we could classify them under the name of national identity, or in its represented form, national self-consciousness.

For a philosophical comparison of different ideologies, we will use a theory borrowed from Immanuel Kant (transcendental ideas: the Self, or "I", the World, and God), supplemented with the metaphysics of abilities: 1.) rationality or mind/sense, 2.) perception or flesh/living body, and 3.) emotions. With the help of these, we will organize the national identity into a logical table due to the phenomenological method.

Among the ideologies, there are three classics: conservatism, liberalism, and communism. We will discuss two of the new ones in a comparative way. The national identity, and the neoliberal globalism. The neoliberal globalism discovered early the significance of network action, as well the narrative possibilities, inherent in the media.

Diplomatic conflict management can be more effective, if we proceed from such aspects for, local and/or global agreements. From this point, we can move systematically towards a solution. After an accurate identification, we can use the conflict management techniques, of which we will mention the compromise technique, which is the most suitable conflict management technique to create a

consensus between the opposing parties preventing the conflict of interests and values from turning into a dangerous confrontation on a local and/or global level.

2. WHAT IS THE MAIN PROBLEM?

Nations with local interests and background financial powers with global interests are in conflict, so they are at odds. Local nations represent their own people, and background financial powers with global interests represent themselves. The leaders of a nation are chosen by a nation and – as optimal – they act for it. The other was not chosen by a nation and they only look out for their own interests, although the latter claims to work for all humanity as neoliberal ideology, which sounds good to young people.

One has a history of more than a thousand years (for example in the case of Hungary) or centuries, while the other built its own network in decades. One is a tried form, the other is trying. Nations are part of an organic development, the global background power as hegemonic empire is nowadays a strong utopia. However, utopia turned into dystopia. You work for your own family and nation, or more just for the money itself?

The question basically concerns whether local, sovereign and value-oriented nations and the forces of the global sphere of interests can come to terms with each other – are they able to compromise or not?

Instead of unilateral, one-sided will-enforcement and force dominance, we now start from a theoretical and philosophical approach and move in the direction of practice-oriented diplomacy.

3. KANT AND THE LOGIC BASIS OF THE IDEOLOGIES – METHOD AND PHILOSOPHY

I argue like the phenomenological method of Edmund Husserl. Husserl „developed a systematic foundational science based on the so-called phenomenological reduction. Arguing that transcendental consciousness sets the limits of all possible knowledge”.⁷⁶ Husserl himself liked the first edition of Kants *Critique of Pure Reason* (1781), – mainly the “A” deduction – which is based on the epistemological experience. The main point of Husserls method is the essential approach (*Wesensschau*) on the basis of the experience of the self (first person singular) and intersubjectivity. Kant wrote about the connection between the three kinds of relative judgments (categorical, hypothetical and disjunctive) and the principles of logic (the principle of contradiction, the principle of sufficient ground and the principle of the excluded third) in a letter to Reinhold dated 19 May 1789.⁷⁷ The three types of transcendental ideas are as follows:

1. the unconditional entity performing the *categorical and conjunctive synthesis*, the subject without predicate, the Self or “I”;
2. the *hypothetical and connective synthesis* of the conditional members of a set, the unconditional unit of the set of phenomena, the World;
3. the *disjunctive synthesis* of the elements of a system, the unconditional unity of all possible objects of thought, God.⁷⁸

In his *Critique of Pure Reason* (1781/2004), Kant formulates this as follows, referring to their illusory but undeniable transcendental existence:

These are not the delusions of men, but of pure reason itself. Even the wisest man cannot get rid of them, and even if he may, with much effort, expose the error, he can never entirely dispel the illusion which incessantly torments him.⁷⁹

⁷⁶ https://en.wikipedia.org/wiki/Edmund_Husserl (downloaded: 11-03-2024)

⁷⁷ Kant 1972, 391.

⁷⁸ See more: Kant 1781/2004, CPR, 325-326. Quoted: Czétány 2015, 35.

⁷⁹ Kant 1781/2004, pp. 329 (B 397-398)

4. PHILOSOPHY AND POLITICS

Western thinking does not understand the Hungarians' sense of unity based on an ancient blood pact, since the actual development of national identity in the West can be traced back to the times of colonization and was formulated as the relationship of the colonizers to their subjects, the colonized (Stoler 1995, 1997) or we could say simple the slaves. This explains, among other things, why national identity is evaluated and interpreted as a certain distance, difference, distinction, separating others (Takács 2009, 25.); as it would be a disjunctive synthesis, or in old terms: conservatism, although it would be more correct for them to refer to themselves as globalization self-awareness. That is why it is unfair if they want to sweep the innocent Hungarian "concept of nation" as identity and self-awareness under the carpet as something that is not understood, something that does not need to be dealt with.

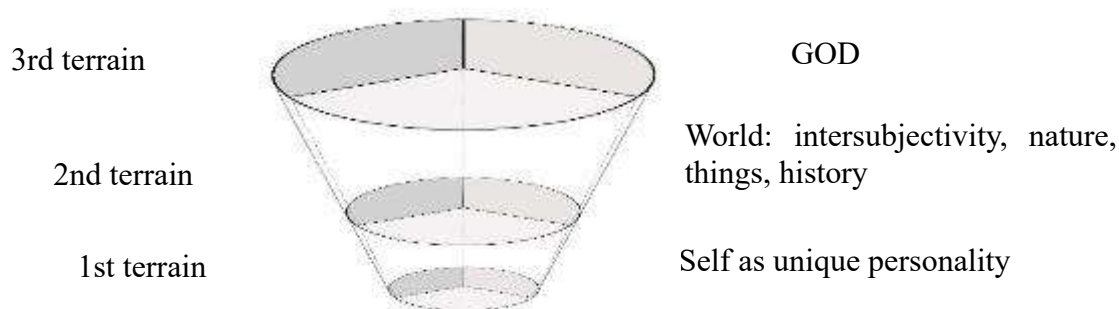
In addition, the recognition of the concept of the Western nation in relation to colonialism and its fusion with World War II. and German Nazism (as with the conquests of the "living space" – *Lebensraum* – of the racist ideology) made the concept of the "nation" and, in general, all the attributes, qualities, and values related to it, backward and even repudiable, refused by the Western thinking.

Just think of the "woke" ideology - so it's no wonder that they show complete incomprehension and lack of understanding regarding the non-colonizing Hungarian nation concept, if they (the western woke and neoliberal ideologies) only know their own history and its critical approach, and can't imagine anything else. However, they apply their own historical criticism schemes to everyone else without examining the issue of responsibility. This review suffers a hiatus. The Hungarians are specifically treated by the woke and the neoliberal ideologies as if Hungarian people were former slaveholders - let's add: completely wrong. We were, who suffered under others, and had to fight for our freedom and nation through centuries.

In a general sense, we should also note that national identity and self-consciousness/self-awareness in today's West are either considered an invented entity, a fiction (cf. Anderson 1983/1991: *Imagined Communities. Reflections on the Origin and Spread of Nationalism.*), or an unimaginative tradition, however, we show that, according to the aspects of Kantian ideas of reason, that a re-founded concept of nation can be fruitful, which is not the same as re-enacting the shadows of old ages of others. This is possible if the most beautiful traditional elements are dynamized and updated in a contemporary way.

5. THE LOCAL VIEW: A PHENOMENOLOGY OF NATIONAL IDENTITY – THE ARCHITECTONICS OF THE PHILOSOPHICAL “BACKGROUND” AND THE LOGIC TABLE WITH EXAMPLES

Figure 1. The three metaphysical abilities (rationality, perception, emotion) in the three terrains



Source: Own editing

I will slightly rename and supplement the Kantian transcendental trinity of "I-World-God", since the concept of "I" can give rise to many misunderstandings nowadays (narcissism, selfishness, egoism), and "World" as an intermediate terrain carries with it a variety of relations, divisions, such as relations to intersubjectivity, nature, things and history. The consciousness is made up of three factors, according to our three capabilities – rationality, perception, emotion – so in each of these terrains ("Self-World-God") and divisions they will help us to navigate.

Table 1. The logical table

Terrains	Division	Capabilities
A.) Self		1.) rationality
		2.) perception
		3.) emotion
B.) World	I. Intersubjectivity	1.) rationality
		2.) perception
		3.) emotion
	II. Nature	1.) rationality
		2.) perception
		3.) emotion
	III. Things	1.) rationality
		2.) perception
		3.) emotion
	IV. History	1.) rationality
		2.) perception
		3.) emotion
C.) God		1.) rationality
		2.) perception
		3.) emotion

Source: Own editing

Since I consider the philosophically emphasized harmony as a balance to be important, one of the most attacked ideological identity types, namely national identity/national consciousness has to be defended from being rendered impossible or eliminated. What is national identity if not exclusion and hatred, as its opponents claim? Let us treat National Identity (NI) as a phenomenon that gives itself⁸⁰ and needs to be expressed.

My philosophical methodology is as follows: I examine national identity – or national consciousness in its represented state – as a phenomenon in terms of how, through what, in what ways it manifests itself, in terms of the further development of Kantian transcendental ideas and concept of reason. Our method is simple: we have the criteria, let's see how the national identity itself behaves/acts according to our experience, especially in Hungary.

The Hungarian national identity and national consciousness is not exclusionary, the Hungarians also like other nations people, nature, things and history, but like another nations, they prefer their own.

⁸⁰ „Givenness” – Marion (1997/2015); https://en.wikipedia.org/wiki/Jean-Luc_Marion (downloaded:17-03-2024)

Table 2. Transcendental ideas as terrains, their division, metaphysical capabilities and their relation to national identity

Terrains	Division	Capabilities	Relation
A.) Self		1.) rationality	identity
		2.) perception	tastes, smells
		3.) emotion	homeliness, love of country
B.) World	I. Intersubjectivity	1.) rationality	language, literature, science, arts
		2.) perception	music, dance, films
		3.) emotion	sporting successes, sense of historical justice
	II. Nature	1.) rationality	sustainability and responsibility
		2.) perception	hiking in the Carpathian Basin
		3.) emotion	symbolic landscapes
	III. Things	1.) rationality	value-based relation
		2.) perception	tourism
		3.) emotion	imprintings in duration ⁸¹
	IV. History	1.) rationality	members of a nation
		2.) perception	epochal symbols
		3.) emotion	respect for ancestors and tradition
C.) God		1.) rationality	brothers and sisters in faith
		2.) perception	sacred symbols and holidays
		3.) emotion	religious community, civilization, ethics

Source: Own editing

A./1. The individual wants to define himself and considers national identity an integral part of his core of self.

A./2. The individual also expresses his national identity through his perception, i.e. he likes "home" tastes, smells, etc. (little part of the "Hungarikums"⁸²).

A./3. The individual's national identity is emotionally committed to his or her sense of self, which is manifested in both a sense of being at home and a sense of love for his or her country.

B./I./1. In the world, through intersubjective - i.e. social - relationships, our sense of national identity is attuned to each other through shared understanding, such as a common language, complemented by the achievements of literary, artistic and scientific excellence (e.g. our sweet mother tongue, the Hymn, Munkácsy, Semmelweis, Neumann).

B./I./2. Through intersubjective relationships in the world, our sense of national identity is intertwined through the music, dances and films that are known and enjoyed by everyone "at home". These are linked to perception, since their reception is primarily linked to perceptual perceptions, but they also have cultural significance, i.e. they are also embedded in rationality and emotions (e.g. folk music, folk tales, film art).

B./I./3. Through intersubjective connections in the world, our sense of national identity is intertwined with our sense of joy - very proudly - in national sporting successes, and our sense of historical truth (e.g. Olympic successes, historical view of our nation).

B./II./1. A community with a national identity protects its own wildlife and nature, has a responsibility for sustainability for future generations (e.g. nature conservation, not wasting resources).

B./II./2. People with a national identity consider the Carpathian Basin to be of inescapable importance for hikes (e.g. Danube bend, Transylvania), although they also like to go on trips elsewhere.

B./II./3. People with a national identity feel closer to the symbolic landscapes of their "home" (e.g. Hortobágy, Lake Balaton).

B./III./1. People with a sense of national identity turn to - or turn away from - things on the basis of values (e.g. constitution, legal system).

B./III./2. Turning to things with a sense of national identity adds value to certain tourist destinations (e.g. Parliament, Eger Castle).

⁸¹ Bergson (1889/2001) - *durée* as duration.

⁸² <https://www.hungarikum.hu/en/szakkategoria> (downloaded: 18-03-2024)

B./III./3. Some things of particular importance are imprinted in duration and occasionally their significance is highlighted in the community of people with a sense of national identity (e.g. flag, coat of arms).

B./IV./1. National identity in historical and conceptual terms is the history of brothers and sisters and of members and groups who have become brothers and sisters.

B./IV./2. National identity in historical and perceptual terms refers to the symbols of different periods and territories (e.g. national costumes, uniforms).

B./IV./3. National identity in a historical and perceptual context means respect for ancestors and tradition (e.g. St. Stephen's Day, freedom fighters, water sprinkling at Easter).

C./1. From God's point of view, representatives of national identity are understood as brothers and sisters in faith.

C./2. God is expressed through perception in sacred symbols and festivals (e.g. baptism, Easter, Christmas) for those who represent a national identity.

C./3. Nationally conscious believers are one in God. From God's point of view, the representatives of a national identity form an emotionally committed religious community, a civilisation, with internal ethical commandments (e.g. Christianity and culture).

Spatio-temporal location, circumstances and personality traits of psychological development, and changing community embeddedness determine who/what, when, which aspects are preferred and which are actually represented. That is true for all the ideologies.

6. SOME WORDS ABOUT THE GLOBALIST POWERS

It is difficult for us to use our schema-table for the financial background power (globalists), because they refer to themselves differently (usually as neoliberals) and act differently – the stronger they are, the less they tolerate contradictions. If we would fill out the table based on their influence activities, none of the 18 points in the table would match national self-consciousness, because they want to rule over all nations, or more likely: without nations, by a global government.

The global network consists of transnational organizations. This is a for-profit association. We could name a few private capital examples of transnational influencers, but this is now unimportant, because important is that, how they act.

The most influential members of the global financial background power control the flow of money itself. Through this, the economy. Politics through the economy and media. This is lobby politics.

All of this at the beginning was done through media and civil organizations (NGOs – non-governmental organizations), founded and financed by themselves. Then politics serves them through politicians. At the end, the politicians vote them money. That's how the influence came around. That is why it is worth investing money in this kind of global network. More money comes out of it than was invested in it.

Their common goal is to build global influence and control. They are basically a financial "elite" that represents transnational interests. This means that they rise above nations in every aspect and require fully cooperative governments. This is necessary so that they can realize their goals. They influence nations that do not agree, through the media and the economy, and if this is not enough, politically and if necessary, military forces are also used.

All this is supported by legal justification and democracy is mentioned. They formulate the legal criteria as they please, as they want. This is not, what the liberal Fukuyama (1992) meant in *The End of History and the Last Man*.

In doing so, they shape democracy for their own will. This is what they want locally, for the nations that are problematic for them. This is active influence – the mask of a global democracy. Behind it are the interests of the narrow, approximately little 1% financial elite of the whole population on Earth. It is a transnational network organization. Against the nations – according to them – nations and peoples should be mixed up. We see this in Europe today and as Huntington (1996) warned us in *The Clash of Civilizations and the Remaking of World Order*. Anyone who has visited Western Europe at the end of the 90's and nowadays, can clearly see the difference. The diversity of the World does not mean mixing "colours" into grey.

7. CONCLUSIONS

The more locally interested national self-consciousness is loosing power against the globally interested money-powers. The two ideologies are in strong conflict. But we need a peacefully solution. The one and only common goal is trading. Who work for their family and nation has to have money too. They want to trade globally and use the profit and „know-how” more locally. Who want to rule globally, need more and more money to fulfil what they want. But so, the more locally interested people will have less money. They both need a golden middle, an optimal way not to hate each other.

Conflict management strategies are usually interpreted in the Thomas-Killmann (1974) coordinate system. As we can see nowadays, the global powers are more competitive, as strong local nations too, while servant nations are adaptive to the global powers, or conflict-avoidant, as weak nations. But we need problem solvers (optimal for win-win situations), but for reality much better: compromise seeker local nations and global powers – for the golden middle way.

Ralp Dahrendorf (sociologist, philosopher, political scientist and liberal politician⁸³) named the optimal action at the beginning of the 21st century: “Glocalization” (Dahrendorf 2003) – „Think globally, act locally”⁸⁴. But now we have to say: „Trade globally and think locally too”.

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⁸³ https://en.wikipedia.org/wiki/Ralf_Dahrendorf (downloaded: 15-03-2024)

⁸⁴ https://en.wikipedia.org/wiki/Think_globally_act_locally (downloaded: 15-03-2024)

149 Water for Peace: The Importance of Water and the Regional Dimension of Water-Related Conflicts

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Abstract

At international level, water was first identified as a basic need in the ILO's report in 1976, and later in the Millennium Development Goals and the Sustainable Development Goals. In 2013, the Director-General of the FAO stated that future wars would be fought over water resources, by the fact that during the history 1,634 conflicts have been water-related so far, 72% of which have occurred since 2010 (Pacific Institute, 2024).

The study uses the UN database to analyze how the proportion of people who have access to adequate quality and quantity of drinking water in different regions of the world has changed, and to identify which regions have made the greatest improvements and which are lagging far behind. This paper then examines the regional and temporal distribution of water-related conflicts, thereby answering the question of which countries and regions are most affected by this issue. In addition, this study summarizes the literature to identify those fields where water is relevant for sustainable development.

The research has found that Central and South Asia has made the most progress. Since 2000, 23% more of the population have had access to a safely managed drinking water source in this region. In addition, it has also revealed that Sub-Saharan Africa is the most affected region. Here, less than a third of the population have access to safely managed drinking water. The research has shown that water-related conflicts are intensifying, as more conflicts broke out between 2016 and 2023 than in the entire 20th century. It has also revealed that these conflicts are mainly concentrated in the Sub-Saharan Africa, Western Asia, and South Asia. The summary of literature also shows that water and SDG 6 are important for the achievement of other SDG targets, and that adequate quality and quantity of drinking water has an impact on education, poverty, migration, and conflicts.

As a conclusion, the study recommends that UN Member States should agree on a commitment to allocate a certain percentage of their annual budgets to the investments to achieve the Sustainable Development Goals, given that currently 500 billion USD in investments are needed to achieve SDG 6 alone in the developing countries.

Keywords

Conflicts, development, SDG 6, United Nations, water.

1. INTRODUCTION

At international level, the issue of ensuring that everyone has access to sufficient quantity and quality of drinking water has been addressed since the early 20th century. While this programme was initially running under the League of Nations, it was pursued by its successor the United Nations after World War II. However, water only became a priority from the 1970s onwards. To illustrate this evolution, this paper collects and summarizes literature to show how water-related development policy has evolved from the 20th century to the present at international level. The availability of sufficient quantity and quality of drinking water is not only important for meeting basic needs. To emphasize this, the current study summarizes literature that highlight the importance of water in other areas of life, such as education, poverty alleviation, water-related migration, and peace. Given that the present

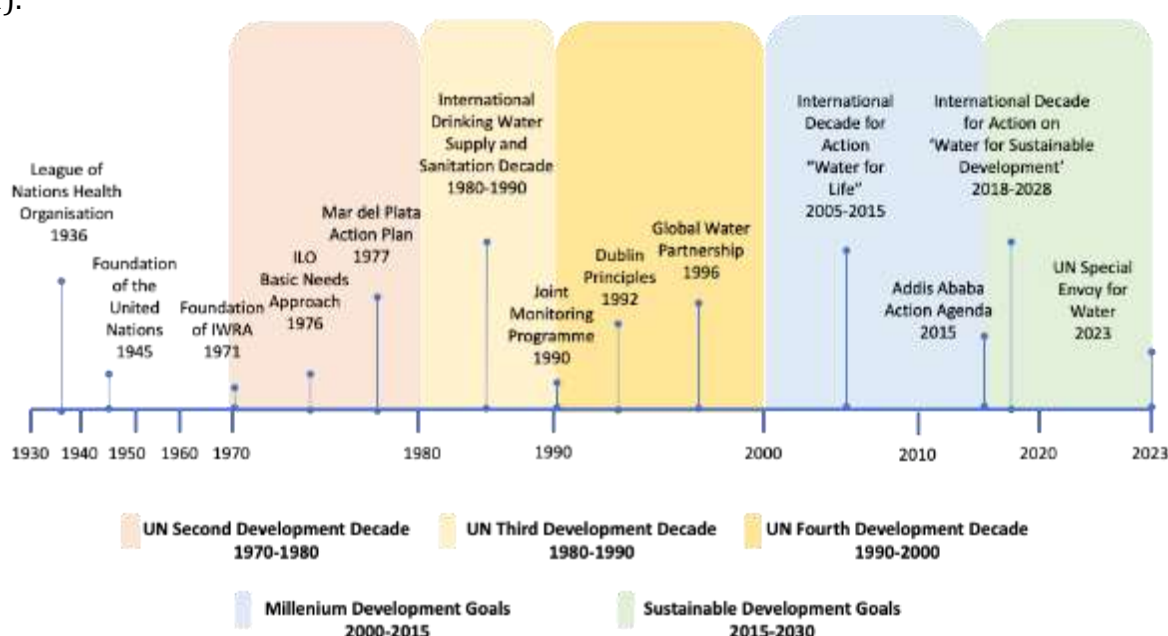
study is more concerned with water security, the concepts related to this issue will be presented in more detail.

After the review of literature – since water has been an issue for a long time –, it is also worth looking at the impact of the programmes that have been set up in the 21st century on the availability of adequate quality drinking water, thus the current study examines how the proportion of people who have access to adequate quality and quantity of drinking water in different regions of the world has changed between 2000 and 2023. As the literature review also addresses the issue of water security, it is also worth discussing how water-related conflicts have evolved in the world throughout history, therefore this paper examines the regional and temporal distribution of water-related conflicts with a particular focus on the 21st century.

2. LITERATURE REVIEW

2.1 The evolution of water policy at international level

Based on the literature, the issue of water has already appeared at international level in the first half of the 20th century, however, states did not pay more attention to the issue of water until 1970 (Figure 1).



Source: Own compilation based on the literature review

Figure 1. The evolution of water development policy at international level

At international level the predecessor of the World Health Organization (WHO), the League of Nations Health Organisation was the first that carried out a monitoring system of drinking water, and published a recommendation on the collection of data in the 1930s (Bartram et al. 2014). After World War II, it took the successor of the League of Nations, the United Nations (UN) several years to begin to pay attention to the issue of water. In 1970, the UN stated that between 1970 and 1980 – under the Second Development Decade of the UN – each developing country in rural and urban areas equally should endeavour to provide an adequate supply of potable water to its population (Bartram et al. 2015). Besides the UN, international organizations emerged as well such as the International Water Resources Association (IWRA) that has contributed to the emerging discourse of global water policy through meetings and its journal since 1971 (Satterthwaite 2016). The International Labour Organization (ILO) has also contributed to the acceptance of water as a prominent factor in international development policy by defining access to water as a basic need (ILO 1976). According to the report of the ILO, Streeten (1981) emphasized that there were many issues that should have been solved in order to provide adequate quality and quantity of drinking water to people mainly in the developing countries, since those countries did not have the capacity to design and construct

enough water supply and waste disposal facilities or properly operate and maintain them because of the lack of trained people.

At international level, Water Conference for the very first time was officially proposed in 1971 by the UN's Committee on Natural Resources (Biswas and Tortajada 2023). Six years later at the UN Water Conference, in Mar del Plata, the Action Plan on the critical role of water resources in improvement of social and economic livelihood was identified (Amengor 2023). The Action Plan also declared that all people had the right to access adequate quality and quantity drinking water to meet their basic needs, regardless the stage of development and social and economic conditions (Clement 1981). In Mar del Plata, the idea of International Drinking Water Supply and Sanitation Decade (IDWSSD) emerged as well aiming to provide safe quality and adequate quantity of water and basic sanitation facilities to all people by 1990 (O'Rourke 1992). Views are divided on whether the programme has been successful. Fukuda et al. (2019) showed that almost every developing region fell far behind its respective targets, because the number of urban population who had no access to safe drinking water increased mainly due to the migration from rural to urban areas. However, according to Amengor (2023), the IDWSSD – in the 1980s – brought a special attention to the importance of drinking water and adequate sanitation for the people, thus it cannot be said to have been a failure. Regardless of whether the targets were achieved or not, according to Rajapakse (2022), during that decade many useful lessons were learned and helped guide work over the next several decades. Going further in history, we can see that the international development policy measures related to water continued to expand during the 1990s. Under the fourth UN Development Decade (1990-2000) the goal remained the same that is providing universal access of drinking water for all people. In 1990 to increase the monitoring efficiency of water policy the WHO and UNICEF created the Joint Monitoring Programme for Water Supply and Sanitation, and since then, they have monitored the percentage of population who have access to drinking water (Bartram et al. 2014). As the members of the IWRA criticized the UN Our Common Future report for not providing much attention to water issues, they organized preliminary meeting in Dublin – before the Rio de Janeiro Summit in 1992 – in order to reinforce the importance of the water related issues (Schmidt 2021). Since the 1948 Universal Declaration of Human Rights does not make any direct reference to water (Bartram et al. 2015), this conference produced what are known as the Dublin Principles in which the basic right of all human beings to have access to clean water at an affordable price was recognized at international level (The Dublin Statement and Report of the Conference 1992). In addition, the Global Water Partnership was established in 1996 that soon determined itself as a key knowledge hub through its influential reports on socioeconomic aspect of water, thus contributing to the more direct influence on water sector in global economic and environmental policy (Schmidt 2021).

In September 2000, the leaders of the world adopted the Millennium Declaration and set up the Millennium Development Goals (MDGs) in which the Target 7c aimed at halving the population that had no sustainable access to water and basic sanitation before 2015 (WHO-UNICEF 2004). In December 2003, the United Nations General Assembly proclaimed the period between 2005 and 2015 to be the International Decade for Action “Water for Life” (United Nations 2015a) in order to improve access to safe drinking water in urban and rural areas, and to shift the emphasis to a rights-based approach from a needs-based one, and also to enhance water related national development strategies and the efficiency of water use (UN-Water 2015). While the UN acknowledged – at an international conference in Tajikistan in 2015 – that much progress had been achieved during the period 2005 and 2015, particularly in terms of water cooperation and implementation of integrated water resources management plans (United Nations 2015b), some experts criticize the implementation and the detail of the MDGs. Schmidt (2021) highlights in her article that the indicators failed to take water scarcity into account, meanwhile the access of different income and ethnic groups to safe water has not been measured consistently. Furthermore, Fukuda et al. (2019) see the MDGs as they widened the disparity between poor and rich states and leaving behind the most vulnerable ones. Even though there are different views and opinions on the effectiveness of MDGs, it surely contributed to laying the foundations of Sustainable Development Goals (SDG) – which were adopted in 2015 – Goal 6 the aim which is to ensure availability and sustainable management of water and sanitation for all (Rajapakse 2022). In the same year, the Addis Ababa

Action Agenda was adopted as well establishing a new forum to encourage the participation of local communities in decision-making, as well as supporting developing countries in implementing resilient and environmentally sound infrastructures related to water and sanitation (UN-Water 2022). In December 2016, the United Nations General Assembly resolution 71/222 on an International Decade for Action on 'Water for Sustainable Development' 2018-2028 was adopted by UN Member States to further improve cooperation, partnerships and capacity development (United Nations 2017). In addition, at the latest UN Water Conference in 2023 the Secretary-General announced the consideration of the appointment of a Special Envoy for Water which would be responsible for raising the awareness and visibility of water-related sustainable development issues, as well as ensuring that water remains high on the political agenda, within and outside the UN (United Nations 2023), and encouraging investments in the water sector, due to the fact that there is still a 500 billion USD of annual SDG investment gap in developing countries regarding the water sector and SDG6 goal (UNCTAD 2023).

2.2 The importance and security aspects of water

Society in our ages highly depends on adequate water supplies in agriculture and industry to generate power, ensure public health, and maintain essential ecosystems. However, several factors – such as the growing population, unsustainable management practices, and environmental challenges – are imposing burdens on the critical freshwater resources of the world (Michel 2020). These factors also contribute to the shortfalls between rising demands and shifting supplies, thus fostering the possibility of water conflicts among countries or communities attempting to secure their share (Carius et al. 2004). Even though water scarcity has many definitions, the excess demand of water over the available supply is the most common out of them (Damkjaer and Taylor 2017). We can distinguish between physical and economic water scarcity. In one hand, in case of physical water scarcity there is not enough water to meet all – including environmental – needs, but on the other hand, water scarcity from economic aspect occurs because of the lack of adequate investment or capacity to meet water demand, even where water is abundant (Manungufala, 2021). Based on the interpretation of UN-Water (2013), water security is the ability of a population to safeguard sustainable access to adequate quantity and quality of water for sustaining socio-economic development and human well-being. According to Wolf (1998), water ignores political boundaries, therefore water-related political pressures could spill over into international conflicts. Based on Gehrig and Rogers (2009), water conflict occurs on four interdependent levels, such as (1) local level where societal groups, states or citizens compete for water in a specific area, (2) national level where the conflicts occur between different interest groups in relation to water-related national policies, (3) international level between states over the use of shared water resource, and also at (4) global level where the conflict occurs between marginalized and affluent populations because of the unequal distribution of water. Water conflicts are directly or indirectly related to water quality, quantity, safe access and availability. In addition, water can be used as a weapon in conflicts if a group contaminates water supplies, blocks transport or controls distribution (USAID 2022).

Beyond conflicts, water is linked to many other factors as well. Staneva et al. (2021) explain in their study that water scarcity and poor sanitation have a negative impact on children – regarding the development of cognitive ability. Furthermore, since children also collect water instead of going to school, they miss out on key learning and socializing opportunities with their classmates, and later this affects their academic performance, and if nothing is done to change it, their financial status as well (Bagayas 2023). In addition, difficult access to water resources is a serious problem for agriculture, as the lack of irrigation also limits the adequate access to agricultural products of people (Telsac-Telsac 2022), which can trigger migration according to Bald (2022), since water insecurity has long been identified as a driver of migration, as it undermines the lives and livelihoods of people. Finally, it is also worth mentioning the connections between water and the SDG goals, thereby emphasizing their importance. Even though the SDGs are formulated as individual goals, they are not independent, as the sustainable use of water is key to achieving other goals. According to Rajapakse (2022), Target 6.1. of SDG – achieve universal and equitable access to safe and affordable drinking

water for all – has direct interlinkages with 42 other targets from the 17 SDGs. The importance and the interlinkages between water and other SDGs is emphasized in the UN-Water Analytical Brief (2016) as well, and in the report of Libala et al. (2021), in which it was shown that SDG 6 had the most synergies with SDG 3 (Good health and wellbeing), SDG 8 (Decent work and economic growth), SDG 9 (Industry, innovation and infrastructure), SDG 12 (Responsible consumption and production), SDG 13 (Climate action), and SDG 16 (Peace, justice and Strong Institutions).

3. METHODOLOGY

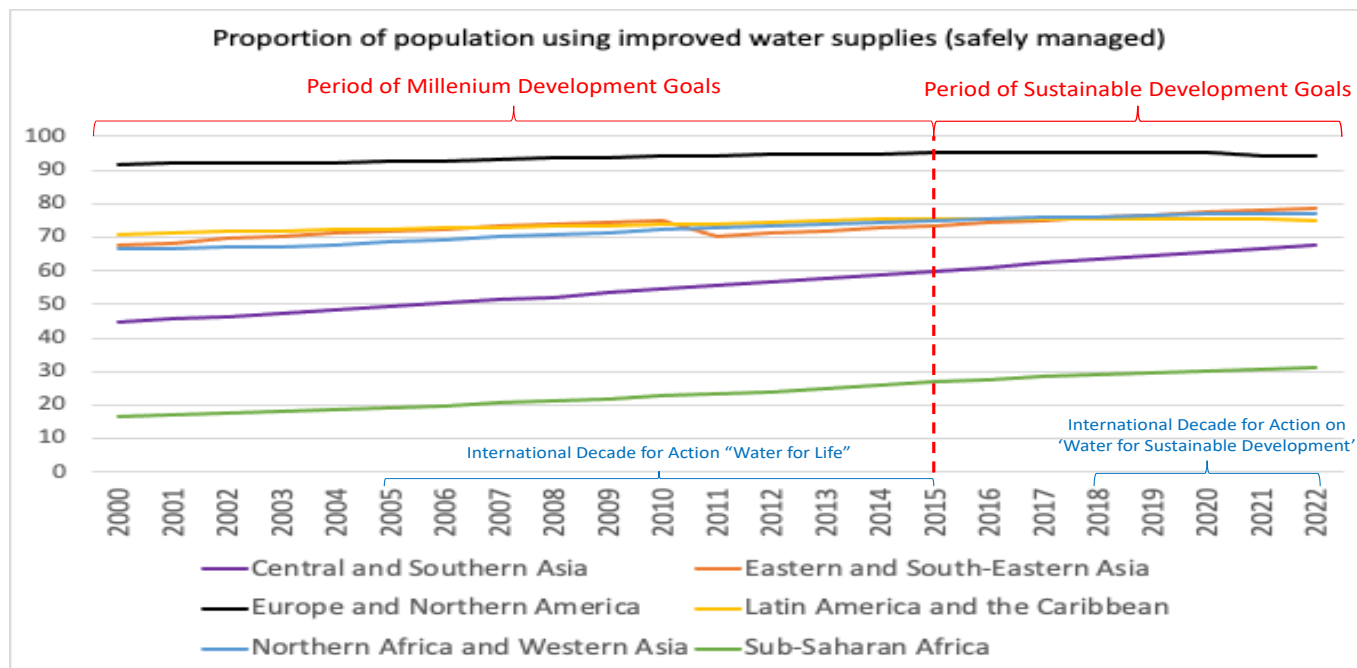
As the literature review has shown, the role of water has become increasingly prominent at international level over the years, but relevant statistical data have been only available since 2000, thanks to the Joint Monitoring Programme (JMP) established by WHO and UNICEF. Since these organizations are active in over 190 countries worldwide, the JMP has well-established mechanisms for collecting and compiling data from different sources. In the database of JMP, the country groupings are based on the geographic regions defined under the Standard Country or Area Codes for Statistical Use of the United Nations Statistics Division. The study uses the JMP database to analyze how the proportion of people who have access to adequate quality and quantity of drinking water in different regions of the world has changed between 2000 and 2022, thus identifying which regions have made the greatest improvements and which are lagging far behind. The adequate quality of drinking water means the usage of safely managed water supplies, which is defined by UNICEF and WHO as the water source is accessible on premises, available when needed and free from faecal and priority chemical contamination (WHO-UNICEF 2018).

This paper then – based on the database - provided by the Pacific Institute – examines the regional and temporal distribution of water-related conflicts, thereby answering the question of which countries and regions are most affected by this issue. The Pacific Institute (2024) provides an online, open-source database related to violence over water – including historical information as well – categorized by conflict time, region and type, and other variables. The events are categorized based on the use, impact, or effect that water had within the conflict, such as (1) *trigger*, where water is a trigger or root cause of conflict, (2) *weapon*, where water resources or water systems themselves are used as a tool or weapon in a violent conflict, and also (3) *casualty*, where water resources or water systems are intentional or incidental casualties or targets of violence. Regarding the regions, all entries in the database have been categorized by world region using the UN Geographic Regions that includes Continental Region, Sub-Regions, as well as Intermediary Regions.

4. RESULTS OF THE DATA ANALYSIS

4.1 *The results of MDG and SDG period regarding drinking water*

Access to safe water and basic sanitation is the most essential need for human health and well-being. Since 2000, WHO and UNICEF have been collecting data in 190 countries on the proportion of the population who use safely managed water supplies (Figure 2).



Source: Own compilation based on the JMP database

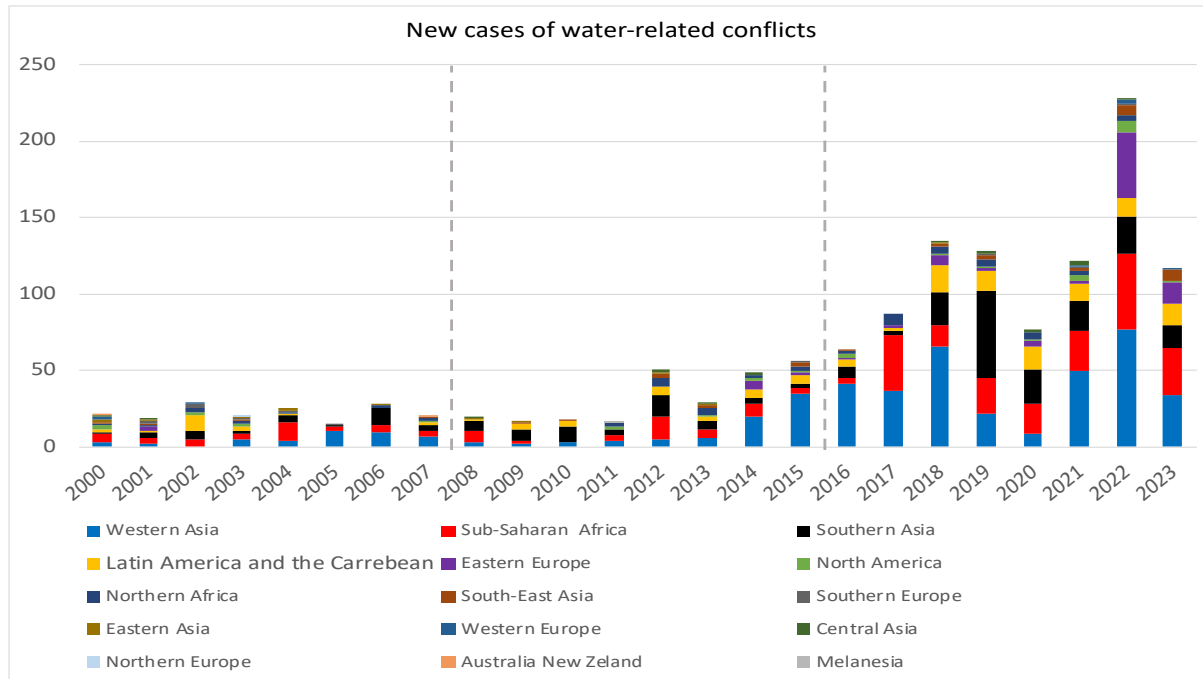
Figure 2. The changes in the proportion of population that have access to safely managed water supplies

Figure 2 shows how the proportion of the population who have access to clean and safe drinking water in their place of residence has changed regarding the given regions. Regional differences in this indicator are clearly visible. The data show that the differences between regions have not changed much over the last 22 years. While Europe and North America stand out among the regions with a consistent rate of over 90% of people having access to clean and safe drinking water, Sub-Saharan Africa has consistently lagged behind comparing to other regions even in our ages. In addition, the Central and South Asia region has also failed to overtake other regions – except Sub-Saharan Africa – in terms of proportion. As the literature has already shown, between 2000 and 2022, two development periods - MDG and SDG - and two water-focused development decades were launched. The data show that all regions have made progress in both development periods compared to 2000. During the MDG period – between 2000 and 2015 – the Central and South Asia region has made the greatest progress with the proportion of the population with access to safe drinking water increasing from 45% to 60%. In terms of growth over the same period, the Sub-Saharan region achieved the second highest growth rate (10% growth), followed by North Africa and West Asia (8% growth). Following the introduction of the SDGs in 2015, the Central and South Asia region also achieved the highest growth rate until 2022, with a 7% increase, moreover, East and South-East Asia and Sub-Saharan Africa also did a 5-5% increase.

Overall, the Central and South Asia region has seen the largest increase (23%) in access to safely managed drinking water between 2000 and 2022, covering 68% of the population of the region. Although the Sub-Saharan region has subsequently made the greatest improvement (14% increase) by 2022, only a third of the population have access to safely managed drinking water supplies, so there is a spectacular gap compared to other regions. In the East and South-East Asia, North Africa and West Asia regions more than 10% more people could have access to safely managed drinking water compared to 2000. Latin America and the Caribbean reached an increase of 4%, but interestingly this improvement was realized during the MDG period, while stagnation has been observed since the introduction of SDGs. Similarly, Europe and North America made an improvement during the MDG period, however, a 1% decrease has been observed since 2015.

4.2 Regional and temporal distribution of water-related conflicts

According to the database of the Pacific Institute (2024), the earliest water-related conflict occurred in 2500 BC, and the most recent in December 2023. Consequently, the database has collected a total of 1,634 cases, of which 15% (238 cases) occurred before the 21st century and 85% (1396 cases) of them since 2000. The data also show that before the 21st century most conflicts were those where water was used as a weapon, however, for the past 23 years water has been mainly considered as a trigger or root cause of conflicts.

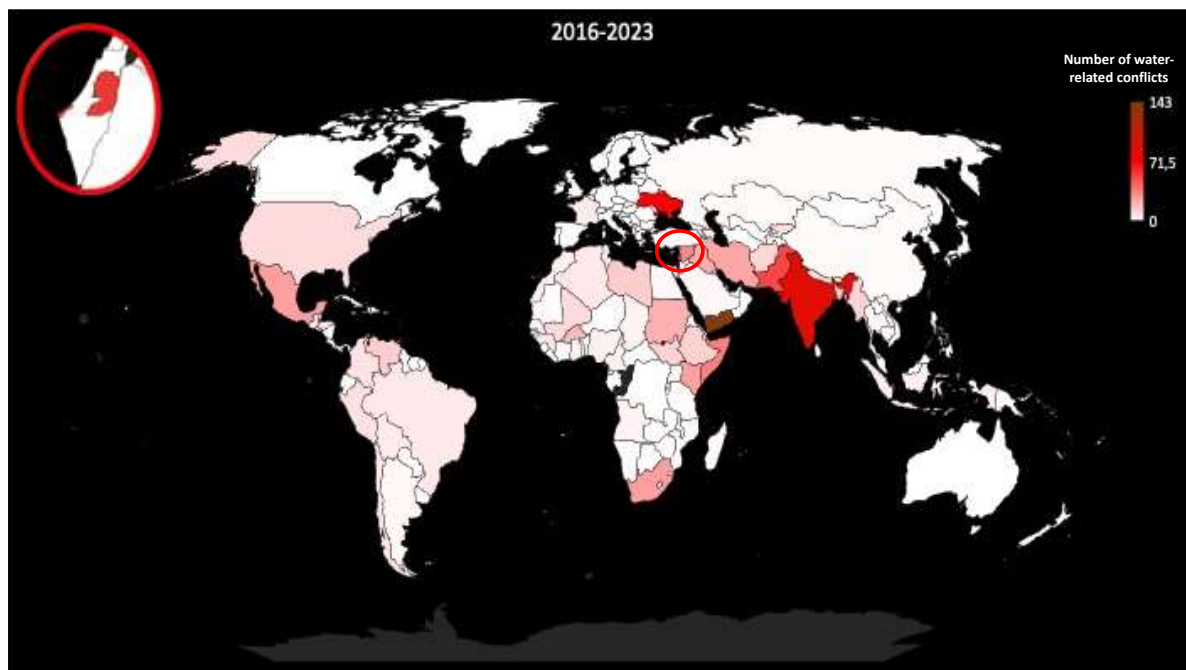


Source: Own compilation based on the Pacific Institute database

Figure 3. The total number of water-related conflicts between 2000 and 2023

Figure 3 shows the evolution of the total number of water-related conflicts between 2000 and 2023 by region of the world. Overall – as can be seen in the figure – an upward trend has been observed over the past 23 years. For the purpose of the analysis, I have divided the last 23 years into 3 equal parts of 8 years. The fewest water-related conflicts occurred in the period 2000-2007, when only 13% of the 1396 cases (181 cases) occurred. In terms of regions, the highest number of conflicts broke out in Western Asia (42 cases) and Sub-Saharan Africa (41 cases), and in South Asia (34 cases). Observing the countries in these regions, the highest number of conflicts occurred in Iraq (29 cases) in Western Asia, Pakistan (9 cases) in South Asia, and in Sudan, Ethiopia, and Kenya (7 cases) in Sub-Saharan Africa. During this period, water resources or water systems in the conflicts have been mostly intentional or incidental casualties or targets of violence.

Between 2008 and 2015, there was a 5% increase in the number of water-related conflicts compared to the previous period. A total of 257 cases were recorded during these years. In addition, the aforementioned regions also have been the most affected ones. A total of 78 conflicts occurred in Western Asia, 53 in South Asia, and 47 in Sub-Saharan Africa. Within regions, the focus has shifted to other countries compared to the 2000-2007 period. In Western Asia, Yemen (28 cases), in South Asia, Afghanistan (18 cases), and in Sub-Saharan Africa, Somalia (12 cases) recorded the highest number of cases. As in the previous period, water systems have been intentional or incidental casualties or targets of violence in most of the conflicts between 2008 and 2015.



Source: Own compilation based on the Pacific Institute database

Figure 4. The most affected countries by water-related conflicts between 2016 and 2023

Over the past 8 years there has been a dramatic increase in the number of incidents, since 69% of water conflicts (958 cases) – in the 21st century – occurred between 2016 and 2023. Figure 4 shows which regions and countries have been most affected in recent years. Figure 4 shows that the same regions were the most affected, just like in the periods 2000-2007 and 2008-2015. Over the last 8 years, 43% of water conflicts have broken out in Yemen (143 cases) and 29% in the State of Palestine (97 cases). The main period of conflict happened between 2016 and 2018 in Yemen and between 2021 and 2023 in the State of Palestine. In South Asia, the two most affected countries are India, where slightly more than half of the conflicts (88 cases), and Pakistan, where a third of the conflicts (52 cases) occurred. In the Sub-Saharan Africa region, Somalia remained the most affected country by water-related conflict (27 cases) for the period of 2016-2023. Despite the fact that South Africa was not affected by water-related conflicts that much before 2016, it has been the country with the highest number of conflicts in the region after Somalia recently. Compared to previous periods, water became a trigger or root cause of conflicts.

Despite not being among the most severely affected regions, it is worth mentioning that after Yemen, the State of Palestine and India, the most water-related conflicts broke out in Ukraine over the last 8 years. Here 72% of the incidents occurred in 2022 and 2023, mainly due to the war against Russia.

5. CONCLUSION

While there is still time until 2030 to achieve the SDG targets, the data has shown that there had been more progress in the regions under the MDGs, and therefore a higher proportion of people have access to safely managed water supplies. Based on the available data, there are still large disparities between regions, which should be addressed, especially in Sub-Saharan Africa. The literature review has shown that adequate quantity and quality of drinking water is crucial for almost all aspects of life, such as education, human development, poverty alleviation, and even peace.

In my opinion, the relationship between peace and water is very well represented by the trend in the distribution of water-related conflicts over time. The analysis of the data shows that 85% of the water-related conflicts occurred in the 21st century, which is extremely worrying. There is also a trend in the current century that most conflicts have broken out in the last few years and that, while until the 20th century water was used mainly as a weapon, in the 21st century water has become more the trigger of most conflicts. In terms of regions, I believe that in the future, particular attention

should be paid to Western Asia, Sub-Saharan Africa, and the countries of South Asia, so to those areas which are the most affected ones by water-related conflicts.

To my mind, the present study has succeeded in presenting the evolution and the current situation of access to drinking water and water-related conflicts over time. In my point of view, in order to address the investment gap in developing countries – as it is shown in the World Investment Report (2023) prepared by the UNCTAD – UN Member States should consider a commitment to invest a certain percentage of annual GDP in the water sector, as has been the case for NATO Member States to increase defence spending.

Finally, I believe that this study – by identifying the regions and countries that are most affected by water-related conflicts – provides a good starting point for further water-related research to be carried out specifically for these countries or regions, either in the context of water and peace or in the context of water-related development.

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191 Ecological Feminist Analysis of Sustainable Development in Rural Tourism Economy—A Pilot Study of Hot Spring Village

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Abstract

This paper explores sustainable development in rural tourism through an ecological feminist perspective, focusing on a pilot study in a hot spring village in Shanxi Province. Utilizing a mixed-methods approach, it combines qualitative interviews with female practitioners from five hot spring inns and on-site observations. Key findings highlight the need for standardized regulations to address management inconsistencies and product redundancy. The study emphasizes the importance of female economic empowerment in achieving gender equality and sustainable development goals, particularly SDG 1 (No Poverty) and SDG 5 (Gender Equality). It also underscores the interconnected oppression of women and nature, advocating for collaborative efforts among stakeholders to promote gender inclusivity and achieve SDG 17 (Partnerships for the Goals). The insights provided serve as a foundation for further research and policy considerations in rural sustainable tourism.

Keywords

Rural Tourism, Ecological Feminism, Gender Equality, Sustainable Development Goals.

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1. INTRODUCTION

China's rich cultural resources are primarily concentrated in urban areas, and its valuable natural tourism resources have been extensively developed. With the government's focus on marketization, industrialization, and urbanization in the 21st century, urban areas face issues such as environmental degradation. China's economic development has transitioned from a purely politicized rural structure to a triadic framework centered on political power, economic strength, and local culture (Sun, 2004). Since 2005, government policy documents have specifically mentioned "rural tourism" policies. Rural tourism leverages the natural and cultural landscapes of rural communities, becoming an important pathway in the government's discourse to promote sustainable rural livelihoods. However, rural tourism also faces challenges such as inconsistent management, over development, and product homogenization.

Ecological feminism combines contemporary feminist and environmental movements, rationally exploring the relationship between anthropocentrism's domination of nature and patriarchal domination of women. It theorizes the connection between the oppression of women and the subjugation of nature. By focusing on the relationship between the domination of women and nature, ecological feminism examines how women are defined as women, rather than how they differ from men (Zhao, 2003).

Zhen (2013) posits that the Earth's environmental carrying capacity is a material issue that humanity must address. On a non-material level, changing traditional viewpoints also aids in environmental protection. Ecological feminism addresses four types of oppression: gender, race, class, and nature (Zhen, 2013). It integrates the women's liberation movement with ecological conservation, arguing that human destiny is interconnected with that of nature. The ultimate goal is to eliminate all forms of oppression and establish a harmonious coexistence between humans and nature. As an advocacy against the devaluation of women and nature under patriarchal worldviews, ecological feminism calls for new relationships between people and between humans and nature. In East Asian societies, androcentrism is particularly pronounced, marginalizing and oppressing women and feminine qualities, ensuring the dominance of masculine values in a "patriarchal" culture (Greenhalgh, 1994). This paper focuses on a pilot study in a hot spring village in Shanxi Province, examining sustainable development in rural tourism from an ecological feminist perspective. The study employs a mixed-methods approach, combining qualitative interviews and on-site observations to gather comprehensive data. In-depth, semi-structured interviews were conducted with female practitioners from five hot spring inns to explore their experiences, challenges, opportunities, and perspectives within the rural tourism sector. These insights were supplemented by on-site observations, providing contextual understanding of community dynamics and the operational environment. The study underscores the necessity of standardized regulations to address management inconsistencies and product redundancy. It highlights the crucial role of female economic empowerment in achieving gender equality and promoting sustainable development goals, particularly SDG 1 (No Poverty) and SDG 5 (Gender Equality). Through an ecological feminist analysis, the research reveals the interconnected oppression of women and nature, emphasizing the need for an integrated approach to sustainable development in rural areas. Additionally, the study advocates for collaborative efforts among government, private sectors, and grassroots communities to promote gender inclusivity and achieve SDG 17 (Partnerships for the Goals). This research provides a foundation for further study and policy development in rural sustainable tourism, considering the challenges faced by female practitioners and the importance of fostering gender inclusivity and achieving sustainable development in rural areas.

2. OVERVIEW OF RESEARCH AREA⁸⁵

Qicun Hot Spring Town (Qicun) is situated in the northwest of Xinfu District, Xinzhou City, Shanxi Province. Positioned between two mountain ranges, the town features a complex terrain and limited transportation infrastructure. Despite these challenges, Qicun leverages its natural hot spring resources to serve as the political, economic, and cultural center of northwest Xinfu District, with a population of 35,000. In response to national rural tourism policies, Qicun has pursued holistic economic and social development, with a particular emphasis on ecological health and wellness. This study examines the geographical environment and industrial profile of Qicun.

Spanning 410 square kilometers, Qicun Town is located between two mountains and two lakes and is characterized by a strong Buddhist cultural influence. Despite its advantageous geographical position, 13 kilometers northwest of Xinfu District, transportation primarily depends on private vehicles. The town is accessible mainly via winding mountain roads, which are often congested with heavy trucks and are narrow, limiting ease of access. Nonetheless, Qicun's high-quality hot spring resources attract over 500,000 tourists annually.

Qicun's economy is relatively diversified, with significant contributions from agriculture, livestock, and tourism. The Qicun Hot Springs, recognized as one of the world's four major hot springs, encompass a confirmed exploitable geothermal field area of 4 square kilometers, with water temperatures averaging between 63-83 degrees Celsius. The town hosts nearly 20 medium and large-scale hot spring wellness enterprises. Furthermore, the local government actively promotes the cultivation of high-value and specialty fruits by residents, fostering the creation of distinctive

⁸⁵ All the data in this section and overview description were excerpted from the People's Government of Xinzhou City. Available at: http://xzxfq.gov.cn/zjxfq/xzgz/201712/t20171220_122868.html (Viewed on May, 2023)

local brands. Policy initiatives aimed at developing rural tourism in Qicun focus particularly on the commercialization of the hot spring wellness industry. Programs such as "tourism poverty alleviation" and "agriculture-tourism integration," coupled with proactive community engagement, have shaped its tourism landscape into a model characterized by "hot springs in winter and fruit picking in summer."

3 METHODOLOGY

3.1 Theoretical Basis

Classical feminism posits that gender roles are not inherent attributes of sex but are constructed based on societal perceptions of gender differences. Tong (2007) suggests that feminist thought defies easy categorization, particularly regarding the classification of its founders. Beauvoir asserts a direct correlation between oppression and nature, contending that women globally constitute a class subjected to enslavement and discrimination (Weiss, 2001). In English academic research, feminist discourse has expanded to link women to nature and ecology. The connection between women and nature persists across different cultures, languages, and histories. The physiological attributes of women, such as childbirth and breastfeeding, bear similarities to the earth's cyclic production supporting life (Sun, 2004). Eco-feminists argue that nature and women constitute the foundation of human survival and development. Consequently, the concepts underlying the domination and oppression of nature and women in patriarchal societies are interlinked (Wei, 2019). In Western culture, the binary values centered around patriarchy establish oppositions between humans and nature, as well as between men and women, forming the foundational ideas of domination and oppression over nature and women. The logic of colonization engenders complementary, even complicit subordinate identities through the process of colonization. Reclaiming and affirming these subordinate identities is a critical issue facing the colonized, especially in racial, class, and national colonial contexts. The affirmation of women and female identity is part of this issue (Plumwood, 2003).

Hence, attempts to sever the association between women and nature within the confines of gender dualism inevitably propel women into a rational society dominated by patriarchy, repositioning nature as the object of human centrism. Socialist eco-feminism posits that every individual embodies both "natural" and "cultural" aspects (Zhao, 2004). In contrast to the sacred religious beliefs advocated by spiritual ecologists in connecting women with nature, socialist eco-feminism fundamentally opposes the destructive capitalist patriarchal ideologies towards the environment, advocating for a simpler lifestyle and reduced consumption of nature to achieve environmental protection goals. However, this stance conflicts with the concept of sustainable development in rural tourism.

The philosophical stance and research methodology adopted for this paper is interpretivism, which contextualizes social events within the specific value system of a society or culture. As Walsham (2006) aptly puts it, "What we call our data are really our own constructions of other people's constructions of what they and their compatriots are up to" (p. 320). Interpretive studies prioritize delving into the substance of the research topic, dedicating minimal space to discussing research behaviors and methods. Field data collection, a common practice in interpretive research, was also employed in this paper. Accordingly, a semi-structured and in-depth interview format was constructed to explore people's culture and behavior through ethnographic discussions and interpretive analysis.

Self-disclosure, as defined by Jourard and Richman (1963), entails openly sharing personal information, including private thoughts and feelings, with others. This study delves into the parallel oppression between women's employment environments and the natural environment in rural settings, while also examining women's awareness of labor rights and environmental preservation. The primary research methodology employed is quantitative research.

3.2 Data Collection

Regarding data collection, interviews for this pilot study were conducted between January 2022 and August 2023. Due to political constraints, formal approval for interviews was not obtained, resulting in limited participation. Therefore, most information was gathered through conversations with staff during visits to establishments as a customer. Despite the lack of familiarity with feminism or ecological feminism among the individuals interviewed, they expressed awareness of the importance of environmental protection, albeit with shortcomings in individual-level practices. After a year and a half, recorded interviews were finally conducted with five relatively familiar female workers, ensuring confidentiality while analyzing the daily operations and community atmosphere of the hot spring centers in Qicun. The interviews lasted approximately 60 minutes each, with the researcher assuming the role of a customer during observation sessions. With permission, all information gathered was recorded in handwritten notes.

Table1. Basic information of the interviewees, collated by author

Code Name	Age Range	Education	Occupation	Salary (CNY / Vague)	Working Duration
Yuna	20 - 25	Bachelor	Daily Reception, Cashier and Accounting works	4,500	10:00 - 18:30
Linshu	45 - 50	Senior School	High Masseuse, and shower gel Salesperson	3,000	18:00 - 4:00 (+ 1 day)
Guie	40 - 45	Junior School	High Masseuse	2,000	Day and night shifts every three days, each time 8 hrs.
Chenyu	35 - 40	Junior School	High Lobby Manager, Reception and Cashier	Unknown	Flexible
Caifeng	55 - 60	Junior School	High Cleaner	2,000	7:30 - 22:30

(All interviewees are female. The names of interviewees have been redacted here to protect their privacy.)

3.3 Limitation

All interviewees were drawn from similar geographical areas, resulting in a high degree of demographic similarity among them. This could potentially affect the reliability of the interviews. Additionally, the focus primarily revolves around rural women working in this village. However, there was a lack of targeted examination regarding the human geographical characteristics of Qicun, including aspects such as its economy, social structure, and community characteristics.

Moreover, the discourse exclusively focuses on female workers, overlooking the perspectives of their male counterparts, thereby presenting a limitation. In subsequent research endeavors, I intend to rectify and refine this aspect of the study. This improvement may entail conducting a more exhaustive investigation into specific regional dimensions, including the economy, social structure, hierarchy, agency, and community characteristics. Augmenting these efforts with field surveys has the potential to substantially enrich and elevate the paper's content. Such a comprehensive approach promises to foster a more profound comprehension of the living circumstances of rural women and their roles within both their professional endeavors and broader societal contexts.

4 ECO-FEMINISM: WOMEN, NATURE, AND LABOUR

Upon first learning about Qicun, renowned for its hot spring resources, I envisioned a picturesque village adorned with pristine streets, verdant landscapes, and nestled amidst mountains and water. However, the reality differs from my initial perceptions. Despite the cleanliness of the roads and the azure skies above, the town exudes a somewhat subdued ambiance. Despite concerted greening efforts, the town, situated on loess soil, lacks the lushness one might expect. This can be attributed to years of intensive farming practices, with human activity exhaustively exploiting the land's resources. This paper seeks to explore the potential connections between women and their societal roles within and beyond nature, with a specific focus on their awareness of environmental protection.

4.1 Women's family role in North of China: Constructed Mother Roles and Neglected Self-Awareness

The social construction of motherhood significantly influences population reproduction, shifting societal perceptions away from the significance of becoming a father (Cooper et al., 2022). Women, as subjects of maternal production, are subject to regulation by various laws, institutions, and ideologies across different societal stages.

In recent years, the traditional Chinese conception of women's roles within the family and society has undergone significant transformations. Historically, women's roles were confined primarily to the domestic sphere, with limited opportunities for involvement in the broader economy. However, contemporary China has witnessed considerable progress in women's empowerment, marked by increased access to education and employment opportunities. Despite these advancements, societal expectations and cultural norms continue to shape women's choices and experiences, particularly concerning family and career decisions.

During interviews, Yuna expressed regret when discussing her future life plans, emphasizing the expectation of marriage, child-rearing, and familial care. She explained that deviating from these expectations could lead to social stigmatization. Traditionally, the concept of "self" in China leans more towards collective identity than individualism (Yang, 2014). Women's roles in contemporary China are heavily influenced by traditional values and expectations surrounding motherhood. Despite expanded opportunities outside the home, many women still prioritize their familial duties over personal and professional ambitions.

Discussions with rural Chinese women revealed their complex relationships with family members and their struggles to balance family and career responsibilities. Linshu, for example, described her motivations for working late hours as supporting her father and son financially. Guie expressed regret over her past failures to fulfill her roles as a mother and wife. Chenyu, who manages a spring inn owned by her husband, balances her flexible working hours with her responsibilities as a mother. Caifeng emphasized the importance of prioritizing family over work.

"Most women in village are like to put children and husbands always come first. ... My mum educated me that it is more important to find a husband. Only marriage will provide me a stable life rather than having a job." Yuna

"Every day after finishing my work, I back home and to do the housework before sleep. My husband sleep more. ... For my son's better life in Shanghai, we (her and her husband) both work during night (which salary is higher)." Linshu

"Women, making more money is not good as having a stable family." Guie

"Definitely tight on the kids first, and when it comes to any school event and the inn will be closed." Chenyu

"Young girls aren't getting married these days... they want to make money first... Even if they make a lot of money, what's the point? They can't get married. It's a shame." Caifeng

Figure 1. Opinions around Balance of Family and Women's Career

It appears that when delineating roles within and beyond the familial sphere, the rural woman's role is expected to primarily prioritize her duties as a wife and mother. Regardless of marital status or marital history, there exists an enduring tradition that strongly associates females with maternal responsibilities. However, this perceived "consistency" runs counter to their individual consciousness, thereby reinforcing entrenched gender expectations within traditional Chinese cultural norms. Essentially, while they acknowledge the necessity of securing employment and earning income, they tend to prioritize professional pursuits over familial obligations. Additionally, a woman's familial responsibility transcends mere child-rearing; it encompasses a profound commitment to the family unit.

Moreover, in the discourse surrounding the equilibrium between career and family, women do not lack the capacity to manage both domains; rather, they are often hindered by social constraints that impede their full potential. Through their engagement in motherhood, rural women have inadvertently relegated themselves to the periphery of the public sphere. Despite advocating for their rights and safeguarding their families' interests, they remain subject to the prevailing gender dynamics within the family structure. The status of women within the distinctive social and

institutional framework of rural locales underscores the inherent gender disparities and the internal conflicts experienced by individual women within the familial context.

For instance, Yuna, possessing superior educational credentials compared to the lobby manager, was denied a managerial position due to purportedly masculine requirements inherent to the role. Caifeng's husband, despite being a freelancer with ample free time, necessitates her to undertake household chores, including cleaning after tending to the swimming pools. A comprehensive examination of rural women's familial roles reveals a pronounced imposition of ethical constraints stemming from entrenched traditional norms within rural society.

4.2 Nature Resources under Eco-tourism: Feminisation under Patriarchal Oppression

In the realm of theoretical research on rural tourism, Chinese scholars have predominantly focused on macro studies aimed at identifying general laws applicable to Chinese culture. Despite the existence of scientific management programs, such as the Shanxi Provincial Government's substantial investment of 750 million RMB in 2021 to establish the Qitang Hot Spring Health Project⁸⁶, which created the largest health and wellness complex in North China, scholars have not adequately recognized the essence of establishing tourism norms and regulations, let alone addressing issues of gender equality. Rural tourism, a form of eco-tourism, utilizes rural communities as its activity sites, leveraging rural natural ecological environments, settlement landscapes, economic landscapes, and cultural landscapes as tourism resources. However, despite the rich tourism resources inherent in rural tourism, rapid development has brought about numerous hidden problems, such as the lack of unified management of rural tourism markets, product development redundancy, and subpar farm tour construction and development.

Upon entering Qicun, one encounters no fewer than 15 large and small hot spring centers within a ten-minute drive, operated by a varied mix of official and private entities. The excessive exploitation of natural resources is evident in the proliferation of hot spring facilities across the area. A geothermal field spanning 4 square kilometers supplies water to numerous hot spring establishments, which often feature swimming pools, hot spring pools, shower areas, and more, all relying on this natural hot water. Despite claims of "daily water change" in some establishments, suggesting a commitment to environmental sustainability, my observations suggest that this may be more of a marketing tactic than a genuine practice. While some establishments indeed empty their pools daily or continuously replenish larger pools with fresh water, it remains unclear whether this can be deemed wasteful, given that tourists are not directly charged for this environmental impact. Despite my observations, which suggest that this is mostly a marketing gimmick by businesses, there are indeed a few scattered establishments that empty their small pools daily or keep their larger pools continuously filled with fresh water. I'm unsure if this can be considered wasteful, as tourists are not directly charged for this environmental impact. After all, "With so much water being produced every day, whether you use it or not, it's still wasted. If you use it, that's reasonable use of the environment", as one manager at a state-owned enterprise conference center told me.

Nevertheless, the practice of exploiting natural springs for economic gain undoubtedly constitutes a form of oppression against nature. It reflects a common tendency among humans to assert dominance over non-human nature, a phenomenon rooted in patriarchal ideologies. Patriarchy, characterized by the dominance of males over females and nature, justifies the natural subjugation of non-humans by humans based on perceived hierarchies of characteristics. The basic logic runs as: Firstly, humans have the ability and consciousness to change their own societal life, whereas plants and rocks do not. Secondly, whatever has the capability and consciousness to alter its living environment is considered morally justified and superior to something that lacks such abilities. Therefore, humans are morally superior to plants and rocks, which is "reasonable". This worldview extends to East Asian societies, where the constructed qualities of women, along with the selflessness attributed to nature, lead to unsustainable social development. The oppression of "feminized nature"

⁸⁶ All the data in this section and overview description were excerpted from the People's Government of Xinzhou City. Available at: http://xxzf.gov.cn/zjxfq/xzgk/201712/t20171220_122868.html (Viewed on May, 2023.)

and "naturalized women" mutually reinforce each other, perpetuating a cycle of exploitation and degradation.

In 2021, the average annual wage for urban non-private sector employees in Xinzhou City increased by 4,975 yuan compared to the previous year, representing a nominal growth of 7.4%⁸⁷. However, individuals like Yuna, Linshu, and Chenyu do not receive compensation commensurate with their contributions. Despite holding multiple low-paying positions, such circumstances are considered normal for them. For instance, Guie, a masseuse, faces physical strain from working with hot streams every day, even during nighttime shifts, yet she risks salary deductions for minor errors in the service process. Linshu attributes the low income to insufficient education, compounded by unclear job descriptions and uncomfortable working environments.

Despite their lack of familiarity with feminism or ecological feminism, many individuals are cognizant of the importance of environmental protection and the need to build an ecological civilization, as emphasized by the government in nationwide education initiatives. However, environmental conservation efforts at the individual level often fall short, as evidenced by the reluctance of many bath attendants to conserve water, citing the lack of personal financial responsibility for water usage.

"The front desk work has nothing to do with the environment, does it? ... Paperless office? Look at the piles of scrap paper at our printers (laughs)." Yuna

"We are environmental friendly, ... we change the water every day. It's clean. And you see, we don't even turn on the lights in that house when no one's around." Linshu

"This pool is brushed once a day and cleaned with a disinfectant solution. I don't know if it's environmentally friendly or not, but it's still important to be clean, right?" Caifeng

Figure 2. Attitudes to Environmentalism

Despite the government's advocacy for "sustainable development" and "ecological civilization" in official documents, the reality revealed by these five workers indicates a lack of awareness among operators regarding the unfairness of their practices towards nature. In Qicun Town, the prevailing industrial model is characterized by numerous family-run eco-tourism operations that combine activities like "orchard picking" with "hot spring recuperation." While some larger operators employ marketing tactics to attract external tourists, there appears to be limited price competition among them, as they consistently attract customers due to the naturally superior water quality of the hot springs. The grandiose large-scale hot spring facilities often function as conference centers under state-owned enterprises, showing less concern about profit and loss due to the backing provided by resources and funding.

Chenyu perceives other competitors in the same category as exploiters of natural resources. She contends that local thermal resources should exclusively benefit the local area, but currently, the focus is on capital markets. Consequently, there has been no improvement in the living environment. In this context, nature remains relegated to a position of devotion, akin to a stereotypical "mother".

5. CONCLUSION: BIASED BOOMING OF ECO-TOURISM AND IGNORANCE OF WOMEN AND NATURE

Barry Commoner's First Law of Ecology, asserting the interconnectedness of all things, underscores the central tenet of eco-feminism: the importance of organizing without hierarchy and prioritizing the restoration and preservation of the environment. In practical terms, this philosophy guides us towards the realization of a sustainable society, exemplified by the eco-tourism industry's development in Qicun. Ideally, such sustainable development should embody principles of gender equality, positioning humans and nature on equal footing.

Ecocentrism and deep ecology advocate for viewing the Earth as a living system and challenging male-centric perspectives, respectively. While modernization and economic progress have empowered women in various spheres (McDonald), the situation in Qicun's wellness and spa

⁸⁷ All the data in this section and overview description were excerpted from the People's Government of Xinzhou City. Available at: https://www.sxxz.gov.cn/ggsj/sjfx/202204/t20220413_3750362.shtml (Viewed on May, 2023)

industry reveals persisting gender disparities. Despite female economic independence and political empowerment, women often occupy subordinate positions compared to men, reflecting broader societal structures entrenched in patriarchal norms. This imbalance extends to the exploitation of natural resources, where women's contributions to patriarchal systems mirror their exploitation of nature.

Recent developments, including temporary closures of large facilities due to the pandemic and corruption issues, have reshaped the landscape of Qicun and neighboring Duncun. Chenyu once mentioned, "In Duncun and Qicun, people are wealthy now. It's different from our village; they have good benefits." While these changes have brought economic benefits, they have also led to environmental degradation and altered community dynamics. The proliferation of homogeneous hot spring centers raises questions about sustainable development and underscores the need for a reevaluation of what constitutes true sustainability.

The government's investment in sustainable development, exemplified by the construction of a new bus station, reflects a commitment to economic growth in Qicun. However, addressing poverty, particularly women's poverty, remains a pressing challenge. Achieving true equality between humans and nature requires a comprehensive reassessment of sustainable and green practices, ensuring the well-being of both communities and ecosystems.

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217 Hierarchical Cluster-Analysis of the European Regions

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Abstract

In this study we analyse the structure of economic activities at regional level in Europe based on gross value added (GVA). After determining the economic specialization of each geographic area, using hierarchic clustering units involved in similar economic activity or affined economic structure are identified and presented on map.

The work is based on the publicly accessible data in the EUROSTAT database. The method used was agglomerative clustering with chi-square distance calculation and complete linkage algorithm, that allowed the identification of the similarities and differences of the regions. In order to highlight better the most typical economic activities in a region, the activities have lesser share in GVA-production were set to zero before clustering.

The NUTS 3 regions of the European Union and certain additional countries (such as West-Balkan ones) were settled into different clusters along the used criteria. Based on the results it is observable, that certain regions can be characterised with similar economic features, and the clusters are well-distinguishable according to the key factors, like strength of industry or development of service sector.

Examining the clusters in detail we stated that regions classified into the same cluster and having similar characteristics are located geographically to each other relatively close. These regions even can constitute over-border units, could be representative on a given part of the continent, while the sporadic or island-like units are rarely appearing (practically they can be connected to one of the clusters). The detectable differences could be also interesting, whereas it allows identifying the regions, or blocks of regions having specialized role in division of the economic performance – even when they are at different points of Europe. As a conclusion it can be stated that the cluster-based regions in Europe can be separated well using their economic characteristics, as well as that the agglomerative clustering is an effective tool in such analysis.

Keywords

Economic activity type, Europe, GVA, hierarchic clustering, NUTS 3 regions.

1. INTRODUCTION

In Europe, where historically, traditionally and economically the regions are rather different, it is in particular important to study the regions and their interactions or relationships. The regional policy in Europe aims to provide measures to increase economic growth, job-possibilities, sustainable development and improve quality of life through investments (Regional policy (2024); European Parliament Briefing (2019)). These measures can target either Member States and third countries located in the same geographical area (macro-regional approach) or a limited smaller part of the continent (meso- or micro-level approach). The Interreg – European territorial cooperation – provides a framework for economic, social, and territorial actions at cross-border, transnational and interregional forms (European Parliament Briefing (2019)).

The results of any measures can be monitored through information collected on regional levels. These collected data could cover any type of economic, social, and environment-related information,

and generally the implemented indicators use several inputs. To derive appropriate conclusions simple use of these indicators are not enough, they should be also analysed with all possible methods – among the others using clustering.

The aim of this study is twofold. Firstly, to provide an overview on the typical economic activity or activities can be linked to each geographical unit on the European continent using hierarchical clustering. Secondly, to map activity-patterns on larger scale: whether same activity-type could be assigned to neighbouring regions or larger cross-border areas, respectively where are those regions or larger geographical areas which can be described by same type of economic involvements.

2. RELATED RESEARCH

Porter (1998) defines clusters as “geographically proximate groups of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities”. Ketels already stated in 2004 that “clusters have become focal point of many new policy initiatives”; and wrote that “Europe is home to a large number of clusters”. For that time plenty of studies were published on regional clustering. Stierle von Schütz and Stierle (2013) provides an overview “of studies analysing regional specialization and sectoral concentration” published during the period 2000-2010.

In the studies, the general focus on regions and subregions is put on economic development or studying a question of special interest (for example European Cluster Panorama (2001).) A common approach is that the analyses and studies use several different and/or complex indicators as input for clustering. The Gross Domestic Product (GDP), particularly its specific variant, the GDP/head is usually a key information. Another generally use variable is the employment data. Time to time Gross Value Added (GVA), investment data (GFCF, FDI), trade information or other are used also. Indeed, for better understanding and correctly interpreting development one single data or dataset is usually not eligible, since all significant aspect should be included. However, if we would like to take a simple snapshot on the European regions that presents a typical situation, without including any changes in time, one piece of information could be sufficient.

We could not find any papers dealing with the typical, most characteristic economic activity or activities that could be connected to geographical areas, therefore in this study we focus on this variable, and used only one single information for the analysis. Value added is the basic concept for determining the classification of a (geographical) unit according to economic activities, thus gross value added (GVA) was chosen. GVA is defined as the difference between output and intermediate consumption, therefore tightly related to the actual activities (“production”) carried out on spot.

3. “THE RESEARCH” METHOD

In this study we use gross value added (GVA) figures as far as they are more tightly and directly related to the production itself than gross domestic product (GDP). [The main difference between GVA and GDP figures is that the balance of taxes and subsidies not directly related to the concrete activity is not taken into account determining the GVA, while included in GDP.] Furthermore, two other decisions were made:

- focusing on the possible most detailed geographical breakdown (NUTS 3 level)
- examining available information according to different economic activities (NACE sections).

3.1 Data Input

The relevant data – GVA at basic prices by NUTS 3 territorial units⁸⁸ – were downloaded from the EUROSTAT database. In this dataset figures are expressed in Million euros for 34 countries – Member States of the European Union and some additional countries on the continent – covering A10 economic breakdown are available.

⁸⁸ nama_10r_3gva_custom_8703364; extracted on 27/11/2023

3.2 Data Preparation

For our research the latest, most complete annual dataset, year 2020⁸⁹, was chosen. Unfortunately, for certain countries (Bosnia-Herzegovina, Kosovo, Switzerland, and United Kingdom) data were not presented.

Examining the dataset, Norway was also left out from further processing due to sporadically not available values, as well as two NUTS2 regions in Serbia (Beogradski region and Region Vojvodine) due to missing breakdown at the targeted NUTS3 level. The so-called “extra-regio” units were also left out, whereas they cannot be connected to any concrete geographic locations.

It also became obvious that only a 6-group economic activity approach could be used, whereas for some countries – Austria, Germany, Poland and Spain – data were not available for each of the A10 categories. The used economic activity categories are listed in *Table 1*.

Table 1. Grouping of the economic sections

NACE section codes	Content (covered sections)	Simplified designation used in the study
A	Agriculture, forestry and fishing	Agriculture
B – E	Mining and quarrying (B) – Manufacturing (C) – Electricity, gas, steam and air-conditioning supply (D) – Water supply, sewerage, waste management and remediation (E)	Industry
F	Construction	Construction
G – J	Wholesale and retail trade; repair of motor vehicles and motorcycles (G) – Transportation and storage (H) – Accommodation and food service activities (I) – Information and communication (J)	Trade, transportation, tourism, IT
K – N	Financial and insurance activities (K) – Real estate activities (L) – Professional, scientific and technical activities (M) – Administrative and support service activities (N)	Finance, real estates, other businesses
O – U	Public administration and defence; compulsory social security (O) – Education (P) – Human health and social work activities (Q) – Arts, entertainment and recreation (R) – Other service activities (S) – Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use (T) – Activities of extraterritorial organisations and bodies (U)	Others

Using the GVA data in Million euros, the distributions among the 6 economic activity categories in each geographic unit, as well as for the total of them were calculated. These distribution ratios provided the basis for the analysis.

3.3 Data Processing

Following the data preparation, the datafile contains 6 values (distribution ratios) for 1,285 territorial units, plus for the total (all units). In favour of increasing the interpretability and highlighting the economic activity/activities characteristic for each NUTS 3-unit, distribution ratios not exceeding the relevant total (all examined geographical units/population) value by 5% (a kind of ‘psychical threshold’) at least were replaced by 0. Using this approach, the significant differences about the population (total) value were privileged.

As next step, IBM SPSS was used to cluster hierarchically the NUTS 3 geographical units based on these transformed data. The hierarchical clustering into 10 clusters was done by using WARD’s linkage with Euclidean metric. The number of desired clusters was chosen after preliminary calculations and attempts.

4. RESULTS AND FINDINGS

⁸⁹ At the time of the data retrieval datasets for later years were rather incomplete.

The chosen method and the set number of clusters resulted a dendrogram visible in *Figure 1*. Majority of the clusters are rather distinct, but 2-2 of them look similar (5 and 7, respectively 4 and 6) according to their economic activity pattern.

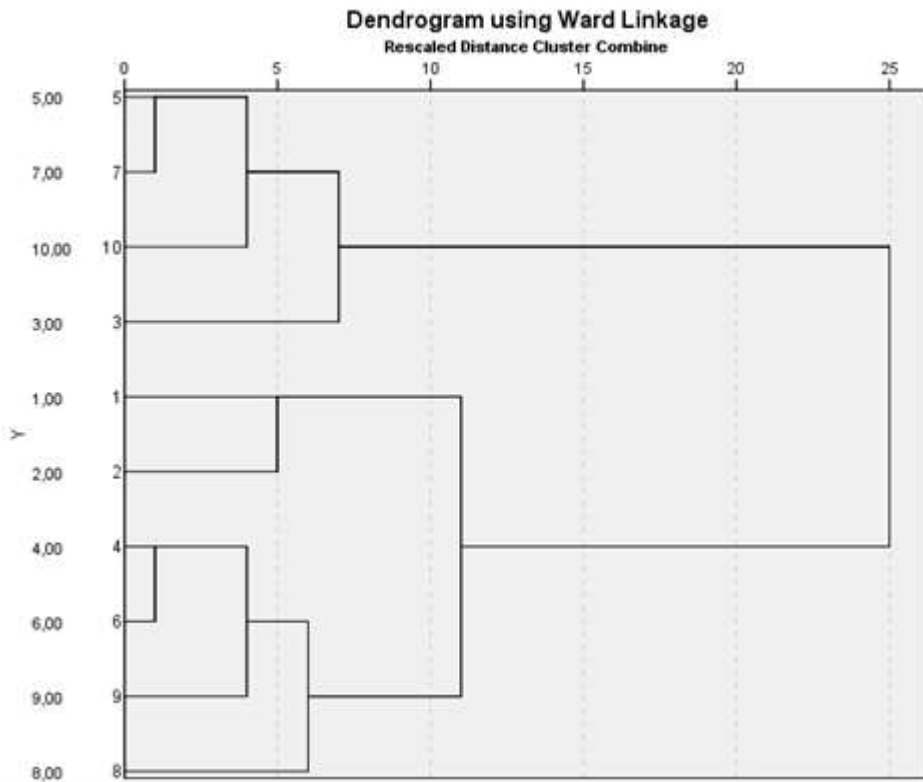


Figure 1. Cluster-dendrogram

Table 2 presents the distribution of the GVA by the used economic activity units in each cluster and for the total, respectively the allocation of the 1285 geographic units among the clusters. This allocation can be considered favourable as far as no bigger concentration of the geographical units in any cluster can be observed.

Table 2. Brief overview of the clusters

Cluster sq. no.	Number of units	Economic activity categories (GVA distribution, %)					
		A	B - E	F	G - J	K - N	O - U
1	64	0.00259	0.11082	0.03908	0.27203	0.37308	0.20240
2	108	0.01654	0.17100	0.05630	0.35151	0.23950	0.16515
3	128	0.01775	0.46214	0.04809	0.16098	0.16971	0.14132
4	216	0.01990	0.18667	0.06351	0.23316	0.26186	0.23490
5	75	0.02661	0.26109	0.10873	0.17248	0.19532	0.23577
6	208	0.02154	0.15280	0.05646	0.20281	0.25660	0.30979
7	202	0.01956	0.29581	0.06012	0.19606	0.23132	0.19714
8	48	0.01106	0.10726	0.04538	0.18500	0.24396	0.40734
9	168	0.12929	0.15628	0.05897	0.19791	0.19221	0.26534
10	68	0.10155	0.33509	0.05668	0.19583	0.12971	0.18113
Total	1285	0.02113	0.19933	0.05492	0.23381	0.26664	0.22418

In order to characterise the clusters using the GVA distribution among the defined economic activity categories, two visualisation outputs were prepared:

- a cluster-level bar chart based on *Table 2* values, and
- a decile-based presentation.

Both charts are including the same distribution for all units (total) for comparison.

The decile-based distribution charts allow us to have an insight the clusters. When the decile-points of a given activity category are concentrated within a narrower band, we can consider the activity category more characteristics for all units in the cluster (means more or less the given activity has

the same GVA-contribution to the total in each unit), while when these decile-points are spread in a wider range, the units differs from each other according to the importance of the examined activity. (The bold line indicates the share of the activities for the total.)

4.1 Description of the clusters by typical economic activities involved in

In this chapter a brief description on economic activity carried out in each cluster – certain typology – is given using the two charts prepared on the distribution of GVA according to the activity groups. The formed clusters are rarely homogenous indicating the presence of only one activity group but could be described as combination of 2-3 different ones.

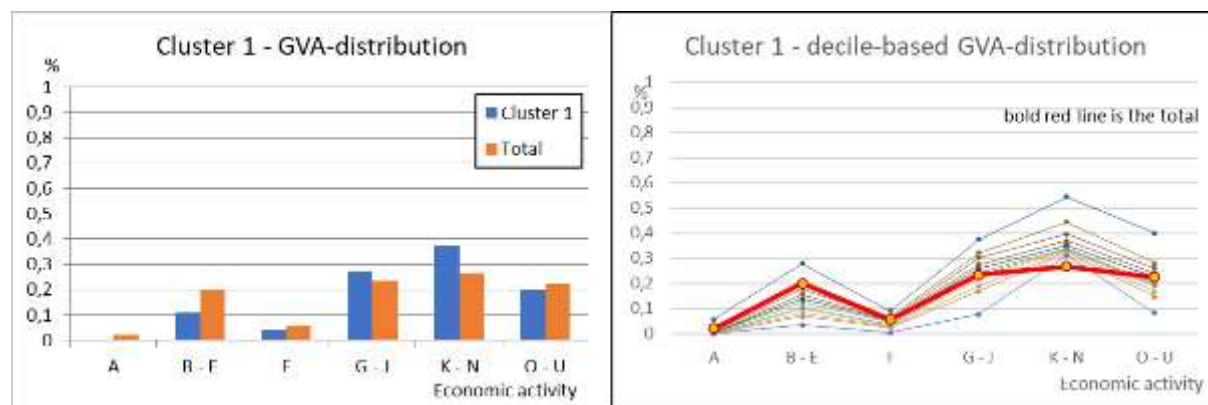


Figure 2. Economic activity pattern of cluster 1

Geographic units allocated to cluster 1 can be characterised with stronger activity in finance, real estates and other businesses (37% of the GVA-contribution), but the trade, transportation, tourism and IT sector is also significant (27%). Besides the other activities are typical (20%) in these regions. Agriculture is almost not existing; industry and construction have rather limited contribution to the gross value added. Examining the decile-based GVA-distribution, however a varied picture is detectable: the GVA-ratios of the regions in the cluster are within a wider (20 to 30%) range regarding the typical activities. In case of the finance, real estate and other businesses even the lowest decile contribution is higher than the total population one, therefore this activity group seems really specific for these regions.

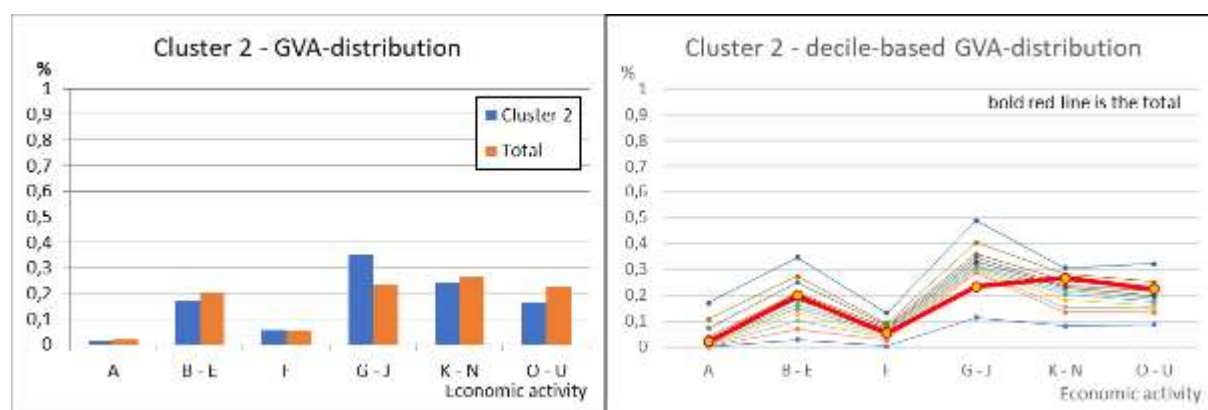


Figure 3. Economic activity pattern of cluster 2

According to the dendrogram (Figure 1) cluster 2 is the “closest” to cluster 1., representing the same 3 activity groups as main ones. However, in these regions the trade, transport, tourism and IT sectors are dominant in GVA-contribution (35%), and the finance, real estate and other businesses are a bit less important (24%). These observations can be also derived from the decile-distribution chart: generally, the points for category G-J are above the ratio calculated as total, while for K-N they are

below. It is characteristics here as well, that the GVA-ratios of the separate regions varies in a wider range (10 to 40%).

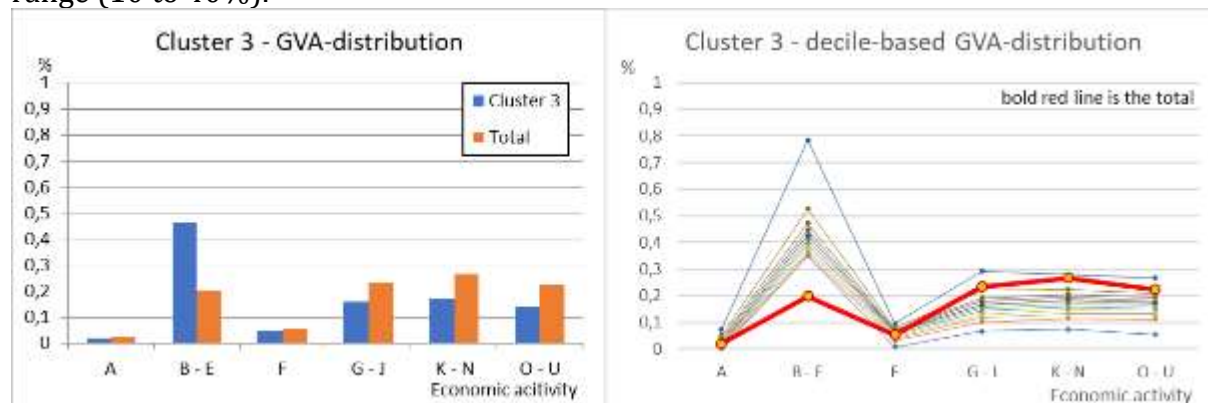


Figure 4. Economic activity pattern of cluster 3

The regions allocated to cluster 4 are typical industrial ones; 46% of the total GVA was “produced” by economic activities B to E (mainly by manufacturing). This can be clearly seen also from the decile-distribution: the lower decile percentage is significantly above the total percentage calculated for the total population. Within the cluster, however, huge differences exist among the geographic units – in particular the upper decile contribution is impressive. These regions in this decile could be the large industrial centres of the continent.

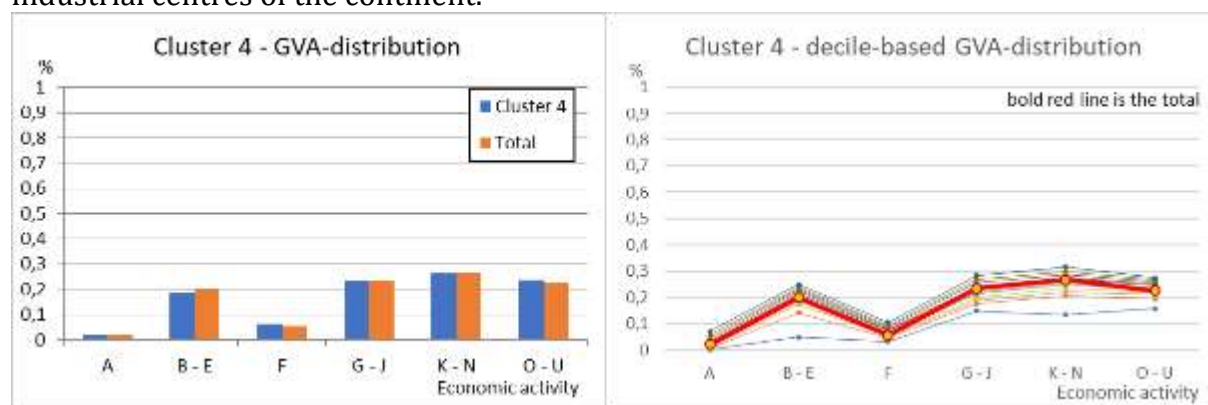


Figure 5. Economic activity pattern of cluster 4

The regions in cluster 4 have no real characteristic activity, we can call them “doers of everything”. The agriculture and construction are not so strong, but the other four categories contribute more or less the same to the total GVA. The decile distribution indicates that all these activities are typical, perhaps the regions in the lowest decile are a bit outlier. The total distribution ratios are somewhere in the middle of the decile-ranges; therefore, we can consider the regions in this cluster as “European average-type” ones.

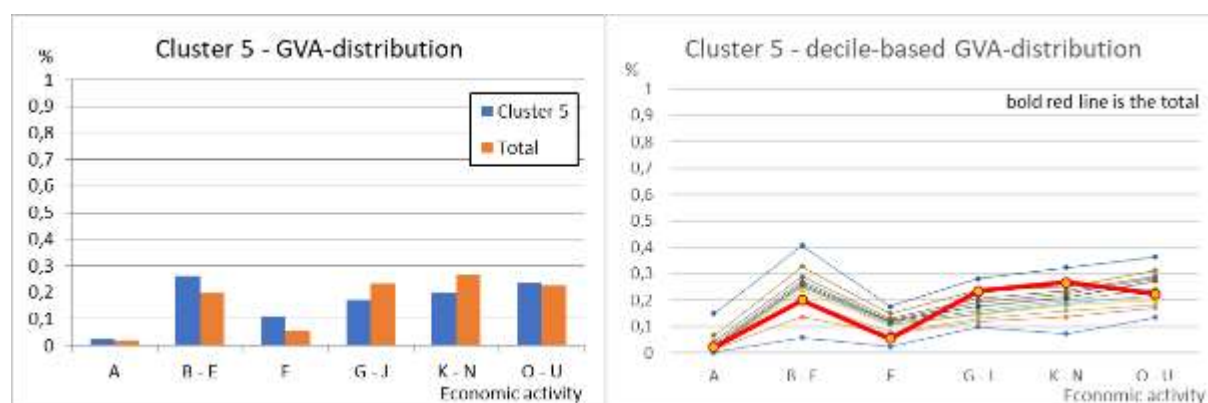


Figure 6. Economic activity pattern of cluster 5

When we would like to describe the regions in the cluster 5, we can see the importance of the industry, followed by the other activities, the finance, real estate and other businesses, plus the trade, transportation, tourism, IT group. Another observation can be made on construction: in this cluster the highest share of this activity is calculated (11%) compared to all other clusters. However, within the cluster, there are huge differences among the regions – in particular in case of the industry (between the two extreme deciles about 35% gap exists).

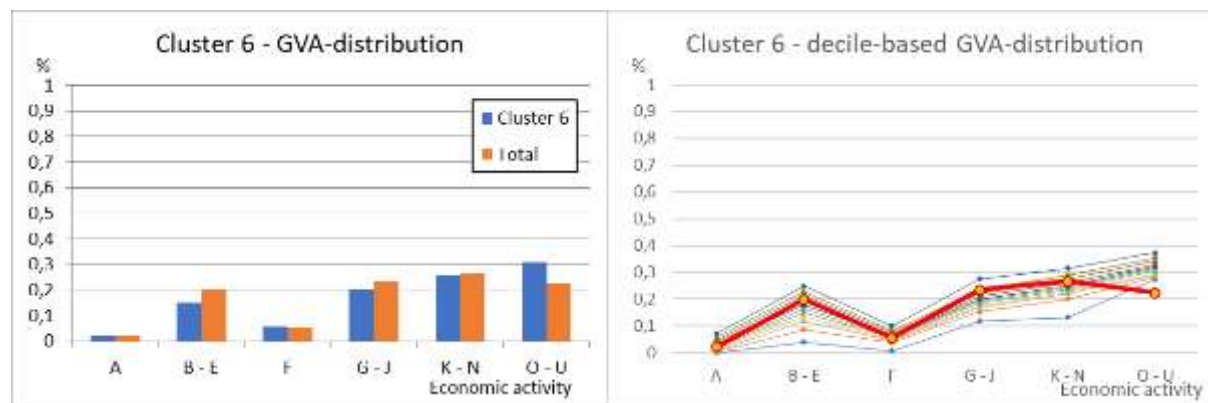


Figure 7. Economic activity pattern of cluster 6

The geographic units in cluster 6 are engaged in more or less the same activity-pattern than in cluster 4. No wonder, that these two clusters are rather close to each other on the dendrogram (*Figure 1*). The main difference is that the other activities (O-U sections) have the highest share in the GVA-contribution (31%). This characteristic can be seen also from the decile-distribution chart: the deciles are within a narrow band and significantly over the total GVA-distribution determined for this category.

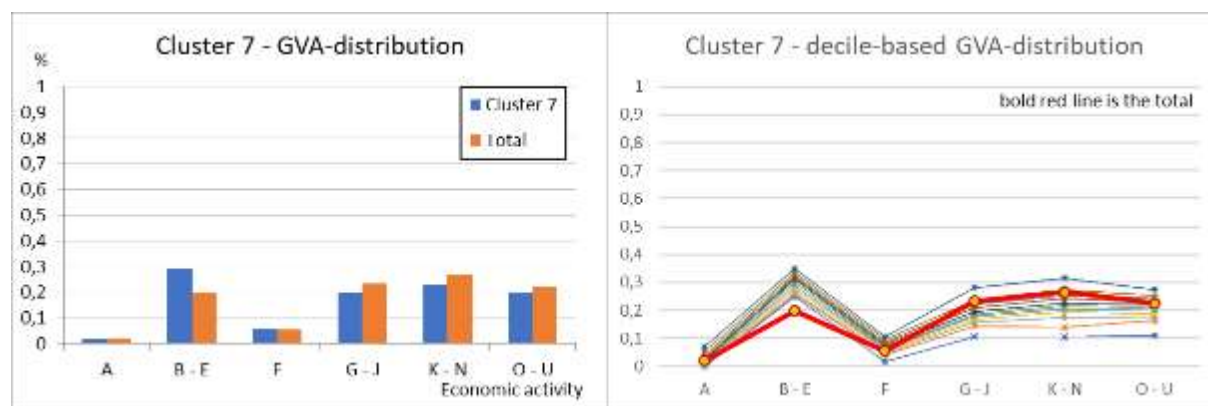


Figure 8. Economic activity pattern of cluster 7

According to the dendrogram (*Figure 1*) the cluster 7 and 5 have the same activity pattern. The industry is even more significant here (29%), the activities G-J, K-N and O-U have the same contribution to the GVA. At the same time a rather concentrated view is presented on the decile-distribution chart for industry (not like in cluster 5), and for the less characteristic agriculture and construction. While in cluster 5 there are regions which has smaller share in industry than the total one (20%), here, in cluster 7, all deciles are at least 5% over it.

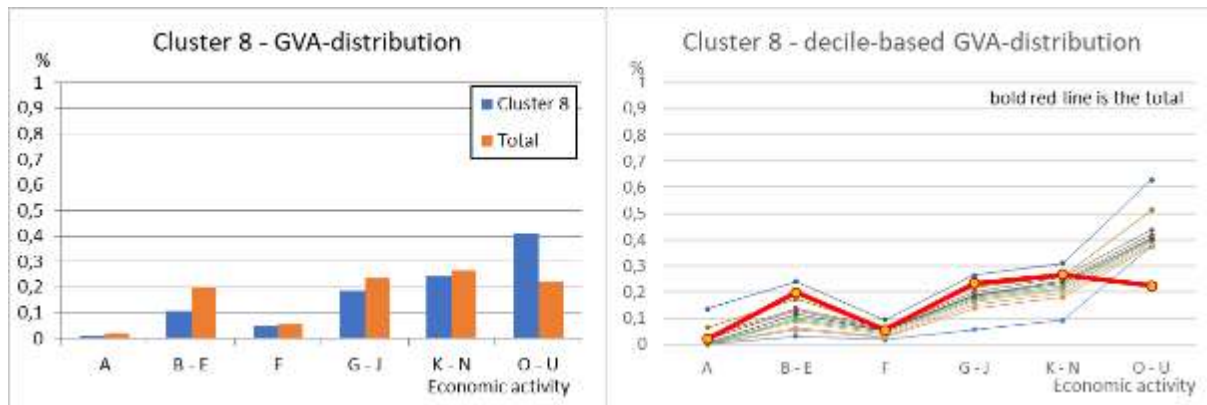


Figure 9. Economic activity pattern of cluster 8

The regions in cluster 8 can be described as involved in other activities: the 41% share in GVA is the highest among all clusters, and each decile value is well above the total value. Interesting to see, that the most upper decile indicates a 63% share in the “GVA-production”. Furthermore, another interesting feature is in this cluster, that in case of all the activity-groups, the deciles are below the total distribution ratios except the most upper 1-2 deciles.

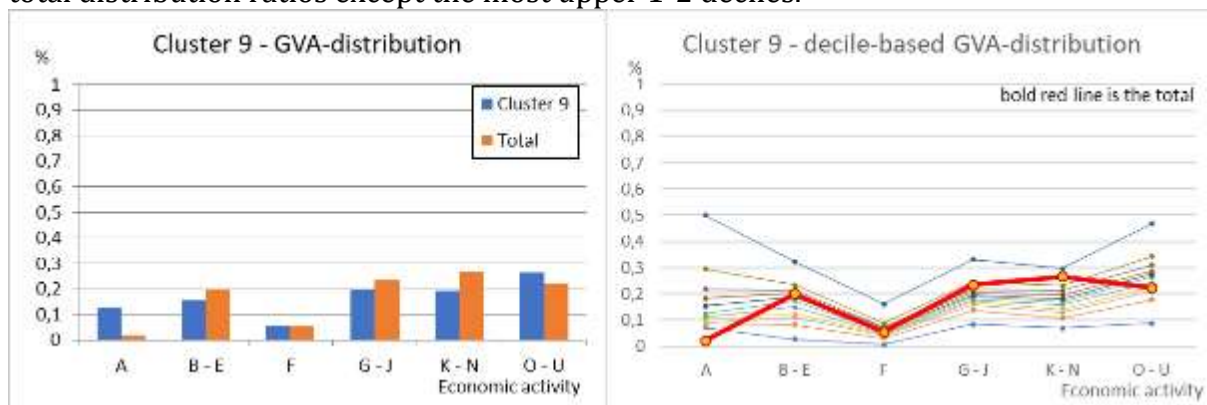


Figure 10. Economic activity pattern of cluster 9

Cluster 9 is the first one where the agriculture has certain bigger role (12%); this can be derived also from the decile-distribution. The other activities still have leading share (26%), while the others – except construction – have almost equal contribution to GVA. The regions are rather varied within the cluster: the difference between the two extreme deciles is generally large.

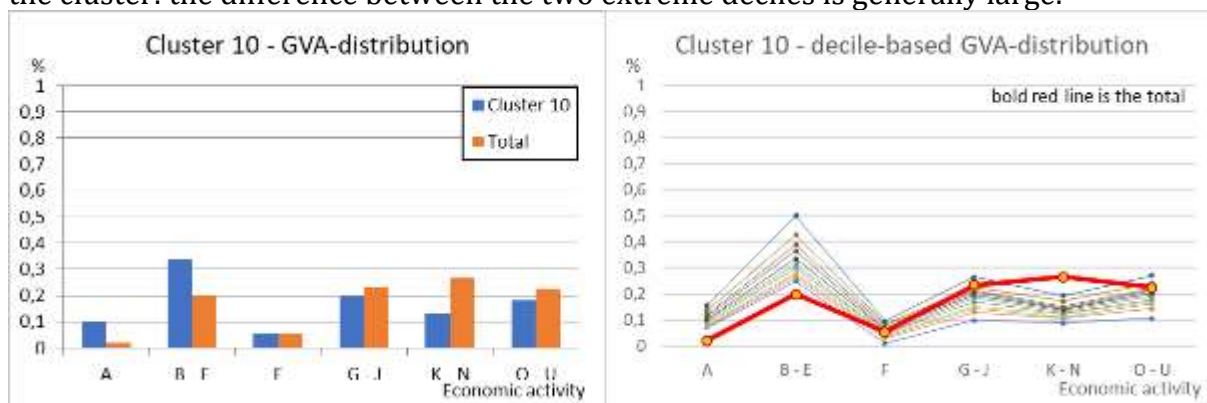


Figure 11. Economic activity pattern of cluster 10

The last cluster (10) has almost the same share in agriculture like cluster 9 (10%), but here the industry is more important – means the second largest share (33%) among the clusters. Therefore, this cluster can be characterised as industrial-agricultural one. For both activity group the share in GVA is visibly higher than the total value, while in case of the last three activities (G to U) the deciles show less overall importance.

When the pattern of the GVA-share of the ten clusters are analysed, the following observations can be made:

- The share of agriculture in GVA-production is between 0-3 percent in each cluster, except for clusters 9 and 10, where it is 10, respectively 12%.
- Similarly to agriculture, the share of construction shows an almost constant 4-6% in the clusters, except cluster 5 where it is double (11%).
- The other four activity groups show more varied distribution ratios than the previously mentioned two ones. Generally, the highest share is approximately double of the lowest one calculated for the clusters, for example, the GVA-share of trade, transportation, tourism and IT is around 20%, except for clusters 1 and 2, where it is a higher (27 and 35%). This is not valid in case of industry, where this ratio is about 4.5 (the lowest share is 10, while the biggest is 46%).

4.2 Allocation of the clusters on the continent

Following the short overview of each cluster, it is worth to have a look at on their distribution in Europe (*Figure 12*). On the map the geographical pattern of the clusters – and beyond that the typical economic activity-distribution of the regions – are visible.

Cluster-allocation (economic activity by GVA-distribution)

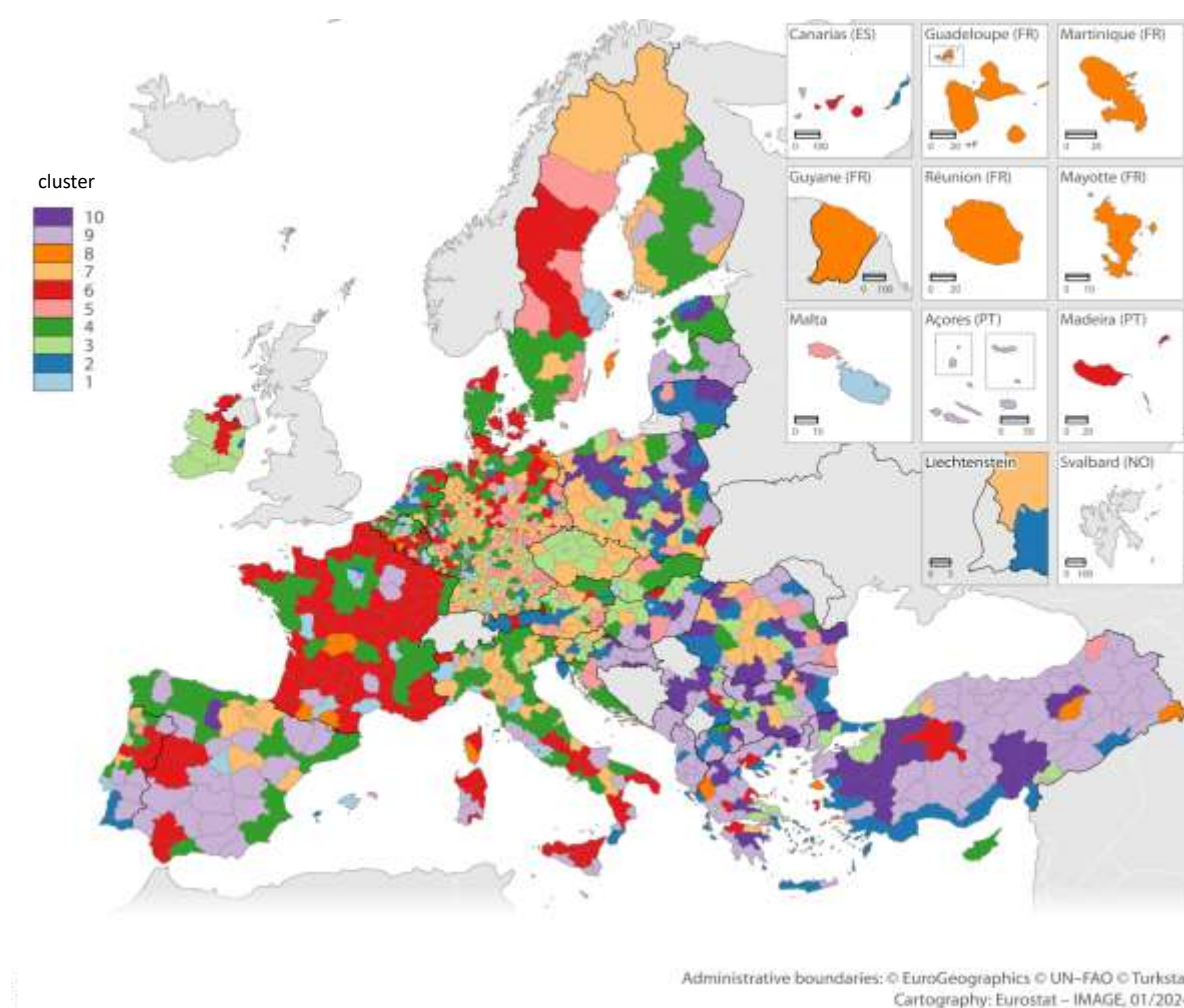


Figure 12. Allocation of the ten cluster in Europe⁹⁰

⁹⁰ The map was compiled via <https://gisco-services.ec.europa.eu/image/screen/home>

It is obvious that the allocation of the ten clusters in Europe presents a colourful and disproportional picture. Certain clusters are more typical in the western, while others in the eastern part of the continent.

During the previous short description of each cluster, it was mentioned that agriculture looks important in cluster 9 and 10. These clusters are detected first of all in the eastern (from the Baltic down to the Balkan) and southern (Spain, Greece, Turkey) parts of Europe. The regions could be considered “industrial” ones (cluster 3, 10, 7) are in the middle and eastern part of the continent (Ireland, Germany, Czechia, Poland etc) – many times represent cross-regional centres.

Cluster 4 and 6 are characteristics in particular for France, but additional, well-circled group of regions have this type, as well, like in middle-Sweden, along the Spanish-Portuguese border, or sporadic in south Italy and northern Germany.

The cluster includes the less regions (48 in cluster 8) – could be describe with high proportion of other activities – is typical for island (Gotland, French overseas areas), or for sporadically appearing, generally smaller regions (few in Belgium, France, Germany, Greece, and Turkey).

The experienced distribution of the clusters indicates certain division of labour within Europe, on the other hand, this division cannot be connected strictly to any administrative borders, but many times larger – cross regional – conglomerates could be seen. From another viewpoint, it is also possible to find those smaller or larger geographical areas being rather distant where rather similar economical activities are present.

Not going into an exhaustive analysis of all possible aspects and observations, only few were mentioned above. Naturally, based on the cluster-map and the full list of the regions according to the clusters, interesting further conclusions could be made.

4.3 Ideas for possible future work

The planned goal, namely analysing the economic activities of the regions in Europe with the help of clustering, was reached. However, when the decision on the concrete method for the clustering was done, new ideas emerged. For this study only an fixed, upper threshold (at least 5% higher share of the activity than the total share) was used. It would be interesting to see, how this threshold could be finetuned. Whether would it be also feasible to determine a similar fixed threshold downwards? Another idea is that moving threshold(s) bound to the actual ratio of the activity or to the decile-distribution could be used. These changes in the cluster-input could finetune and most probably modify the recent results.

As economic activities traditionally carried out in each region and their GVA-contribution are not changing rapidly, the activity pattern of the regions is assumed more or less changeless within a short time, but on medium or longer run changes could occur. Expanding the observation in time and comparing the results – activity-types and allocation of clusters – slight structural changes could be followed, or sudden changed could be detected.

5. SUMMARY

Knowing more on European regions and follow their development or specialities is important not only for decision makers on national and local levels, but also for researchers. In the available studies, usually the focus is put on the development; the static “snapshot”-type of descriptions or analyses are rare or missing. However, these types of information contribute to better understanding the processes and the relationship among the territorial units. This paper tries to supply a small shred of the missing components: the structure and allocation of economic activities at regional (NUT 3) level in Europe is analysed. The basis for the calculations were gross value added (GVA) values for 2020. Firstly, the economic specialization of each European region using the available data on economic section or section-group level was determined, then geographical areas (units) involved in similar economic activity or affined economic structure using hierarchic cluster method were identified and located. An additional aspect was whether similarities in the activity pattern could be observed in case of neighbouring regions, respectively larger geographical areas including more regions in one

block. Finally, another important consideration was, whether these blocks classified into the same clusters could be detected on the continent sporadically or not. The detectable differences could be also interesting, whereas they allow identifying regions, or blocks of regions having specialized role in division of the economic performance.

In order to highlight the most important economic activity or activities in a region, the activities not having at least 5% higher share compared to the total share were not taken into account during the clustering (the share of these activities was set to 0). With this approach more interpretable, significantly better observable results were received. The clusters are analysed with the help of visual tools: the shares of the economic activities compared to the relevant total share, and a decile-based share-graph. Based on the results it is observable, that certain regions can be characterised with similar economic features, and the clusters are well-distinguishable according to the key factors, like strength of industry, development of service sector, or significance of agriculture.

Examining the clusters in detail we stated that regions classified into the same cluster and having similar characteristics are located geographically to each other relatively close. These regions even can constitute cross-border units, constituting larger, connected areas. Rarely sporadic or island-like units are also appearing. It became also obvious that a pan-European pattern could be detected.

As a conclusion it can be stated that the cluster-based regions in Europe can be separated well using their economic characteristics, as well as that the agglomerative clustering is an effective tool in such analysis.

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221 Contrast and Brightness in Urban Spaces: Unveiling Patterns of Public Space Perception in Beijing's Historic Districts

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Abstract

In urban space evaluation, visual elements are crucial in shaping public perception. Beyond mere aesthetics, these elements, particularly contrast and brightness, are instrumental in influencing the perception of spatial quality. This study delves into how attributes of contrast and brightness in urban public spaces impact user evaluations, a subject that has not been extensively explored in current research.

The research was conducted across 32 public spaces within the historic urban districts of Beijing, engaging approximately 1000 respondents in an online assessment of these spaces through photographs. Participants were asked to evaluate various characteristics and elements within these spaces. The study harnessed computer vision to analyze key visual indices in the photographs, focusing on contrast and brightness levels. These visual features were then correlated with the respondents' evaluations, revealing notable patterns and preferences.

The findings of this study are particularly intriguing, indicating that high-contrast scenes in images are associated with more positive evaluations of architectural elements like pergolas, and a reduced likelihood of perceiving a lack of artificial facilities such as chairs. Conversely, in high-brightness scenarios, this trend is almost reversed, with landscape elements receiving more positive assessments and a greater inclination to perceive the absence of artificial facilities. These insights align with our qualitative observations and analysis of typical public space patterns in Beijing's historic districts, which tend to oscillate between architecturally defined, seating-providing spaces with higher contrast and lower brightness, and open spaces primarily oriented towards landscaping and parking, characterized by higher brightness and lower contrast.

Moreover, in the latter spatial pattern, respondents tended to give more positive evaluations of the space's orderliness and maintenance. While acknowledging the potential biases inherent in image and public space selection, the research has substantial implications for urban design in built environments and for advancing research in image-based spatial perception and evaluation.

Keywords

Computer vision; public's perception; urban public space; visual analysis;

1. INTRODUCTION

1.1 Background

The public's perception is critical in assessing the quality of urban public spaces. It affects the public's consumption and visitation behaviors (Phillips et al., 2023). Therefore, researching the influencing factors of public space evaluation holds positive value for urban design and management policies (Wang et al., 2023). With the proliferation of urban imagery, visual elements have become a central method for gauging these perceptions (Biljecki & Ito, 2021). Techniques from computer vision (Figure 1), such as semantic segmentation (Zhang et al., 2018), object detection (Arietta et al., 2014), and deep neural networks have been utilized to identify the presence and proportion of urban space

elements, as well as to extract relatively high-dimensional visual features of urban space scenes (Zhou et al., 2014).



Figure 1. Techniques from computer vision for urban space analysis.

However, the specific impact of visual attributes, particularly in urban scenes, on spatial evaluations remains to be fully understood. Among these attributes, factors like contrast and brightness play a significant role. While not directly tied to specific colors, these elements significantly influence the perception of space quality, irrespective of one's architectural training. This is particularly true in historic built areas, where the limited spatial area, the diversity of elements, and their complex interrelations amplify the importance of these visual attributes.

In historic urban districts, urban design and management often require clear guidelines and restrictions, significantly influencing the city's economy and vitality. Strict controls often govern color and overall visual consistency, including parameters like brightness and contrast (Figure 2). However, the effectiveness and appropriateness of such control over these global visual attributes in spatial contexts are not well understood, especially from a practical standpoint.

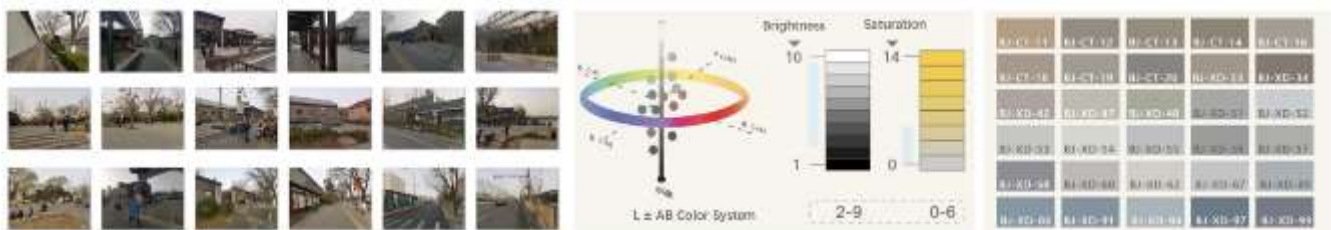


Figure 2. Color guidelines in Beijing's historic urban districts⁹¹.

1.2 Related works

In this study, we primarily focus on the fundamental issue of how the features of public spaces are linked to users' evaluations and perceptions of these spaces. This involves two main topics: how to quantify users' evaluations and perceptions of urban space, and how to represent the features of public spaces quantitatively.

(1) Urban Space Evaluations and Perceptions

In visual-based urban space evaluation, users' subjective spatial perception data are typically obtained through surveys. These can range from detailed scale-based questionnaires to interactive electronic interface surveys for scoring.

A common approach is to divide users' perceptions of space into several dimensions. For instance, MIT Media Lab's PlacePulse uses dimensions such as safe, lively, boring, wealthy, depressing, and beautiful (Dubey et al., 2016). The Public Space Index (PSI) model proposed by Mehta (Mehta, 2014) includes safety, comfort, meaningful activities, inclusiveness, and pleasurability. Each dimension contains several sub-items; for example, safety includes evaluations of the presence of security, the impact of surveillance cameras on safety, etc. Then, respondents need to answer the questionnaires to give a detailed scale-based evaluation.

⁹¹ Resource: Beijing Municipal Commission of Planning and Natural Resources, Urban Design Guidelines for Beijing City Color

Although the evaluation results can be considered a depiction of space quality, it is typically necessary to establish associations with spatial features and other issues to provide insights for urban design and management. Many researchers have further established the relationship model between subjective urban perceptions and visual features through CNN (Convolutional Neural Networks). Among them, PlacePulse (Figure 3) has constructed a scoring model from image to six dimensions based on global street view data and its public evaluation (Dubey et al., 2016). Models based on specific cities and perception dimensions have also been established (Yao et al., 2021). However, existing research primarily focuses on the overall and subjective feelings of space, yet often provides limited analysis on evaluating spatial elements. In this case, even though it is possible to predict the perceptual effects one place may have, it is still difficult to correlate spatial features, especially spatial elements with perceptions. Providing direct suggestions for urban design strategies and management improvements is hard.



Figure 3. PlacePulse Demonstration⁹².

(2) Feature Representation of Urban Space

Constructing the appropriate representation of spatial features is necessary for coupling spatial features with perceptions. Existing research usually uses element proportions or image features to represent space through image analysis.

Through the perspective of spatial elements, the quantification of urban street visuals is primarily accomplished by identifying elements' presence (Arietta et al., 2014) or analyzing their proportional representation (Zhang et al., 2018). The calculated proportions of urban elements can be further regressed against users' subjective evaluations (Zhang et al., 2018), thereby gaining insights into the contribution of these elements to the overall spatial assessment.

In addition to using element proportions for understanding urban elements, for the perspective of image features, depth estimation has also been utilized to determine the spatial positioning of elements. Lumnitz et al. (2021) applied depth estimation to map the location of trees. Similarly, Cai et al. (2022) used monodepth2 to generate three-dimensional point cloud data based on the results. Besides depth, color analysis of urban images has often been utilized as a convenient method for estimating the proportional representation of urban elements. Common approaches included inferring the potential proportion of trees through green pixels (Yang et al., 2009) or identifying dominant urban colors by clustering similar hues (Hu et al., 2023; Zhong et al., 2021; Zhai et al., 2023), to further analyze the distribution frequency of different primary hues in various types of streets within a case study area (Zhai et al., 2023).

However, these studies primarily focused on color distribution, diversity, and harmony without establishing a link to users' urban evaluations. This approach can also be limited by factors like varying lighting conditions in photographs, which often lead to inaccuracies in color extraction. Such limitations can affect the generalizability of research findings and their value to policy-making.

Conversely, visual attributes such as contrast and brightness are less influenced by specific circumstances like lighting and photographic conditions. These attributes offer a more universal value in understanding urban spaces. Contrast, representing the range of visual difference between the lightest and darkest elements of an image, and brightness, indicating the overall lightness or darkness of an image, can provide critical insights into the visual appeal and perceptual quality of

⁹² Resource: Dubey, A., Naik, N., Parikh, D., Raskar, R. and Hidalgo, C.A. (2016) 'Deep Learning the City: Quantifying Urban Perception at a Global Scale', in Leibe, B., Matas, J., Sebe, N. and Welling, M. (eds) Computer Vision – ECCV 2016. Lecture Notes in Computer Science, vol 9905. Cham: Springer. doi: 10.1007/978-3-319-46448-0_12.

urban spaces. Though studies focus on such features as brightness and saturation (Hu et al., 2023; Besora, 2016), the number of studies is still limited.

This gap highlights an opportunity for further exploration into how these more general visual features, beyond specific color hues, can provide valuable insights into the evaluations and perceptions of urban spaces.

1.3 Paper overview

This study investigates the impact of visual attributes such as contrast and brightness in urban public spaces on the public's evaluations, utilizing computer vision for image analysis. By correlating these visual features with subjective evaluations from about 1000 respondents, the research aims to elucidate the relationship between these key visual features of urban spaces and spatial perceptions. Offering valuable insights for urban space design and management, this study introduces an efficient and data-driven approach (Figure 4) for spatial visual analysis in academic research. This approach extends beyond traditional color analysis, encompassing a broader range of visual factors that influence the perceptions and evaluations of urban environments.

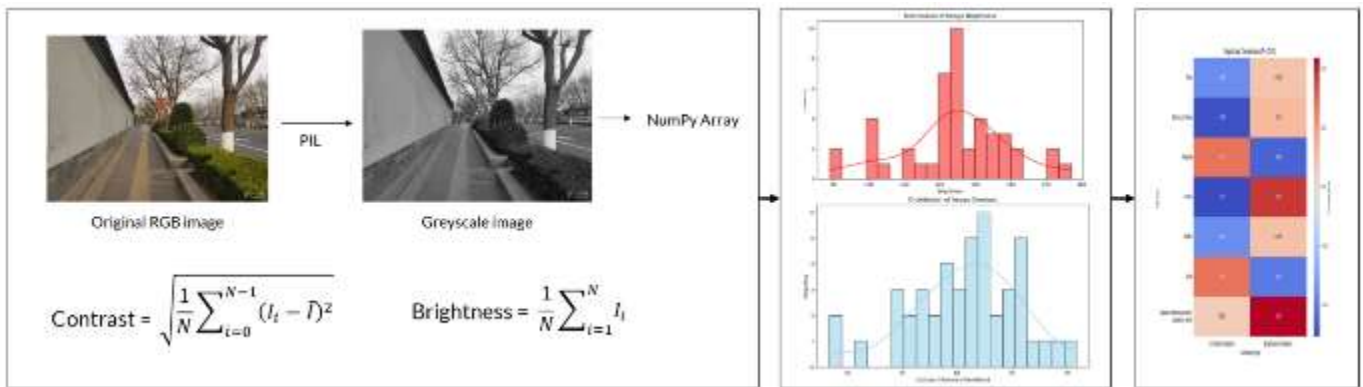


Figure 4. Research Framework.

2. METHODS

2.1 Metrics setting and data collection

(1) Determination of evaluation metrics

Compared with other urban space evaluation models, the Public Space Index (PSI) (Mehta, 2014) was ultimately chosen for its comprehensive assessment of user perception, behavior, and the physical settings in urban spaces. In contrast to other models that focus more on aspects like urban operation, management, and property rights, PSI's emphasis on the quality of urban design aligns more with our research aim at the correlation between urban spatial features and perceptions.

PSI is distinguished by its division of spatial perceptions into five distinct dimensions, with several sub-questions in each, rated on a five-point scale. These sub-questions encompass a variety of elements integral to urban public spaces, such as architectural forms, space layout, and urban furniture, making it suitable for analyzing issues presented in urban scene images.

Preliminary surveys carried out by us highlighted PSI's effectiveness, particularly evident in the questionnaire's validity test. Subsequently, the model was tailored to suit Beijing's unique urban and cultural context, enhancing its accuracy and cultural relevance in assessing the city's public spaces. In addition to evaluating the perception of space, we introduce a tiered evaluation of the quality of elements within the space (Figure 5). This can help us better understand how specific spatial elements should be improved. For the list of spatial elements to be evaluated, we set indicators based on established guidelines for public space assessment proposed by the Beijing Municipal Commission

of Planning and Natural Resources⁹³ and exclude fixed features, such as dedicated bus lanes, to focus on actionable design aspects.



Figure 5. Evaluation metrics.

(2) Data collection

This study was conducted in 32 public spaces across the historic urban districts of Beijing (Figure 6), focusing on two main streets in the core urban area undergoing urban renewal. The selected sites, including plazas and roadside vacant lands, offer a diverse range of typical public spaces in Beijing, serving as primary locations for our survey to capture the city's evolving public space landscape. The survey was strategically conducted in early spring to avoid excessive shading from trees and minimize natural disturbances like plant variations.

The image data for this study was collected over two hours on the same day in early spring. This timing was chosen to ensure consistency in natural lighting conditions. The same researcher took the photographs manually at the approximate central interior point of each sampled public space, maintaining uniformity in photographic variables such as focal length and exposure. Photographs of each sub-space were taken in cases where a public space consisted of multiple sub-spaces.

This method was adopted to closely match the perspective of a person utilizing the space, thereby capturing a more representative view of the environment as experienced by users, which is integral to providing a more detailed visual representation of the public spaces under investigation.

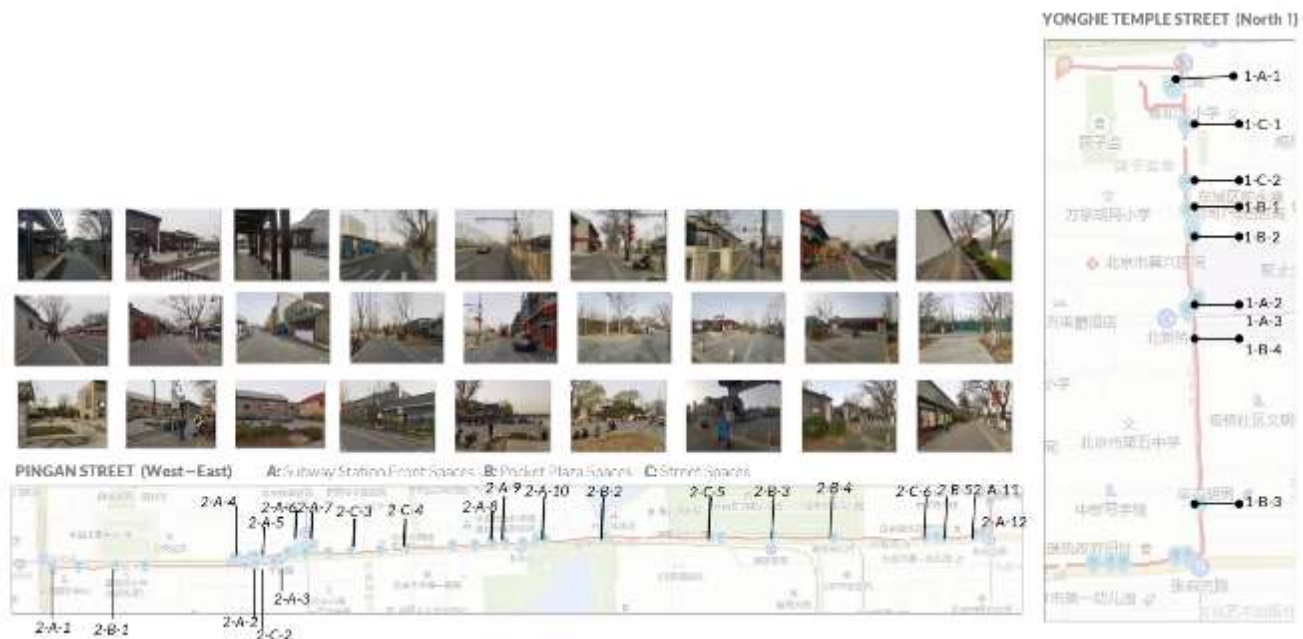


Figure 6. Data collection.

⁹³ Beijing Municipal Commission of Planning and Natural Resources, Beijing Street Renewal and Governance Urban Design Guidelines

2.2 Calculation of image contrast and brightness

Brightness is a perceptual attribute where a source appears to emit a given amount of light. In image processing, brightness is typically quantified as the average value of the pixel intensities in an image. Contrast is the difference in visual properties that makes an object distinguishable from other objects and the background. In more technical terms, root-mean-square contrast is defined as the standard deviation of the pixel intensities (Peli, 1990).

For brightness and contrast calculation, we first convert original RGB images to greyscale images and then NumPy array to facilitate numerical operations (Figure 7).

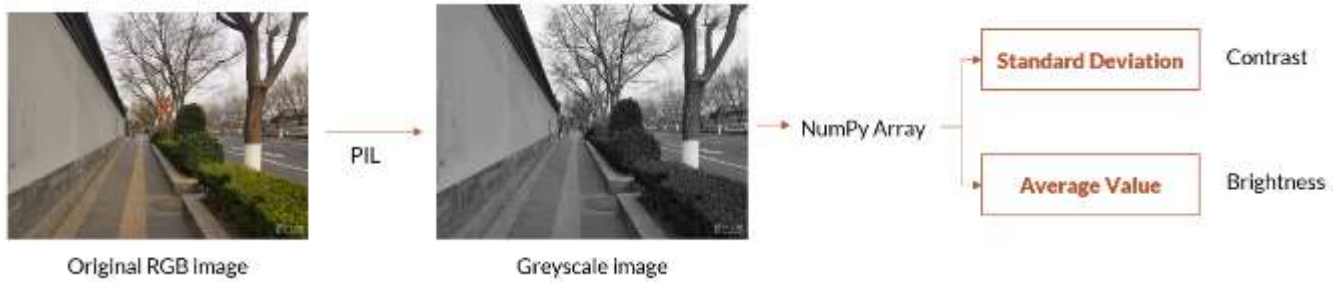


Figure 7. Contrast and brightness calculation.

2.3 Correlation analysis

This study investigated the relationship between visual features (contrast and brightness) and participants' spatial assessments through correlation analysis employing Pearson's correlation coefficient.

Spatial assessment variables were based on participants' evaluations of natural and artificial elements within spaces, assessing their positive contribution or perceived absence, alongside the PSI model for participant's perceptions.

3. RESULTS

3.1 Dominant colors of images

The study involved calculating the proportion of RGB colors in the images and visualizing the top five colors in terms of pixel count for each image. Since, in our subsequent analysis, we convert the images to grayscale to calculate brightness and contrast, we want first to examine whether the RGB values of the images might have significant differences. This is to verify if excluding RGB values and directly analyzing brightness and contrast is reasonable.

The results showed that the saturation levels across all images were relatively similar (Figure 8). However, variations were noted in the brightness and contrast of high-frequency colors between different images. This analysis reveals that within the same historic urban district of a city, color control is indeed effective, primarily in regulating the saturation of city colors. However, there are discernible rhythmic variations in the contrast and brightness of public space colors. These variations enable a more nuanced analysis and open avenues for further research, suggesting that each public space possesses unique visual characteristics despite being in the same urban context.

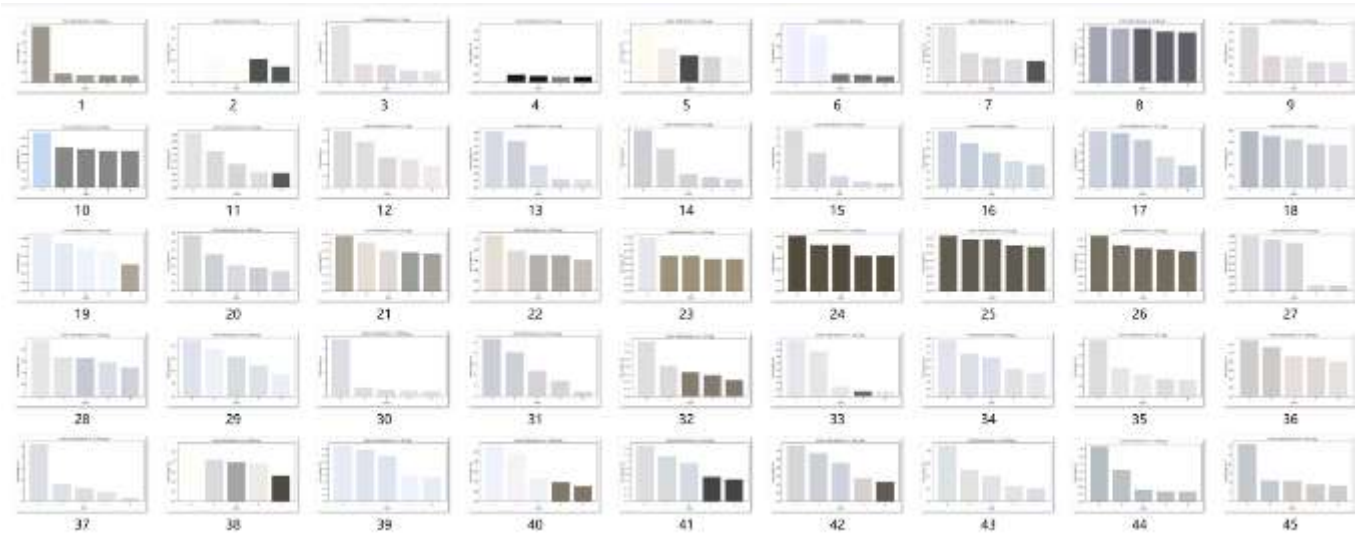


Figure 8. Dominant colors of images of selected scenes.

3.2 Brightness distribution

The histogram provides an overview of the range and distribution of image brightness values across the 45 urban images, centered around a mean of approximately 124.17 (Figure 9).

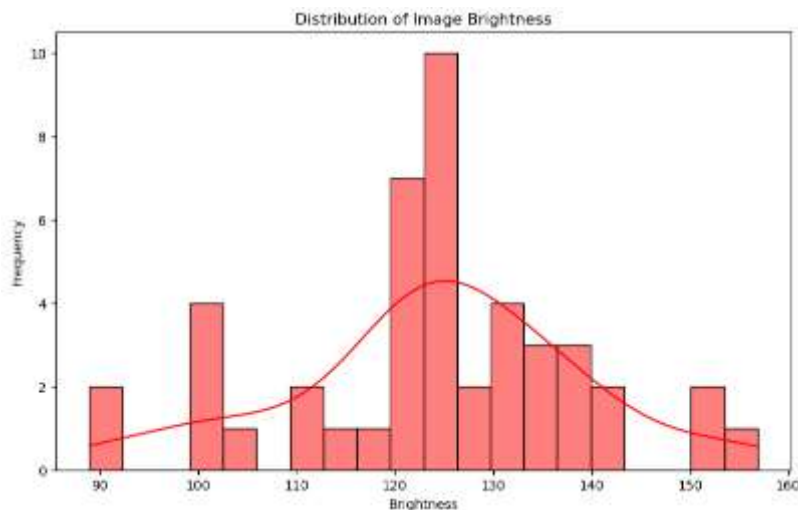


Figure 9. Distribution of image brightness.

Some images with brightness values significantly above or below the average are considered special. Considering the average brightness value of approximately 124.17 from the dataset, we categorize them as follows:

- Low brightness: Beixinqiao Station East Square (brightness=88.96); The square near the G exit of the Lama Temple subway station (brightness=90.15)
- High brightness: Ping'anli Subway Station Exit L (brightness=151.95);

Upon closer inspection of these typical scenes (Figure 10), it can be observed that for low-brightness images, buildings obstruct light, creating extensive areas of shadow. Conversely, the buildings are set back from the public spaces for high-brightness images, allowing for a wide expanse of sky and open views. This typically results in more direct sunlight reaching the scene, enhancing its brightness.



Figure 10. Low brightness image(left), high brightness image(right).

3.3 Contrast distribution

The histogram of the image contrast values illustrates the distribution of contrast across the 45 urban images (Figure 11).

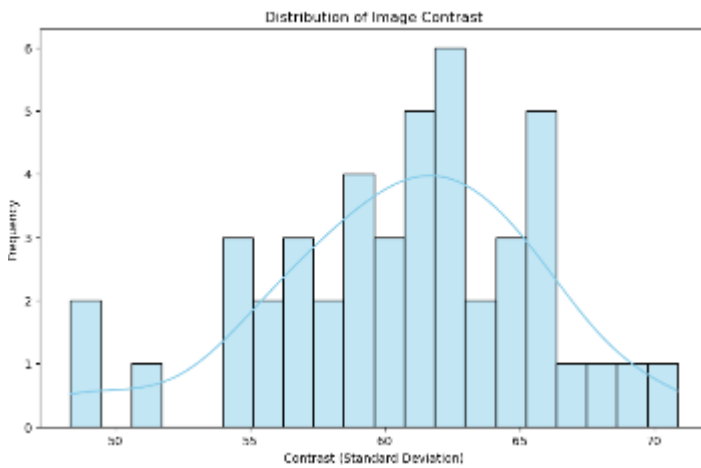


Figure 11. Distribution of image contrast.

Some images with contrast values significantly above or below the average are considered special. Given the average contrast value of approximately 60.67 from the dataset, we can classify:

- High contrast: Beixinqiao Station South Square (contrast=70.86)
- Low contrast: Ping'anli Subway Station Exit L (contrast=48.33); Ping'anli Subway Station Exit E (contrast=48.45)

Upon detailed examination of these typical scenes (Figure 12), it is observed that in high-contrast images, man-made structures, such as buildings and sunshades, predominate the spatial composition. The buildings' darker hues starkly contrast against the sky's color, with the architectural texture and form accentuating light and shadow variations, thereby augmenting the scene's contrast. In contrast, low-contrast images feature buildings veiled by vegetation, with pedestrian pathways emerging as principal spatial components. These pathways exhibit minimal elevation and bear colors closely matching the sky, resulting in diminished contrast due to the absence of elements critical for contrast enhancement.



Figure 12. High contrast image(left), low contrast image(right).

3.4 Correlation analysis between image visual parameters and evaluation information

In this study, 993 valid questionnaires were collected. The correlation showed (Figure 13) the correlation between visual attributes of urban spaces and the public's evaluation of spatial elements and quality.

We found that in scenes with high-contrast images, respondents were more inclined to give positive evaluations of architectural elements such as pergolas and were less likely to perceive a lack of artificial amenities like chairs in these spaces. Conversely, this trend was almost reversed in scenes with high brightness, as people tended to give more positive evaluations of landscape elements in such scenes and were more likely to perceive a deficiency of artificial amenities like chairs.

This aligns with our prior qualitative observations and analysis of specific scene examples, revealing two typical public space patterns in Beijing's historic districts. The first pattern is characterized by architectural spaces, offering numerous seating areas, and exhibiting relatively higher contrast and lower brightness. The second pattern is dominated by open areas primarily designed for landscaping and parking, with trees and urban fitness facilities, showing relatively higher brightness and lower contrast.

High brightness and high contrast both have a positive correlation on the evaluation of space maintenance, but the correlation is stronger for high brightness. This correlation analysis further unveils the distinct public space modes in Beijing's historic districts, highlighting the interplay between visual elements and public perception.

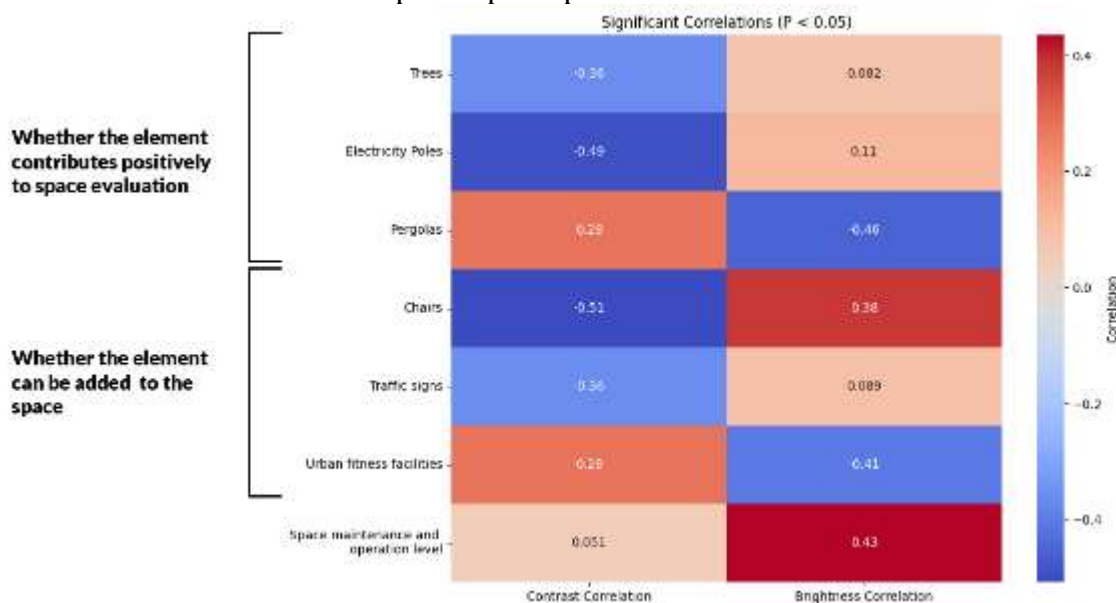


Figure 13. Correlation heatmap.

4. DISCUSSION

4.1 Findings and significance

We used image analysis to identify two typical patterns of public space in Beijing's historic urban areas and combined them with public evaluation.

- Functional Space: composed of urban elements that have both visual significance and utility value. (e.g., pergolas, chairs, and traffic signs).
- Landscape Space: composed of urban elements with mainly visual significance rather than utility value (e.g., trees, electricity poles).

This will assist in avoiding the one-size-fits-all phenomenon in urban policymaking.

We also found that under the control of appropriate overall visual attributes, even spatial elements typically considered potentially negative (e.g., electricity poles) may be considered positively contributing objects in space. Although related to the space's characteristics, it still seems possible to propose that spaces with higher brightness are more likely to give the impression of under better operational management. This may provide suggestions for controlling visual attributes (layout, materials, configuration of elements) of urban public spaces, thus serving the activation and vitality of the urban economy.

4.2 Limitations

One limitation of this study pertains to the presence of people and other non-spatial elements within the images, which, albeit constituting a small proportion, might have subtly influenced the visual attributes of the images to a certain extent.

Additionally, a notable constraint of this study was that the images were manually captured, leading to limitations in terms of density and coverage. This method might not comprehensively capture the full extent of the spatial characteristics of the areas studied. The reliance on this data collection form introduces potential biases in representing these spaces.

Furthermore, in terms of experimental design, the current evaluations we have obtained are based on respondents viewing images of the space. However, evaluations from the perspective of spatial usage behavior and those based on visual assessment may have inconsistencies. For example, in evaluating trees, a spatial usage perspective may value the shade they provide, whereas, from a visual assessment perspective, trees may be preferred if they appear brighter.

Besides, we need further discussion and validation in selecting brightness and contrast as key spatial features for our study. We also consider whether other visual attributes, such as spatial depth obtained through image depth estimation, may be more effective or provide information in additional aspects, which we are continuously working on.

4.3 Future developments

A valuable direction for further development in this research would be to compare the evaluations derived from the image-based analysis with scores provided by individuals who physically visited and rated the spaces. This comparison would help to identify any discrepancies between virtual and actual experiences of the spaces, offering deeper insights into the effectiveness and limitations of image-based evaluations.

In addition, our previous data included participants' demographic information and their purpose for using the space. In future research, we aim to delve deeper into this aspect. Additionally, our questionnaire data was collected in the spring of 2022, when Beijing was still experiencing the COVID-19 pandemic. We plan to combine this with post-pandemic data to consider whether the pandemic has influenced people's perceptions and evaluations of such spaces.

Moreover, beyond the structural properties reflected in images, an important area of exploration is establishing a more authentic connection with the actual spatial structure. This could involve considering aspects such as 'usable ground space,' encompassing factors like area, materials, and

other tangible attributes. By integrating these elements into the analysis, the research can move towards a more comprehensive understanding of public spaces that extends beyond visual aspects to include functional and material characteristics. This approach would provide a richer, multi-dimensional perspective on urban public spaces, potentially leading to more nuanced and actionable insights for urban design and planning.

5. CONCLUSION

This study presents a nuanced analysis of urban public spaces, emphasizing the prominent role of spatial facilities as highly perceivable elements. It delves into the intermediary role of visual features, such as contrast and brightness, in evaluating public spaces. By integrating computer vision technology, the study effectively traces the pathways through which these visual features influence public perceptions and evaluations.

Our findings indicate that high-contrast and high-brightness scenarios in urban spaces correlate with how people perceive and evaluate architectural and landscape elements. This aligns with our qualitative observations, revealing two predominant public space patterns in Beijing's historic urban districts.

However, the study acknowledges limitations, including the potential influence of non-spatial elements like people in the images and the biases introduced by manual image capturing and selection processes. Despite these challenges, our research contributes significantly to understanding urban space perception. It highlights the importance of visual elements in urban design and offers an approach for future research in image-based spatial perception and evaluation.

ACKNOWLEDGMENT

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272 Development of Southeast Asia in the Eurasian Era – The Challenges of Sustainability and Multipolarity

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Abstract

The earlier 500-year Atlantic era is now being replaced by a Eurasian era in which the unity of Europe and Asia is taking on a new significance and a new multipolar world order is emerging with the rise of Asian states. In this context, Southeast Asia, with a population of 690 million people, deserves special attention as one of the most important regions of the new Maritime Silk Road of the 21st century, which is part of the Belt and Road Initiative. The aim of this article is to take a multidisciplinary approach and use the example of the three most populous countries to show how the Southeast Asian states can successfully strike a balance between conflicting interests against the backdrop of the rivalry between China and the United States by shaping political, economic and security relations. In addition, efforts to achieve sustainable development, which is also an integral part of 21st century geopolitics, will be highlighted.

Keywords

Geopolitics, world order, Southeast Asia, multipolarity, sustainability.

1. INTRODUCTION

In the 21st century, with the dawn of the Eurasian era, which replaced the Atlantic era, a new multipolar world order has emerged in which the rise of Asia is unmistakable. Southeast Asia, one of the continent's most important regions, has become one of the world's leading political and economic players. The Association of Southeast Asian Nations (ASEAN) is the fifth largest economy in the world, and its global importance is gradually increasing (Anggoro, 2021). The region can also be seen as a buffer zone of influence of major powers, where the security and military position of the United States of America is still dominant, while China dominates the economic sphere. At the same time, the emergence of a new multipolar world order centred on Eurasia is accompanied by a decline in the dominance of the USA and a parallel rise in China's influence (Tárik, 2021, p. 1555).

Although the Southeast Asian region as a whole is one of the most prosperous in the world, the individual countries face considerable political, economic and social problems that can only be tackled in cooperation with major powers from outside. The pursuit of sustainability cannot be postponed in the face of climate change, even if there are differences in the way this is achieved in individual countries. Taking the three most populous ASEAN states as examples, the aim of this article is to briefly illustrate how the region can successfully balance the conflicting interests of the major powers in the face of the rivalry between China and the United States by shaping political, economic and security relations. Of course, in the 21st century, geopolitical goals are just as important as geoeconomic interests. The paper will therefore briefly outline the economic situation of individual countries in order to shed light on their foreign policy. It also discusses the commitment to sustainable development and concludes that national economic interests should not be prioritised over regional and global interests, which of course will require increased efforts from countries in the Global South, including Southeast Asia, in the future.

2. THE PLACE OF SOUTHEAST ASIA IN THE INTERNATIONAL SYSTEM OF THE 21ST CENTURY

Southeast Asia is an important part of the Asian continent with a total area of 4545792 km² a population of 686.824 million (Worldometer, 2023) and a total GDP of 4.361 trillion dollars in 2021 (Macrotrends, 2024).

Politically, the region comprises the 10 member states of ASEAN (Association of Southeast Asian Nations) (Myanmar, Thailand, Cambodia, Laos, Vietnam, Malaysia, Singapore, Indonesia, Brunei, Philippines) and East Timor, which became independent in 2002. ASEAN is the fifth largest economy in the world, which naturally makes it a heterogeneous region in which Indonesia, Malaysia, the Philippines, Thailand and Vietnam occupy a prominent position. Indonesia is the largest economy in the region with the 7th largest GDP in the world in purchasing power parity, but is projected to be the 4th largest by 2050 (PwC, 2017). Singapore is one of the most advanced countries in the world, a financial and trading centre and is projected to be the richest country in the world by mid-century. Vietnam is currently the 23rd largest economy in the world, but is forecast to be the fastest growing major economy in the world by 2050, with annual GDP growth of around 5.1% (PwC, 2017). Thailand, the second largest economy in Southeast Asia, owes its development mainly to manufacturing, tourism and agriculture. As well as the Philippines, Asia's 8th most populous country, and Malaysia, a dominant player in education and business, with annual GDP growth averaging 6-7%.

Southeast Asia's development appears to be uninterrupted, although there are also major differences within the individual countries due to the heterogeneity of the region. In the long term, the only solution to the serious political, economic and social problems (e.g. ethnic and religious conflicts, terrorism, population explosion, extreme poverty, dictatorships, human rights violations, etc.) is inclusive and sustainable development that involves as many people as possible.

However, Southeast Asia's development is largely hampered by a backward infrastructure environment that requires considerable investment. The Asian Development Bank forecasts that at least USD 2.8 trillion of infrastructure investment will be required in the region between 2016 and 2030, which already requires external financing (Standard Chartered, 2019). It is no coincidence that Southeast Asian countries are keen to join the Belt and Road Initiative (BRI) announced by China in 2013, which, in addition to investment, aims to develop the economies of the countries concerned and strengthen connectivity across Asia (Horváth, 2022, pp. 25-26). The Indo-Pacific strategy of the USA can also be seen as a response to the BRI, meaning that greater US involvement in the region should also benefit the ASEAN countries.

ASEAN was founded in 1967 as a regional integration organisation with the main goal of economic development, peace and security (Balogh, 2015, p. 449). Today, ASEAN is increasingly focused on combating climate change and ensuring sustainability, and is committed to fulfilling the UN Sustainable Development Goal.

3. THE COUNTRIES OF SOUTHEAST ASIA IN THE EURASIA ERA

3.1 Indonesia

With 270 million inhabitants and an area of 1.9 million km², Indonesia is the most populous and largest country in Southeast Asia and the strongest economy in ASEAN. As a member of the G20, the country was categorised by the World Bank in 2019 as an upper middle-income country, but also as an emerging economy. Indonesia currently has the 7th largest GDP in the world based on purchasing power parity, but Wellington Capital predicts that it could become the 4th largest economy in the world in a few years (Wellington Capital, 2022).

The Suharto regime, which lasted from 1968 to 1998, provided the hoped-for economic and social development for a long time, but the financial crisis of 1997 hit the country hard. After the fall of Suharto, however, democracy was restored and economic growth took off, rising steadily by 4-6% per year until the outbreak of the Covid-19 epidemic. The country has done particularly well in

poverty reduction, halving its poverty rate to 9.78% between 1999 and 2020 (The World Bank, 2022a).

Indonesia's new Job Creation Law 2020 is an important reform that will encourage foreign investment and thus job creation.

The biggest question, however, is what political, diplomatic and military power will accompany the country's economic power, as this will have a profound impact on its role in the new world order. Although Indonesia is the dominant power in Southeast Asia, it is reluctant to take a leading role in ASEAN. Under the presidency of Joko Widodo from 2014, the country has endeavoured to play a greater international role than before and to be a link between the Pacific and the Indian Ocean region, both economically and politically. During his first term as president, Jokowi made great efforts to make Indonesia a global maritime power. He believed that the sea plays an increasingly important role in Indonesia's future and that Indonesia, as a maritime country, must assert itself as a power between the two oceans: the Indian Ocean and the Pacific Ocean (Witular, 2014). The five pillars of the "Global Maritime Axis" doctrine are rebuilding Indonesia's maritime culture, conserving and managing maritime resources, developing maritime infrastructure and connectivity, developing the shipping industry and maritime tourism, encouraging other nations to cooperate at sea and eliminate sources of maritime conflict, and developing maritime defence forces.

Indonesia's role as a major power is severely limited by its underdeveloped infrastructure, and the government lacks the financial resources to develop it. It is therefore happy to support China's 21st century New Maritime Silk Road plan. Indonesian-Chinese relations are characterised by the fact that China has become the country's largest trading partner by 2020 (Zoltai – Klemensits, 2020). Politically, Jakarta also maintains friendly relations with the United States and tries to play a mediating role between the superpowers.

President Jokowi showed little interest in foreign policy in the first half of his term of office. He largely left the formulation to competent advisors, such as Foreign Minister Retno Marsudi. However, Indonesia's G20 presidency in 2022 led to a change in this stance, which was influenced by the country's ASEAN presidency in 2023 (Purba, 2022). Jokowi showed greater foreign policy activity during the year than before, following in the tradition of his predecessors.

There is no doubt that for Jokowi, diplomacy serves the economy. In his negotiations abroad, he was primarily concerned with gaining an economic advantage. Given the serious conflict of interest with China over the maritime border with South China, Indonesia's participation in the BRI is also motivated by economic benefits. While the president believes that there is no alternative to economic cooperation with China, he is pro-Western in terms of regional security and international politics. He favours a stronger US military presence in the region while supporting the engagement of Australia, India and Japan in the region.

As the island state is also significantly affected by global warming, the country is in favour of sustainable development. To this end, in addition to preserving the rainforest, the state has committed to increasing the use of renewable energy from 30% to 48% by 2030 (Reuters, 2021a). The Indonesian government has also announced a carbon neutrality target for the country, including a plan to shut down all coal-fired power plants by 2056.

3.2 Philippines

With 109 million inhabitants, the Philippines is Asia's oldest democracy and its population continues to grow. The island nation is one of the emerging economies, the 13th largest economy in Asia and the 29th largest in the world, with 13.2% of the population living in poverty (Philippines Statistics Authority, 2022). The country is categorised as an emerging economy and has the highest nominal GDP in Southeast Asia after Thailand and Indonesia. Today, 60% of GDP is generated in the service sector, with tourism and information technology occupying a prominent position. In 2020, GDP fell by 9.6% compared to the previous year, the largest decline since statistics began in 1946 (Sanchez, 2020).

After gaining independence from the United States in July 1946, the Philippines remained a close ally and "partner" of the US. As a founding member of ASEAN, Manila supported regional integration

efforts, but until the end of the Cold War, the Philippines' political, military and economic relations were characterised by dependence on the US. The government in Manila increasingly saw the rise of China and its expansion in the South China Sea as a threat and was interested in strengthening alliance relations again in the early 2000s in parallel with the global war on terrorism.

The government of President Rodrigo Duterte, in office from 2016-2022, has set itself the goal of increasing competitiveness, improving rural areas, healthcare and education, and promoting investment. The 25-year long-term vision *Ambisyon Natin 2040*, which also incorporated the views of Filipino citizens, identified the main objective as the alignment of socio-economic programmes and development, prioritising education, with the aim of creating a prosperous, “smart and innovative” society with an essentially middle class by 2040 (NEDA, 2016). As the island nation is highly vulnerable to climate change, this year the government pledged to reduce carbon emissions by 75% by 2030 (Reuters, 2021b).

Although the Philippines is an ally of the United States, President Duterte has been open to China to participate in the BRI, but one of the country's priority problems – the lack of infrastructure – has not been addressed with Chinese investment, while the geopolitical conflict between the two countries in the South China Sea has escalated, leaving the president once again without US support in the final months of his term.

In May 2022, the election of Ferdinand Marcos Jr. as president led to a change in foreign policy strategy. Marcos, who had promised to continue the policies of his predecessor but, unlike Duterte, is considered more pro-American, essentially committed to strengthening security ties with the US – including access to new military bases for Washington – but without renouncing effective economic cooperation with China. In January 2023, he visited Beijing with the aim of opening a new chapter in strategic cooperation between the two countries (Strangio, 2023a). Marcos and Xi Jinping eventually signed 14 bilateral agreements in areas such as agriculture, infrastructure, development cooperation, maritime security and tourism (Strangio, 2023b). Like Duterte, Marcos is also trying to rely on Chinese aid (loans, grants, investments) for infrastructure development. In this context, the BRI projects in the Philippines were an important part of the negotiations.

3.3. Vietnam

Vietnam, with a population of more than 98 million, is a geostrategic power in Southeast Asia, which has successfully challenged several great powers throughout its history. Having joined ASEAN in 1995, the country's development over the past 30 years has been remarkable. Economic and political reforms (*Doi Moi*) launched in 1986 have triggered rapid economic growth, transforming one of the world's poorest nations into a lower middle-income country. Vietnam's economy – a socialist-oriented market economy modelled on China's – is the 23rd largest in the world in purchasing power parity terms. Vietnam is projected to approach the upper middle-income group of countries within 10 years. Between 2002 and 2018, GDP per capita increased 2.7 times, while more than 45 million people were lifted out of poverty (The World Bank, 2022b). During 2018-19, GDP grew by 7% while, thanks to export-oriented manufacturing and domestic consumption, the economy showed considerable resilience, which enabled it to continue to grow at a positive 2.9% during the crown virus epidemic in 2020, making it Asia's best performing economy in 2020 (Lee, 2021). In 2022, GDP grew by 8.02%, the fastest rate of growth since 1997 (Vu, 2022). The US remains the largest export market, and it is no coincidence that it has a large trade deficit with Vietnam.

According to the *Socio-Economic Development Strategy for 2021-2030*, the main objectives for the coming years are to improve productivity, efficiency and competitiveness, promote scientific technological development, support the investment and business environment, and address social inequality (Ministry of Planning & Investments, 2019). Vietnam is also committed to sustainable development, with the National Action Plan aiming to achieve sustainable consumption and production by 2030, which essentially means the adoption of environmentally friendly technologies (Ministry of Industry & Trade, 2020).

As far as foreign policy is concerned, the end of the Cold War, the fall of the Soviet Union and the communist regimes in Eastern Europe created a new foreign policy situation that also made

Vietnamese leaders cautious. After the 1979 war, relations with China were successfully normalised, while regional opening was also successful. But the normalisation of relations with the US is even more important. Following the lifting of the embargo, the two countries signed a trade agreement in 2001 and a US warship visited the country in 2003.

The biggest foreign policy challenge for Party General Secretary Nguyen Phu Trong, in power since 2011, and his entourage is how to balance China and the United States in the new multipolar world order. Relations between the Chinese and Vietnamese Communist Parties are now good, with both parties interested in deepening their strategic partnership. It remains true that Vietnamese foreign policy is largely shaped by accommodation with China. However, on certain issues, such as the South China Sea claims, there is little chance of compromise. This is why Hanoi's role in the Belt and Road Initiative is limited and is likely to remain so. Security cooperation with the US should be highlighted. Following Washington's lifting of the arms embargo on Vietnam in 2016, the Trump administration has also opted to strengthen ties (The White House, 2021a).

Under Joe Biden's presidency, the relationship between the two countries has further strengthened, with the Interim National Security Strategy issued in March 2021 listing Vietnam as a key partner in the region (The White House, 2021b).

4. CONCLUSION

As we have seen in the case of the 3 most populous countries in Southeast Asia, both China and the United States want to strengthen their influence. Therefore, the countries concerned are also pursuing a strategy of co-operation with both countries, without choosing sides, but trying to mediate between them. Although the geostrategic conditions of each country are different, each state is confronted with the increasing presence of the US and China in its foreign policy, so there is basically no alternative to a balance between the two. China's economic support (BRI) and the protection guaranteed by the US – the maintenance of the current status quo – are needed by almost all states. The events of recent years (the coronavirus epidemic, the Russia-Ukraine war) have of course also had an impact on the countries of Southeast Asia and have mostly had a negative effect on the region's development. At the same time, they warn those affected that in the new multipolar world order, peaceful cooperation between nations will be even more important than before in order to overcome global challenges, while rivalries between the major powers will remain. Another major challenge of our time concerns sustainability, which particularly affects the Southeast Asian region. Although, as we have seen, all countries are committed in principle to sustainable development, in many ASEAN countries economic development and environmental protection are difficult to reconcile, posing significant challenges for the future of the region. Overall, however, it can be said that national economic interests must not take precedence over regional and global interests for the future of the planet, which will of course require greater efforts from Southeast Asia in the future.

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279 Regional and Economic Differences in Telework, What is the Reality after the Covid-19 Pandemic? A View from the Portuguese Context

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Abstract

Work habits and organization have undergone changes in recent years, especially with regard to the workplace. This was already happening before the pandemic context, but it was with COVID-19 that the need to adopt different work regimes accelerated, especially to control crowds and maintain economic production, which is evident with the growth of teleworking. In fact, there has been a significant increase in the number of employees working remotely across the EU, a trend that appears to continue in post-COVID times. Therefore, this work addresses the evolution of remote work in Portugal, based on the statistical information available by regions and economic activities, comparing the pandemic and post-pandemic periods, supported by information obtained through the execution of exploratory interviews to companies. This work is framed on the REMOBIL project and its approach to teleworking, including the characterization and analysis of the portuguese context. For this evaluation, data on the portuguese workforce were used from the ad hoc module Labor Force Survey of the National Institute of Statistics (INE), reported for 2019, 2020, 2021, 2022 and 2023 (data per quarter from the second quarter of 2020). These data were subsequently stratified by NUTS 2 region and economic activity classification. In addition, around a dozen companies from various sectors and multiple dimensions were interviewed. The results point to the reinforcement of teleworking as a response to the reality brought by the COVID-19 pandemic, with almost a quarter of the workforce working entirely remotely at the peak of the pandemic. In the post-pandemic context, fully remote work decreased, but the hybrid regime gained a lot of preponderance, with values varying from 12% to 19% per quarter. Additionally, regional realities proved to be heterogeneous, with the most economically important regions, with emphasis on the Lisbon Metropolitan Area (LMA), showing the highest proportion of employees working remotely. Concluding that there is a regional hierarchy, in which AML leads the regions (with a completely remote workforce of more than 35% during the peaks of the pandemic, and post-pandemic values that vary between 9% and 13% per quarter), mainly due to the type of economic activities that characterize it, followed by the North and Centre regions with almost half of the values recorded by the AML. Focusing on AML, it was also possible to stipulate future strategies in relation to the use of the teleworking regime by companies.

Keywords

Economic activities; Hybrid regime; Portugal; Remote regime; Telework.

1. INTRODUCTION

Work habits and organization have been changing in recent years, especially in the matter of where work is carried out, with an ever more diversified range of workplace types (from coworking spaces to creative hubs or even in the employee's home) (Méndez-Ortega et al., 2022). This was true before the pandemic context; however, it was with the COVID-19 that these changes were accelerated, due

to the need to control agglomerations and maintain economic production (Marques da Costa & Marques da Costa, 2021), being this blatantly evident with the growth of teleworking and its both benefic and problematic characteristics (Veloso et al., 2022).

Albeit recently reaching new levels of adoption, teleworking as a concept emerged decades ago, in the 1970s, being connected to the energy crisis, the decrease in the price of Information and Communication Technologies (ICT) and the expansion of counter-urbanization. In fact, from the 1990s onwards, this work regime got a boost in support, because the technological advancement and the way of production of the post-industrial society – more specialized and with a higher degree of training – turned possible the adoption and enhancement of teleworking (Gibson et al., 2002). But, until 2020 this work regime consisted only of a residual part of the total work regimes, mainly adopted by very high-skill functions and digital nomads. It was with the pandemic that the people working from home became a factor in the general picture, being estimated that almost 42 million employees teleworked across the EU in 2021, an extraordinarily steep increase when compared with the value from 2019, the last pre-pandemic year (European Economic and Social Committee, 2021). Although these numbers observed a somewhat small decline in 2022, the growing trend is suspected to resume as jobs that are possible to execute through telework are on constant growth due to the advancement of technological developments and both employees and employers tend to favor forms of remote work (Eurofound, 2022).

It is an undeniable fact that the trends in the post-pandemic work regimes are dissimilar from the pre-pandemic ones, with working from home or remote working (either fully remote or as a myriad of hybrid models) dominating the changes, nevertheless, this process shows to be asymmetric amongst several factors, as disparities in the adoption of remote working can be felt across regions, types of activity or even the individual's characteristics.

This study arises within the shifting realities in work regimes, looking at remote work and its changing spatialities, while focusing on the regional and the economic activity scopes, analyzing the asymmetries that derive from that in such an ever-changing process. Furthermore, this paper represents the REMOBIL project's (REthinking MOBILity, location patterns and urban form after the COVID19 pandemic. The effects of telework and e-shopping, PTDC/ECI-TRA/4841/2021) first approach to teleworking, constituting the characterization of the Portuguese reality while also being the basic element that will support the development of future tasks.

2. METHODOLOGY

In this work, we analyze the evolution of remote work across the pandemic period and in the post-pandemic time in Portugal, following a methodology based on descriptive analysis. For this analysis data for the Portuguese workforce from the Instituto Nacional de Estatística (INE) Labour Force Survey ad hoc module was used, reporting to 2019, 2020, 2021, and 2022 (data by trimester from the second trimester of 2020 onwards). This data was stratified by NUTS 2 region and economic activity classification.

3. RESULTS AND DISCUSSION

Before the COVID-19 pandemic, in 2019, only 2.5% percent of the workforce worked from home and 0.7% worked in a place that was not an office or with the client. These values showed to be a little higher in regions with a very strong service sector as is the Lisbon Metropolitan Area (LMA) (2.8% - maximum). As for the demographic characteristics, men (2.6%) showed a higher percentage of teleworking than women (2.3%), workers 45 or more years of age presented the highest proportion of working from home (3.1%) between all age groups, and people with higher education were the ones that registered a higher percentage of workers in teleworking.

With the pandemic the percentages exponentially increased, Table 1 shows the percentage of employees that worked completely remotely as a percentage of the total in Portugal and by NUTS 2 regions (the first trimester of 2022 is included due to the lockdown in place in Portugal). The initial period of the pandemic was the one in which most workers were working from home (23.1%),

followed by the first trimester of 2021 (21.6%), this was expected as both of these periods were accompanied by strict lockdowns (from 18th of March to 2nd of May of 2020, and from 15th of January to 15th of March of 2022). Furthermore, there was a consistent and sturdy decrease of employees in teleworking from the beginning of the year (second trimester in 2020 and first in 2021) to the end of the year, while also the percentage of workers in this working regime due to reasons related with the COVID-19 pandemic decreased.

As for regional asymmetries, it is clear that the values are not similar amongst regions (Table 1). LMA was by far the one with the highest levels of teleworking and, although this value is also related to workers who are at home for reasons related to COVID-19, even if these workers are excluded from the analysis, the number of individuals in complete remote work is much higher than in the other regions.

Table 1. Employed population that worked completely remotely in the reference week and in the three previous weeks as a percentage of the total employed population by NUTS 2 and in parenthesis the percentage of those that worked from home due to reasons related to the COVID-19 pandemic.

Time (year and trimester)		Portugal	Norte	Centro	LMA	Alentejo	Algarve	Azores	Madeira
2020	2 nd	23.1 (91.2)	19.8 (90.7)	16.7 (90.5)	36.0 (93.3)	17.4 (85.6)	18.5 (85.1)	16.9 (89.1)	16.4 (88.1)
	3 rd	14.2 (79.1)	10.2 (76.9)	9.9 (66.8)	26.6 (87.0)	8.6 (66.9)	9.3 (64.3)	7.3 (No data)	6.4 (No data)
	4 th	12.3 (79.4)	9.4 (74.3)	8.1 (66.2)	23.3 (88.6)	7.2 (77.1)	5.5 (No data)	4.4 (No data)	5.0 (No data)
	1 st	21.6 (87.1)	17.1 (84.8)	15.9 (81.9)	36.6 (90.9)	14.9 (85.9)	16.7 (87.1)	8.5 (64.6)	6.5 (76.7)
2021	2 nd	15.4 (82)	11.2 (76.3)	11.3 (78.2)	28.4 (87.2)	8.7 (83.8)	9.1 (67.7)	4.1 (64.7)	6.1 (63.4)
	3 rd	13.1 (71.6)	9.7 (64.7)	8.1 (66.2)	25.4 (79.2)	7.8 (61.5)	8.1 (50.8)	2.8 (28.9)	4.0 (No data)
	4 th	9.9 (63.8)	7.3 (58.7)	6.2 (57.0)	19.2 (71.5)	5.6 (56.3)	4.9 (19.6)	2.5 (13.4)	3.2 (37.4)
2022	1 st	10.8 (64.4)	8.2 (56.5)	6.7 (47.1)	21.1 (74.6)	5.8 (62.9)	5.6 (39.9)	3.2 (28.2)	3.6 (No data)

Analyzing the categories of economic activity (Figure 1), the group that comprises the Information and communication activities, the Financial and insurance activities, the Real estate activities, the Consulting, scientific, technical and similar activities, and the Administrative activities and support services was the one with a higher proportion of employees working completely remotely, this was already expected as they integrate a big part of the more specialized work in which employees have a higher degree of training, characteristics. These were normally followed by the group that encompasses the activities linked to Public Administration and Defense and mandatory social security, Education, and Human health and social support activities, however, in this case, it tends to only react to the pandemic peaks, as the workers in these activities telework mainly at these moments.

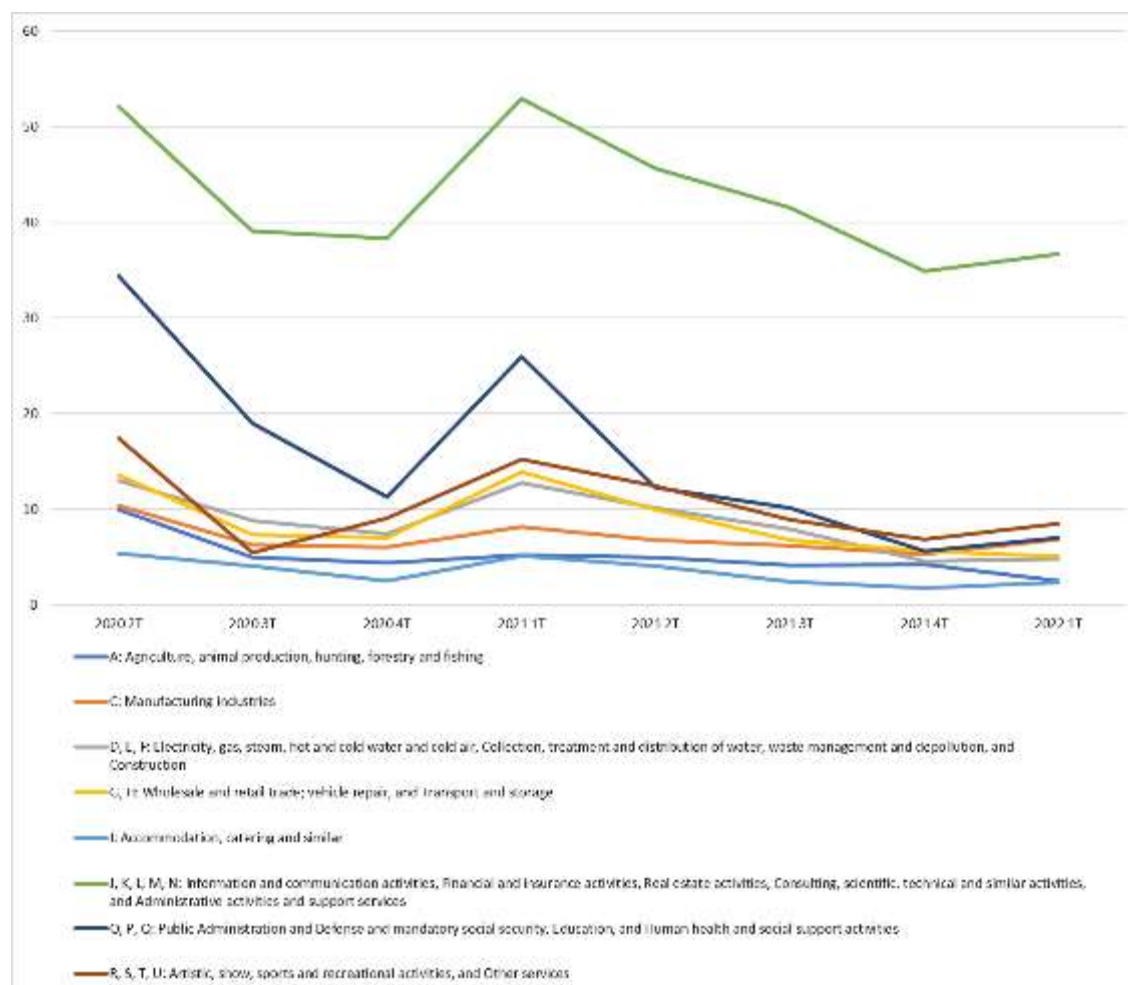


Figure 1. Employed population that worked completely remotely in the reference week and the three previous weeks by category of economic activity as a percentage of each category.

As for the post-pandemic period, and compared with the pre-pandemic year of 2019, the percentage of employees working remotely in Portugal (either completely or in a hybrid system), was now over eight times higher, and in some regions in which the economic structure is more prone to this work regime increased tenfold, as is the case of LMA (Figure 2). Moreover, all regions decreased their values from the second trimester of 2022 onwards, as teleworking due to COVID-19 reasons tended to diminish, although decreasing more than others, particularly the Algarve region.

In the matter of the categories of economic activity, although it is needed to emphasize that the values report to all systems of remote work and not only the completely remote, teleworking is still a reality, even if with somewhat smaller numbers, it maintains its preponderance, even when accounting for the workers only teleworking for reasons related to the COVID-19. The importance of teleworking is latent in the activities that are more suited to it, with the categories of Information and communication activities, Financial and insurance activities, Real estate activities, Consulting, scientific, technical and similar activities, and Administrative activities and support services having consistently half of its employees (or almost) working remotely in the year of 2022 (Table 2).

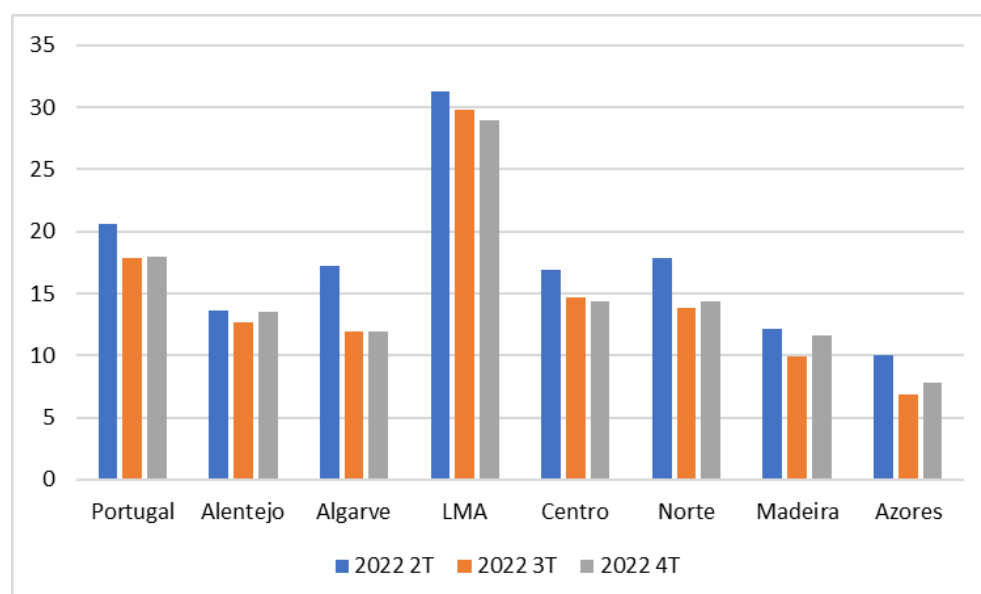


Figure 2. Employed population that worked remotely (completely or hybrid) in the reference week and in the three previous weeks by NUTS 2 in percentage.

Table 2. Employed population that worked remotely (completely or hybrid) in the reference week and in the three previous weeks by category of economic activity as a percentage of each category and in parenthesis the percentage of these that worked from home due to reasons related to the COVID-19 pandemic.

Time and trimester)	(year	A	C	D, E, F	G, H	I	J, K L, M, N	O, P, Q	R, S, T, U
	2 nd	8.9 (3.9)	10.9 (32.6)	12.7 (No data)	12.0 (34.3)	5.9 (6.6)	51.3 (40.7)	22.9 (18.0)	13.7 (20.9)
2022	3 rd	8.7 (8.3)	7.4 (20.5)	11.5 (20.3)	10.7 (24.1)	4.3 (8.3)	47.5 (27.1)	19.5 (11.9)	13.9 (11.7)
	4 th	6.2 (2.4)	8.1 (15.1)	9.7 (No data)	11.3 (14.6)	4.3 (2.9)	45.6 (19.4)	21.4 (7.4)	13.2 (9.0)

This shows that in Portugal this work regime emerged as a response to the pandemic reality and the necessities of economic production but maintained its preponderance in the aftermath of the pandemic context.

4. FINAL CONSIDERATIONS

We found out that remote working in Portugal had an intense evolution catalyzed by the COVID-19 pandemic, moving from a residual factor to an important work regime (either as a completely remote system or as a hybrid one). This was mainly observed in the LMA region, where most of the core of the Portuguese economic tissue is located, and in the categories of economic activities where the most technological and specialized functions are integrated.

Within the framework of the REMOBIL project, this information and paper will support future tasks, shedding light on the Portuguese reality and serving as a reference for the surveys that will be applied to companies and its employees, trying to assess the impacts of the adoption of telework (and e-shopping) on new geographies of mobility and urban form.

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286 Changes in the World of Work since the COVID-19 Epidemic in Rural Areas in Hungary

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Abstract

The epidemic spread of the COVID-19 coronavirus in Hungary in the spring of 2020 has significantly changed the way people used to work in a mostly traditional, personal way. The changes have created the possibility of separating the workplace from the task at hand, and of creating a more optimal working environment for the employee in the form of a home office. The process of change, which has been a major challenge for some business organisations, varies from country to country and from job to job, as not all jobs are suitable for working from home. The use of the home office in Hungary has so far been significantly underdeveloped compared with other European countries, but the coronavirus has forced many companies to adopt this solution. Teleworking has many advantages and disadvantages. Its advantages are primarily felt by employees. This form of work offers a greater degree of freedom, allowing workers to work from the comfort of their own home, and would be a good way of increasing the population in rural areas, given the declining population of rural areas. Using a questionnaire survey, the author analyses the opinions of 341 Hungarian workers on the home office according to the type of municipality where they live. The aim of the study is to explore the relationship (considering the limitations due to the small number of items) and the perception of home office work by the type of municipality of residence of Hungarian workers. It is hypothesized that there is a difference between the opinions of teleworkers living in the capital city, city or village. The calculations show that there is no significant relationship between the perception of home office and the type of municipality where the respondent lives. Among the employee opinions on the home office, the most important factors were the absence of stricter rules on dress and the reduction of travel time.

Keywords

Home office, COVID-19 pandemic, workplace, Hungary

1. INTRODUCTION

The aim of the study is to present the increasing prevalence of home offices as the number of cases of coronavirus disease increases, and the opinions of employers. A distinction must be drawn between home office and teleworking as a form of atypical employment. In Hungarian terminology, in lay and often in professional language, home office is often used as a synonym for teleworking. However, the two terms are not identical, the difference lies in the function. Teleworking is an atypical form of work that requires the active use of a computer and other ICT tools. Teleworking takes the form of a permanent employment relationship, typically carried out from home. Home office means working from home, the employee may use ICT tools while working from home, but this does not automatically make the employee a teleworker. Working from home is usually temporary, as opposed to teleworking, where work is done permanently away from the workplace. The home office is a typically unregulated area in the domestic legal system, while teleworking is covered by domestic legislation (the Labour Code) (Bankó, 2014; Bankó - Ferencz, 2015; Karoliny et al, 2017) In January 2021, I conducted an online questionnaire survey using the snowball method, asking Hungarian employees' opinions on the home office. The coronavirus epidemic also put employers in a difficult situation, as they had to react quickly to the changed working conditions and rules, with

no choice but to learn new ways of working (Kane et al, 2021). The increasing spread of atypical forms of employment may be a partial solution to the labour market difficulties in Hungary (Mélypataki et al, 2020). The question is whether, as the viral situation subsides, the home office will remain a sustainable employment and work organisation option in the future or whether everything will revert to the more traditional employment of the past. The present study cannot answer this question, but it does provide an assessment of the situation and a status report on the perception of the home office by employees.

2. LITERATURE REVIEW

Prior to the emergence of the coronavirus, the share of teleworkers in Hungary was relatively low (3.7% of employees, or 144,000 people, worked telework in Q1 2018, according to the Hungarian Central Statistical Office) compared to the total number of employees. In the European Union before the coronavirus epidemic, nearly 20% of workers were teleworkers (Eurostat). Teleworking is a type of atypical employment, where work is carried out at a location other than the workplace (Belzunegui-Eraso - Erro-Garcés, 2020). Typically, work is carried out in a home environment, so home office is considered as a way of organising work. The rapid shift to the home office in spring 2020 in several countries around the world was aimed at reducing the spread of the virus and the potential risks and burden on the healthcare system (Mouratidis - Papagiannakis, 2021).

The successive closures during the COVID pandemic changed everyone's lives. In the labour market, the relationship of most workers to work has been significantly reshaped in time, space and work organisation. The key adaptation to this shock was the home office. The home office is defined as working away from the traditional office, from home, using computers or other digital devices to maintain contact with the office (Bélanger, 2008). The concept of the home office is often associated with other related concepts such as teleworking, working from home, mobile working, flexible working hours, satellite office. In the late 1970s and 1980s, the home office was seen as the future of work organisation (Illegems, 2001). At the time, it was also argued that it was becoming increasingly feasible thanks to the development of information and communication technologies (ICTs). The home office has many advantages and disadvantages at both organisational and individual levels. Among the advantages are that home office practices help productivity, profitability and flexibility. This is accompanied by a reduction in absenteeism and employee turnover (Frolick, 1993). Some authors highlight the improvement of remote collaboration, yet most authors emphasise the lack of collaboration and team spirit as a disadvantage of the home office. At the employer level, the disadvantages of the home office are administrative and legal, and the reduced control can lead to a reduction in working time and increase the risk of cyberslacking (employees using company internet and e-mail services for personal activities during working hours). At the same time, the home office has offered employees greater flexibility in terms of work schedules and use of time and energy, contributing to better job satisfaction and quality of life. The home office also offers autonomy and greater concentration (Rupietta, 2016).

Waizenegger and colleagues used affordance to investigate the sudden problems caused by COVID-19 and the technological tools that workers were forced to use to achieve their goals of group collaboration. In particular, they highlighted that achieving business goals should also be a priority, even during the period of working from home. In the post COVID-19 period, businesses can evaluate how to preserve the benefits generated during the COVID epidemic, such as increased productivity, reduced communication barriers and the integration of teleworkers (Waizenegger et al, 2020).

Feliciano and colleagues' research aimed to explore the difficulties of maintaining productivity and team engagement in the home office system. They concluded that managers still need to evolve to this working arrangement in order to lead their teams remotely, focusing on results rather than process-focused leadership (Feliciano et al, 2021).

Herdon et al. pointed out that the Labour Code does not contain any provision for home office as a home-based work arrangement, but it does mention two legal arrangements - teleworking and the employment relationship - that allow for working from home. By contrast, the concept of the home office, which was created by the business sector and exists in the legal literature, was created

precisely to allow temporary, irregular home working instead of the atypical legal relationships that are based on regularity and permanence. However, it should be stressed that a specific legal regulation of the home office is considered indispensable (Herdon et al, 2020).

In their study, Moretti and colleagues highlighted those workers perceived working from home as less productive and stressful. They particularly valued the travel time saved to work but were not happy about the isolation from colleagues (Moretti et al, 2020).

Using factor analysis, they found that the advantages and disadvantages of teleworking and working from home were clustered around six factors during the pandemic. Work-life balance, work efficiency and control of work were highlighted as advantages, while limitations associated with working from home, job insecurity and inadequate tools were highlighted as disadvantages (Ipsen et al, 2021). Exploring new digital tools was found to be more difficult for older and less skilled teleworkers (Martin et al, 2022).

Some organisations have raised concerns about productivity loss, the maintenance of corporate culture and health and safety at work as a result of the rise of home working, while workers were more concerned about social interaction, internet connectivity and increased workload (Marzban et al, 2021).

Virtual offices may pose new threats to workers and organisations, but these threats can be managed with proper planning and training. Virtual offices also have the potential to provide positive challenges for employees, making them places where employees feel comfortable and perform well (Stich, 2020).

Workers spent less time in meetings per day post-closure, and a significant and sustained increase in average workday length and a short-term increase in email activity were also highlighted (DeFilippis et al, 2020).

Based on the experience of working from home during the coronavirus epidemic, the literature typically identifies two segments of workers: one segment of workers who would like to return to the office and one segment of workers who would prefer to stay at home in the future and work in a home office. The first segment comprised relatively more male, highly educated, full-time workers with better communication skills, while the segment of workers preferring to work from home comprised relatively more women, part-time workers, administrative workers, and workers with more individual work responsibilities, focused work and long commutes (Appel-Meulenbroek, 2022).

In the period of the COVID pandemic, the relationship of most workers to work has changed in time, space and the way work is organised. The home office was one of the most important forms of adaptation, in which achieving business goals remained a priority. It became clear that managers still needed to evolve to this working arrangement and to lead their teams remotely, focusing on results rather than process-centred management. Employees perceived the home office as less stressful and particularly appreciated the time saved in commuting to work, but were unhappy about being isolated from colleagues and were most concerned about social interactions, internet connectivity and increased workload. Although the home office is not fully regulated in Hungary, the concept of the home office, created by the business sector and existing in the legal literature, was created precisely to allow temporary, irregular home working rather than atypical employment relationships that presuppose regularity and permanence.

3. METHODOLOGY AND RESULTS

To confirm or refute what I read in the literature, I conducted primary research among people living and working in Hungary. The questionnaire survey was conducted in electronic form. The data collection was carried out online using Google Form and the processing was done using IBM SPSS Statistics Version 24. Data were processed anonymously. The data collection phase of the research was conducted in the month of January 2021 using a snowball method and targeted Facebook groups. In addition to demographic data, I also investigated the conditions of home office, the process of transition to telecommuting, advantages and disadvantages. In the present study, I formulated the following research questions.

After cleaning and checking the data, a sample of 341 respondents was available (Table 1), but the sample is not representative, and the results should be treated with reservations. This is a small sample compared to the total number of people employed, but the results show interesting correlations.

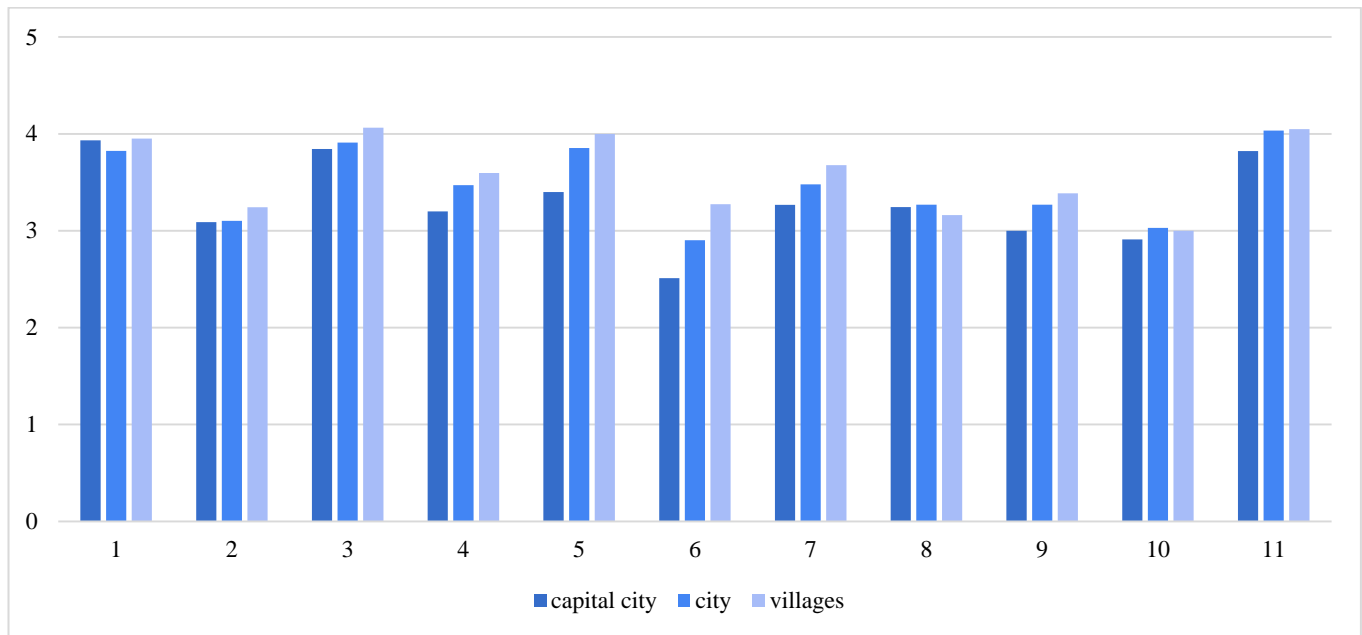
Table 1. Composition of the sample

Featured	Title	Item number
Gender	female	283
	male	58
Age	15-29	87
	30-39	117
	40-49	95
	50-59	38
	60-	4
Marital status	Married	144
	In a relationship	121
	Divorced	17
	Widow	2
	Single	57
Education	Primary school	0
	Secondary school	7
	High School	109
	College/university diploma	207
	Ph.D. or other academic degree	18
Permanent place of residence	Municipality, village	62
	County seat, other town	234
	Capital city	45

Source: Own compilation.

293 people (85.6%) had worked in a home office in the year before the survey and 48 (14.4%) had not. Only 95 people had ever worked typically from home before the COVID-19 virus outbreak, but these experiences were negligible, only one or two days per week. Only 63 people had a new type of work contract in spring 2020 when the home office was imposed, this could be explained by the fact that the transition took a few days and everyone was confident that it would be a short period. The survey found that 22% of respondents have been in a permanent home office since spring 2020, and the summer suspension of the state of emergency did not give them the opportunity to return to their jobs. The persistent home office can be explained by the fact that some employers perceived significant cost savings from the home office, as when an entire corporate division or department can be assigned to work from home, it results in a tangible reduction in overhead costs.

I asked employees for their opinion on each of the home office factors (they were asked to rate on a scale of 1 to 5). Figure 1 shows the average scores per factor based on the type of municipality where the respondents live.



Source: Own compilation

Note: 1: it gives me more freedom, 2: I am free from the daily working hours and the constraints of being tied to a particular place, 3: I don't have to look fit and dress nicely, 4: human relations are broken down, 5: I miss personal meetings with colleagues, 6: loneliness, 7: I can spend more time with my family while telecommuting, 8: I am more productive now that I telecommute, 9: I work much more than I used to in the traditional way, 10: household overheads are much higher, 11: travel time and costs are reduced.

Figure 1. Employee reviews of the home office

Those living in a village gave the highest scores for not having to look fit (4.0) and reduction in travel time and cost (3.9). For those living in the city, the highest scores were given to the reduction in travel time and cost (3.8), while for those living in the capital, the factors not having to look fit (3.9) and lack of personal contacts (3.8) were the highest scoring factors. The factor of loneliness received the lowest average score (2.5) in all municipal categories.

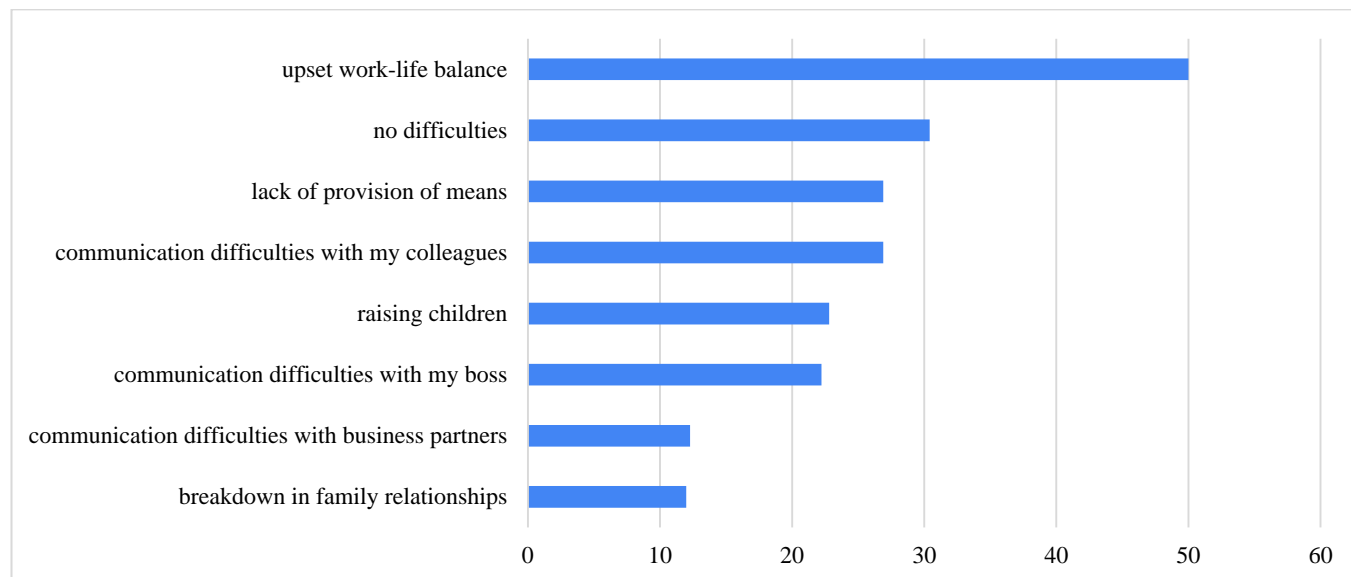
In the case of the settlement structure, I have examined independence. These showed a weakly significant non-significant relationship between home office characteristics and settlement structure. Following the independence test, I also conducted an analysis of variance. I tested for homogeneity, Levene's Statistic showed that the homogeneity of variances was met (Levene's Statistic 0.440, $df_1=1$, $df_2=216$, $p=0.725$). The ANOVA table showed that the significance level of the home office factors was greater than 0.05 so there was no relationship between the factors and settlement type. For those living in the county seat and other cities, the most important factor was that travel time and cost were significantly reduced during the home office. For those living in the capital city, getting rid of the fit appearance and the increased freedom from the home office were the most important, while for those living in a village or hamlet, the reduction in travel time and cost and the lack of personal contact with colleagues were the most important. Loneliness was the factor with the lowest average score, regardless of the type of settlement. It can be concluded that the type of municipality in which respondents live determines to a small extent the evaluation of the factors of working from home.

50% of the respondents experienced difficulties in the home office due to a lack of work-life balance (Figure 2). This is confirmed by the literature (Musinszki et al, 2020) by identifying the problem of work-life balance, that a common problem in teleworking and working from home is that the duration of work is not separated from household and other tasks, but can continue continuously from morning until late evening or with small or large interruptions, which clearly leads to a blurring of the boundary between work and private life. In the long term, this causes stress and strain for the worker and their family members.

29% of respondents complained about the lack of adequate tools, often having to work on their own computers, using home printers. This in no way motivates the worker to work efficiently and the

increased demands that arise mean that the assets are worn out more quickly. Any repair costs were also borne by the workers in this case.

Communication difficulties with colleagues were complained about by 26% of the respondents, which is also quite high. Presumably, the employees did not have a high enough proportion of soft skills (e.g. good communication skills, curiosity and critical thinking). The demand and expectation for soft skills is increasing in the case of employer needs (Horváth-Csikós - Juhász, 2021).



Source: Own compilation

Figure 2. Difficulties encountered during the home office based on the proportion of respondents (%)

Another difficulty mentioned was the difficulty of raising minor child(ren), as parents with young children had to manage the care and supervision of their children at home during this period due to the temporary closure of nurseries, kindergartens and schools. If the parent was working in a home office at the same time, the extra burden caused real problems. Of the respondents, 174 (51%) had no children, 57 (17%) had one child, 86 (25%) had two children and 24 (7%) had three or more children. 75% of respondents with no children would still prefer to remain in a permanent home office after the ageing situation. Among those with one child, this proportion is only 45%, and 23% for those with two children. This of course depends on the age of the children. Under normal working conditions, a permanent home office can help women's participation in the labour market if nurseries and schools are available for children.

4. SUMMARY

The aim of the study is to analyse the perception of the home office from the employees' side and to analyse the difficulties they encountered and how they experienced working from home. A questionnaire survey was conducted, as the sample was not representative, and the results should be treated with reservations. The survey could be repeated in the future by selecting a specific age group or a specific job to meet the representativeness requirements. The results of the present survey show a very mixed perception of the home office among employees. Parents with young children (typically mothers) found it difficult to reconcile work and private life and to care for children. Workers mostly used their own devices when working from home. Some workers received help only from their employer. Due to the relatively short time, it was not possible to evaluate the effectiveness of the home office in this study.

A future research direction could be to further analyse the home office through another questionnaire survey and in-depth interviews with employers. I believe that in the current sensitive labour market situation, the period of the coronavirus has given a lot of experience to employers and

employees, perhaps a change of attitude and a greater use of this atypical form of employment in the future. As the virus situation subsides or diminishes, perhaps the use of a partial home office (1-2 home working per week) will become common practice in jobs where the nature of the work allows it. I believe that it is important to analyse the experience to date and the effectiveness of employees working from home, so that employers can gain a clearer picture of the situation.

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326 Depopulation in the Borderland of Canton 10 in Bosnia and Herzegovina

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Abstract

In this paper, we consider the depopulation process in the borderland of Canton 10 in Bosnia and Herzegovina from 2013 to 2022. Canton 10 is an administrative area of Bosnia and Herzegovina on the west side of the country, bordering the Republic of Croatia. This borderland includes three municipalities: Bosansko Grahovo, Livno, and Tomislavgrad. The area of the borderland is 2,741.4 km². According to the estimate, 63,981 inhabitants lived in this area in the middle of 2022. Compared to 2013, the number of inhabitants decreased by 6.2%. In the same period, the number of live births decreased by 18.4%, and the number of deaths increased by 6.1%. The natural population change in 2022 is negative: -378, or -5.9‰. According to official data on migration in the period 2013–2022, the migration balance was negative and amounted to -1,141. The depopulation is evident in the accelerated reduction of the total number of inhabitants, but also in the decreasing number and share of young people (0–14 years) and the increasing number and share of elderly (65 and older) in the same period. For the analysis of contemporary depopulation processes, the following methods were used: indices of population change; rate of total and average annual change in the number of inhabitants; absolute change and relative change in the number of inhabitants; the types of population movement by municipality were calculated; change in the number of live births and deaths, birth rate, mortality rate, natural change and natural change rate; the number of emigrants and the number of immigrants, migration balance, in total, but also by age group; implied total fertility rate; contingents of the female population, working contingents, large age groups of the population, types of aging of the population, the proportion of the elderly and the young; unemployment rates. A special survey on a sample of 300 respondents was conducted in the period September–December 2023 in order to show the perception of the most important causes of depopulation and their impact on the development of this area. The results of the survey showed that 77% of respondents aged 20–39 want to leave the area permanently. The respondents see unemployment, low wages, emigration (of young people), politics, corruption and nepotism, and lack of cultural and entertainment activities as the main problems in the area.

Keywords

Depopulation processes, fertility, perception, western Bosnia and Herzegovina.

1. INTRODUCTION

The subject of the study is depopulation in the borderland of Canton 10 in Bosnia and Herzegovina. The aim of the research is to analyze and show the demographic processes of the borderland, from 2013 to 2022. When necessary, the aforementioned period of analysis was expanded with earlier periods to obtain a more precise "framework" in which the number of inhabitants changes.

The main hypothesis is that there is a continuous process of population reduction in the border area, as well as in all its municipalities from 2013 to 2022, which is directly influenced by modern reductions in natural change.

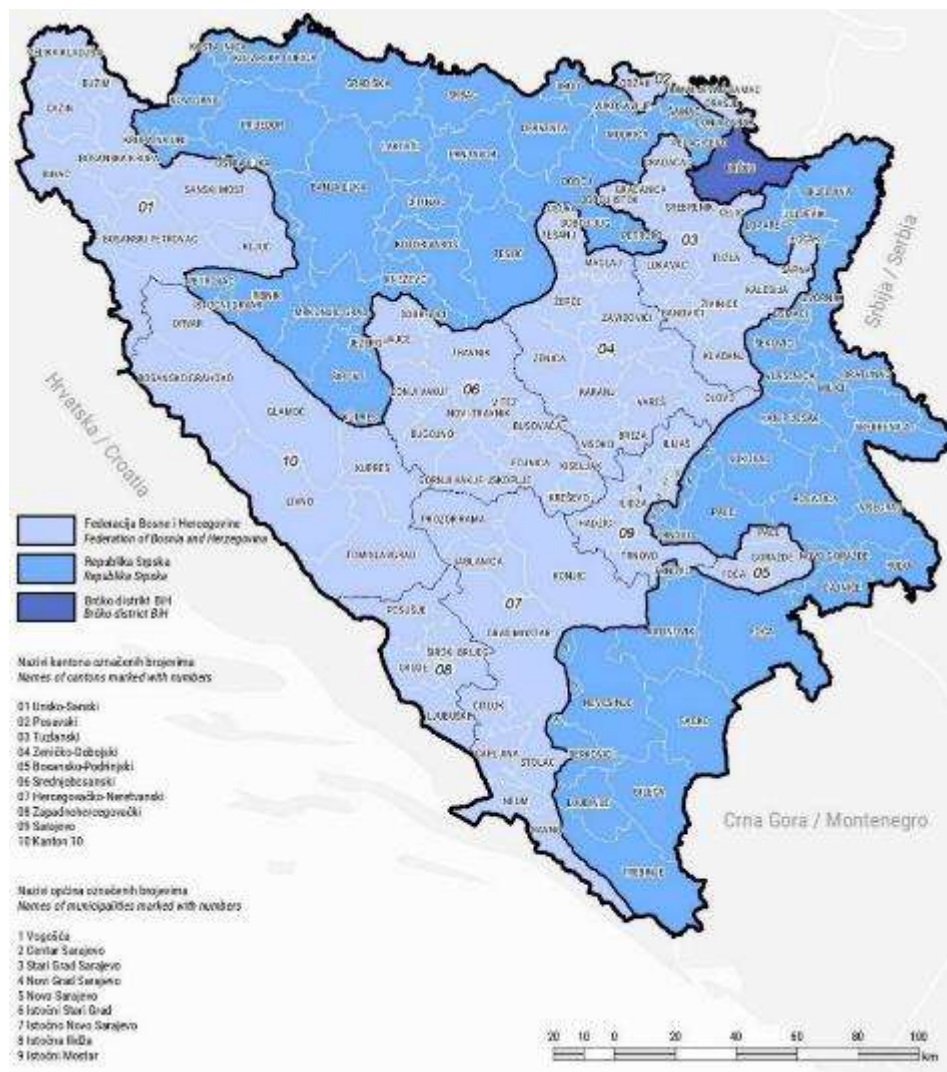
For the analysis of modern demographic processes, the index of population change was used; the rate of total and average annual population change; absolute change and relative change in population; according to the value of the relative change in the number of inhabitants, the type of

population movement is calculated; the number of live births and deaths, birth rate, mortality rate, natural change and rate of natural change; the number of immigrants and the number of emigrants, the migration balance, the total, but also by age groups; implied total fertility rate; contingents of the female population, working contingents, large age groups of the population, type of age structure of the population, share of the elderly and youth.

For the purposes of previous analyses, data from the 2013 Census (Agency for Statistics of Bosnia and Herzegovina, 2016) were used, as well as data collected and estimated by the Institute for Statistics of FBiH. A special survey on a sample of 300 respondents was conducted in the period from September to December 2023. The sample is spatially and demographically stratified in order to be as representative as possible. Of the total number of respondents, 22.3% were from urban settlements and 77.7% from rural settlements. Among the respondents were 50.7% men and 49.3% women. According to the age groups, the subjects were: 20-39 years (27.4%), 40-64 years (51%) and 65 years and older (23.6%). The survey was done live, "face to face". The survey contained 16 questions. There were six profile questions. Of the total number of questions, six were open, and the rest had more proposed answers. This paper analyzes the results of survey research on the current and desired number of children, the intention of emigration from the border area, the perception of population problems, and the recommendations of respondents for local authorities (Survey, 2023).

2. STUDY AREA AND SHORT LITERATURE REVIEW

The borderland of Canton 10 consists of three units of local self-government: Livno, Tomislavgrad, and Bosansko Grahovo. The borderland is located in the west of Bosnia and Herzegovina (Figure 1), bordering Republic of Croatia. The total area is 2,741 km², which makes 5.3% of the total area of Bosnia and Herzegovina (hereinafter: BiH), 10.5% of the total area of the entity of Federation of Bosnia and Herzegovina (hereinafter: FBiH), and 55.5% of the total area of Canton 10 (Canton 10 in numbers, 2013-2022). This is an area of high Bosnian karst that stretches parallel to the coast of the Adriatic Sea. Both geographically and climatically, mediterranean, continental and mountain climates meet and collide with sometimes harsh winters and pleasant summers. The area belongs to the mesoregion of the bila, karst fields, and highlands of southwestern Bosnia, and is generally identified with the structural-facial zone in the outer Dinarides, which is marked as the "Higher zone of the High Karst" (Vidović 1978). It is also the most extensive field complex in the Dinaric karst, and it consists of three large fields: Livanjsko (the largest field in the Dinaric karst with an area of 405 km²), Duvanjsko (121.6 km²), and Grahovsko (80 km²). They are characterized by a large area, which is closed by higher mountain terrain, and hydrological communication that is possible only by underground flows (Gekić et al., 2022: 345-405).



Source: Agency for Statistics of Bosnia and Herzegovina, 2023.

Figure 1. Administrative division of Bosnia and Herzegovina with borderland of Canton 10 on the west

Arable land occupies 24%, while about 57% of the total area of the borderland is under forest (Development Programming Institute of FBiH, 2023). The border area consisting of three units of local self-government is administratively divided into 154 settlements (Agency for Statistics of Bosnia and Herzegovina, 2016). About 60% of the ploughland is not used. According to an estimate in mid-2022, there were 63,981 inhabitants in this area (1.8% of the total population of BiH; 3% of the total population of the FBiH; 82.2% of the total population of Canton 10), while the average population density was 23.3 inhabitants per km² (three times less than the average for BiH) (Population estimates, 2022). The largest urban settlement is Livno with 7,927 inhabitants, and the degree of urbanization is about 21% in the borderland (Agency for Statistics of Bosnia and Herzegovina, 2016). In 2022, there were 8,206 people employed and 4,409 unemployed residents. The majority of the population worked in the tertiary sector of activity (65%), with the most in retail (15%) and administration (13%). The average monthly salary in 2022 was 538 EUR, which was 5% below the FBiH average, but by 1% more than in Canton 10. The ratio between the number of employees and the number of pensioners is 1.3 to 1 (Canton 10 in numbers, 2013-2022).

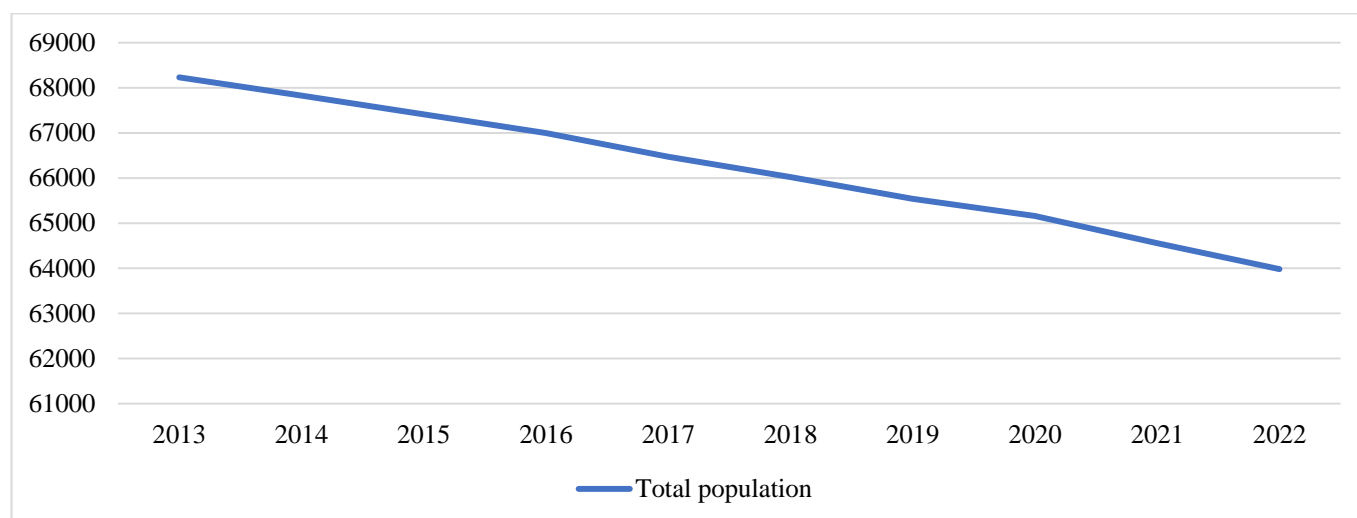
The contemporary demographic situation and fertility in the Canton after 2000 has some similar characteristics to those stated in the theory of the second demographic transition (Lesthaeghe, Neels, 2002: 325-360; Lesthaeghe, Surkyn 2002, 2007: 80-108; van de Kaa 1994, 2001: 290-331, 2002; van Bavel, 2010), in which the birth rate falls below the replacement level and refers to changes in family and fertility patterns associated with structural and cultural changes marked by modernization, the

expansion of higher education, the rise of secularization, the growth of individualistic values, and the importance of self-fulfillment.

In addition to unemployment, the inadequacy of the education system, the depressing political situation, and the lack of prospects for a better future have all contributed to the mass emigration of young people. Existential problems of the youth also have a strong impact on having fewer children than desired (Gekić et al., 2020: 47-64). The high increase in the proportion of the elderly population, especially the older part of that contingent, indicates that Bosnia and Herzegovina is rapidly approaching the situation in the most developed European countries, where the proportion of the elderly age group of the elderly contingent is growing much faster in the total elderly population. In Bosnia and Herzegovina, this is a consequence of especially the war, and in recent times, the economic emigration of the population aged 20-39 associated with the inability to find employment in their country (Gekić et al., 2019: 215-226).

3. RESULTS AND DISCUSSION

The population of the borderland was 63,981 in 2022 and is down by 6.2% (4,252 inhabitants less) compared to 2013 (index of change 93.8) (Figure 2). Also, in 2022, there were 19% fewer inhabitants in this area than in 1991. On average, the total population decreased by 0.62% per year between 2013 and 2022. The total number of inhabitants is decreasing on average annually faster compared to the FBiH (0.62% vs. 0.28%) and BiH (0.62% vs. 0.47%), but slower than compared to Canton 10 (0.62% vs. 0.77%). It should be noted that the data on the total population after 2013 were estimated by the Institute for Statistics of FBiH. At the level of municipalities, Livno had a population decrease of 6.1% (from 34,178 to 32,078), Tomislavgrad by 5.5% (from 31,606 to 29,858), and Bosansko Grahovo by 16.5% (from 2,449 to 2,045).



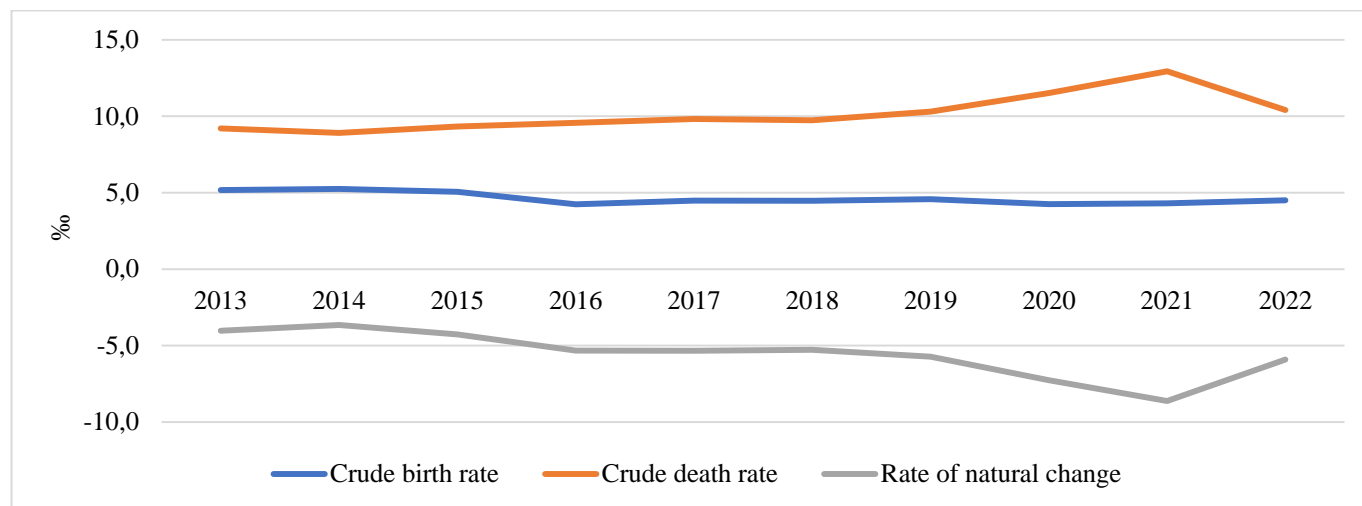
Source: Population estimates 2022.

Figure 2. Change in the total population number in the borderland, 2013-2022

The size of the change in the total population of -6.2% from 2013 to 2022 determined the type of population movement in the area, which is mediocre population depopulation. The population decline was 85% due to negative natural changes and 15% due to negative migration balances. Between 2013 and 2022, a total of 3,070 children were born. At the same time, 6,724 people died. In the pandemic year 2021, 23.7% more people died than in the pre-pandemic 2019. This is significantly less than compared to the FBiH (32%), BiH (30%), but slightly more than in Canton 10 (22.5%). Throughout the period from 2013 to 2022, the birth rate in the borderland is very low (4.5‰ in 2022), the mortality rate is moderately high (10.4‰ in 2022), and the rate of natural change is negative (-5.9‰). The highest number of live births in the period from 2013 to 2022 was in 2014, 356, and the lowest in 2020, 277 (down by 22.2%). The highest number of deaths was recorded in the pandemic year 2021 (835) and the lowest in 2014 (604) (up by 38.2%). In 2013, the natural

population change was negative (-275), and it was the lowest in 2021 (-557). As of 2016, the birth rate has been consistently below 5‰ (extremely low rates). As of 2019, as a result of population ageing, mortality rates have been above 10‰, and during the COVID-19 pandemic period, they were between 11‰ and 13‰ (Figure 3). The rate of natural change has decreased since 2016 from -5.3‰ to -5.9‰ in 2022 (Demographic Statistics, 2013-2022).

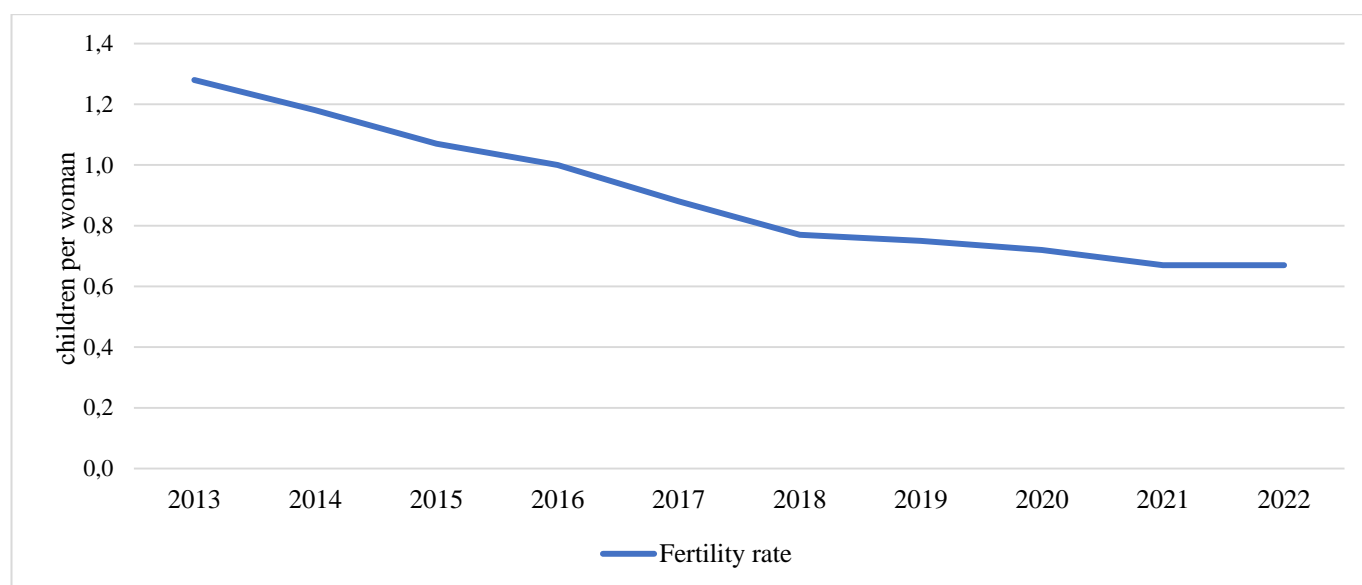
According to the share of the total number of live births in Canton 10 in the period in 2022, the borderland accounted for 85.7%, and in the total number of deaths for 79%. The influence of borderland on the natural population change of Canton 10 is negative, with -74.6%.



Source: Authors calculation from data from Demographic Statistics, 2013-2022 and Population estimates 2022.

Figure 3. Crude birth rate, crude death rate and rate of natural change in the borderland, 2013-2022

The implied total fertility rate (Hauer et al., 2013) has been steadily declining for the past 10 years. In 2013, it was 1.28, then in 2016 it was 1.0, and in 2019 it was 0.75 (Figure 4). In 2022, it was 0.67. The situation by municipality was as follows: Livno reduced the implied fertility rate from 1.15 in 2013 to 0.74 in 2022, and in the same period, Tomislavgrad decreased from 1.41 to 0.60 and Bosansko Grahovo from 1.51 to 0.71. The implied fertility rate is characterized by an extremely low value. It should be kept in mind that in order to have a simple reproduction of the population, this rate must be at least 2.1.



Source: Authors calculation from data from Demographic Statistics, 2013-2022 and Population estimates 2022.

Figure 4: The implied total fertility rate in the borderland, 2013-2022

It is very difficult to assess migration movements due to the very poor reliability of external migration data. Although the Institute for Statistics of FBiH collects data on external migrations, the population who definitely moves outside the borders of the state is not obliged to register a relocation.

In the period from the beginning of 2013 to the end of 2022, 1,682 people immigrated to the borderland and 2,823 emigrated. Of the total population who immigrated, the most were aged 20 to 34, 718, and they accounted for 42.7% of the total number of immigrants. Of the total number of emigrants, the most were between the ages of 15 and 34, 1,218, and accounted for 43.1% of the total number of emigrants. In the negative migration balance, the age group of 20 to 34 years participates with as much as 44.5%. The number of emigrants in this age group is 69.6% higher than the number of immigrants. The number of emigrants also increased in the age group of 60 and older by 114.9%. The migration balance in no age group is positive. Migration movements within the boundaries of this borderland account for 15% of the total number of migration movements. The immigration rate averaged around 2.5‰ per year, and the emigration rate averaged around 4.2‰ per year. The migration balance rate was negative, averaging -1.7‰ per year. Out of the total population of the borderland, on average 6.7‰ of the population participates in migration. The majority of the population immigrates from other municipalities within Canton 10, then Central Bosnia Canton and Herzegovina-Neretva Canton, while mostly emigrate abroad (Croatia and Germany), and to Herzegovina-Neretva Canton (Migrations, 2013-2022). Almost all Croatian population in the area has passports of Republic of Croatia (member of European Union) too, and that is one of the negative factors influencing migrations and population change (they can freely migrate in EU countries). Traditionally, this borderland is the area of "gasterbeiters" (more than 60 years tradition of emigrations to Germany, Austria and Switzerland).

In the analysis of the age structure of the population, it is noticeable that in the contingents of the female population, the prefertile contingent decreased by 1,782 or 36.8% in 2022 compared to 2013, while the postfertile contingent increased by 1,234 or 9.5%. The share of the female population in the pre-fertile period decreased by 4.6%, while in the postfertile period it increased by 6.6%. The share of women in the fertile period decreased by 2% (from 47.4% to 45.4%), while the number of women in the fertile period decreased by 1,677 or 10.5%. It is clear that the female population is aging slightly faster than the total population. In 2022, the pre-fertile contingent accounted for 9.7%, the fertile 45.4%, and the postfertile 44.9% of the total female population. Working contingents have also aged significantly. Thus, the pre-working contingent (0-14 years) decreased from 14.6% to 9.7% (by 4.9%) the working contingent (15-64 years) from 69.4% to 69% (by 0.4%), and the post-working contingent (65 years and older) increased from 16.3% to 20.8% (by 4.5%). The pre-working contingent decreased by 3,740 or 37.5%, working by 2,700 or 5.7%, while the post-working contingent increased by 2,188 or 19.6% (Population Estimates, 2022).

Analyzing large age groups of the population, the number of young (from 0 to 19 years) decreased by as much as 5,318 or 35.8% (share in the total population decreased from 21.8% to 14.9%), mature residents (20-59 years) by 1,893 or 4.9% (the share in the total population increased from 56.1% to 56.9%), while the number of elderly (from 60 and older) increased by 2,959 or 19.6% (share in the total population increased from 22.1% to 28.2%). The aging index in the borderland in 2013 was 101.5, and in 2022 it was as high as 189. The type of age structure in 2013 was advanced old age, and in 2022 it was extremely advanced old age. Changes in the age structure are very pronounced.

The unemployment rate decreased significantly in the 2013-2022 in the borderland from 49.8% to 35.4% (taking into account employed and unemployed persons as labour force). However, the unemployment rate remains very high. The average salary increased from EUR 430 to EUR 538 (by 25.1%), but was 5% lower compared to the average for the FBiH (it was equal in 2013) (Canton 10 in numbers, 2013-2022).

For research within this paper, it is very important to list the population according to ethnic/national belonging in the borderland, because Croats mostly have passports of the neighboring Republic of Croatia (members of the European Union) and can freely migrate to the countries of the European Union. That's what they do, especially the population between the ages of 15 and 44. According to

the 2013 census, the highest share in the ethnic/national structure had Croats 86%, Bosniaks 9.6%, and Serbs 3.6% (Agency for Statistics of Bosnia and Herzegovina, 2016).

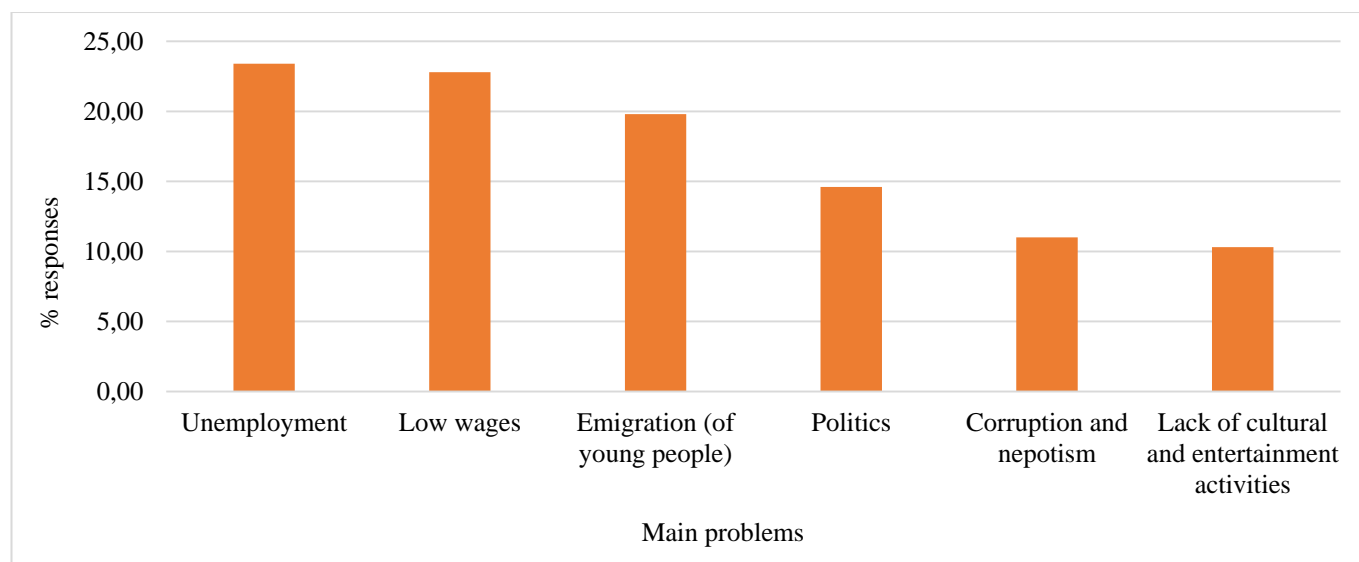
4. SURVEY RESULTS

In this section, only the most important results of the survey are listed. Of the total number of respondents in the borderland (300), 32.6% do not have children. By age groups, the share of respondents who do not have children is as follows: 20-39 years old (67.2%), 40-64 years old (24.7%), 65 years and older (3.3%). Of the respondents who have children (67.4%), the most common are those who have two children, and mostly of those respondents are in the age group from 35 to 49 years.

The difference between the desired number of children and the actual number of children that respondents have is 46.7% (respondents would like to have 46.7% more children than they have). Of the total number of respondents who do not have children, 8.7% do not want to have children at all. The average desired number of children among respondents is 2. The differences in desire between the sexes are not significant.

Of the total number of respondents, 23.2% still live with their parents, and the largest number are in the age group of 20 to 39 years. A total of 67.3% of respondents aged 20 to 39 still live with their parents. One of the problems of young people in the borderland is independence, mainly as a result of economic impotence. Out of the total number of respondents, 35.3% answered that they intend to emigrate outside of borderland, of which over 90% abroad, and the rest to Sarajevo or Mostar. The majority of respondents who want to emigrate are in the age group from 20 to 39 years, they make up 85.6% of the total population with intent (77% of respondents aged 20-39 want to emigrate permanently). Of the total number of respondents, 56.4% have no intention to emigrate (4.1% answered with a maybe, and 4.2% did not give an answer).

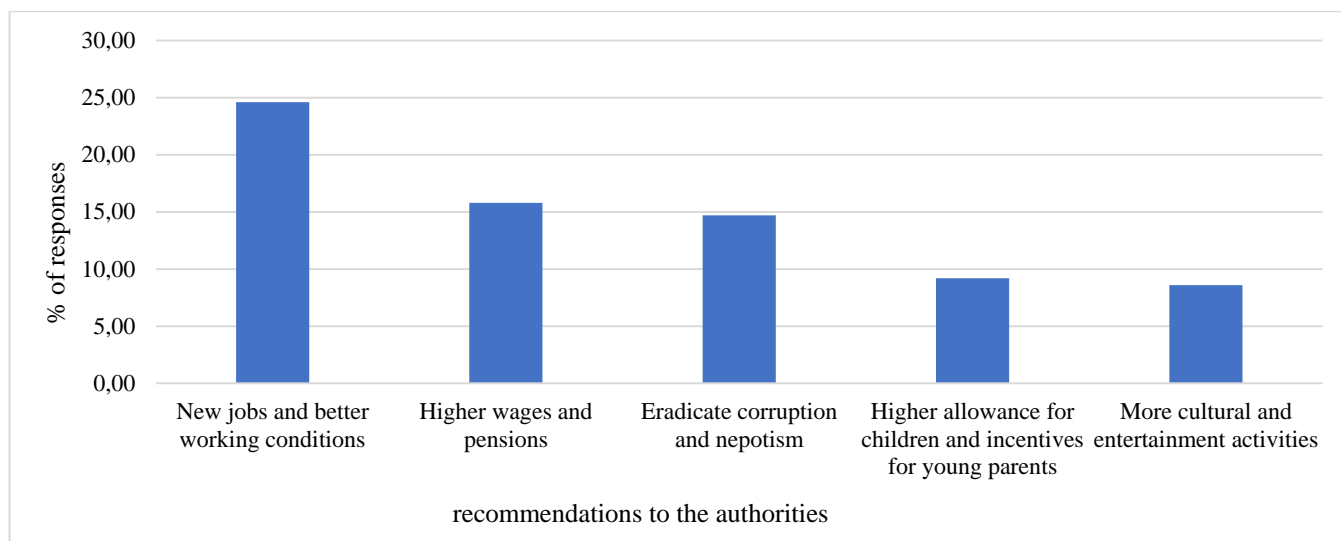
Respondents pointed out the following as the main problems of the population in the borderland: unemployment (23.4%), low wages (22.8%), emigration (of young people) (19.8%), politics (14.6%), corruption and nepotism (11%), and lack of cultural and entertainment activities (10.3%) (Figure 5). Respondents were able to provide multiple answers (Survey, 2023).



Source: Survey, 2023

Figure 5. Perception of the main problems of the population in the borderland, 2023

The main recommendations of respondents to the authorities for solving the problems of the population in borderland relate to: new jobs and better working conditions (24.6%); higher salaries and pensions (15.8%); eradication of corruption and nepotism (14.7%); higher child benefits and incentives for young parents (9.2%), and more cultural and entertainment activities (8.6%) (Figure 6). Respondents were able to provide multiple answers (Survey, 2023).



Source: Survey, 2023

Figure 6. Recommendations to the authorities for solving the problems of the population in the borderland, 2023

5. CONCLUSION

In the borderland of Canton 10, in the period 2013-2022, 2.2 times more people died than were born, and a significant number of inhabitants emigrated. The rate of natural change was -5.9‰, while the rate of total population change was negative and was -6.2%. The migration balance was negative (more emigrants than immigrants) and was -1,141. It is a clear conclusion that the borderland in the last ten years has been a depopulated area. The key long-term, very negative processes of population development in the borderland are total and natural depopulation, demographic aging, and urban-rural population polarization. Modern dynamic and structural processes in demographic development do not give some reasons for optimism.

The borderland is home to just over 4/5 of the population of Canton 10, and 1.8% of the total population of BiH. The total number of inhabitants of the border decreases on average twice as fast annually compared to the FBiH 1.3 times faster compared to BiH, but also 1.2 times slower than compared to Canton 10 from 2013 to 2022. In 2022, the birth rate in the borderland is extremely low, the mortality rate is moderately high, and the rate of natural change is negative. The population is in extremely advanced old age, where 28.2% of the total population are residents aged 60 and over.

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340 The Contested Role of Vocational Training Institutions in Reducing Regional Disadvantage in Hungary

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Abstract

The role of vocational education and training (VET) in reducing social inequality is particularly important in areas where secondary VET is the type of school with the highest educational attainment. This situation is most prevalent in disadvantaged areas and leads to serious consequences if a VET institution ceases to exist. Numerous examples show that in case of lacking a local VET school, the family moves to a larger settlement. The loss of the school and the consequent relocation of the families will inevitably lead to a further decline and depopulation of the disadvantaged area. The impact of economic considerations has a negative long-term impact on both local VET and the life of local society. Sometimes the schools in smaller settlements are closed to make up for the shortage of students in cities. The city school will have a sufficient number of students, but this will come at the cost of the lagging area. The additional roles that VET institutions could play in the rise of local society, in stopping the backwardness of a disadvantaged area, are not taken into account behind the primacy of traditional economic considerations. In Hungary, municipalities and their institutions have lost their former power because of the strong centralization process in recent years. One of the negative consequences of increasing centralization likely is that it will slow down and make impossible internal, bottom-up innovation efforts. I assume that local innovation can be successful when it is actively supported by local education and training institutions. In underdeveloped areas, this can be a task especially for secondary vocational schools. Answering the question „What room is left at regional, sectoral, and local levels for institutional diversification and innovation?“, the answer is: not too much, nearly nothing. There is a room only for 'local heroes'. My paper presents that building partnerships among possible actors in underdeveloped areas is a challenge. My conclusion is that the low prestige of VET and the marginalization of the wider social context of VET, prevent VET institutions from being partners in regional development projects. This situation further hampers local development in underdeveloped areas. The method of my research is literature processing and document analysis.

Keywords

Centralization, disadvantage, governance, innovation, vocational education and training.

1. INTRODUCTION

The role of VET in reducing social inequality is particularly important in areas where VET, especially secondary VET, is the type of school with the highest educational attainment. This situation is most prevalent in disadvantaged areas and leads to serious consequences if a vocational training institution ceases to exist. The existence of vocational training institutions operating in disadvantaged areas is influenced by several circumstances (Velkey, 2011): ensuring adequate recruitment, related to both students and teachers, can be difficult. If there is no viable company in the area, providing practical training for students can also raise a problem.

Numerous examples show that in case of the lack of local VET school, the family move to a larger settlement, a city, where their child can get involved in vocational training, precisely to ensure

learning conditions. The loss of the school and the consequent relocation of the families will inevitably lead to a further decline and depopulation of the disadvantaged area. The impact of economic considerations has a negative long-term impact on both local vocational training and the life of local society. In a disadvantaged area, sometimes the school in a smaller settlement is being closed in order to make up for the shortage of students in cities due to declining interest towards VET or a declining number of children. Potential students from the discontinued school will thus appear among the applicants in the city. The city school will have a sufficient number of students, but this will come at the cost of the lagging area losing possibly its last educational institution.

My research attempts to point to the role of VET institutions as potential innovation partners in local development processes. I am planning to explain the reasons which lead to the fact that secondary VET is mostly ignored in the learning regions concepts, and in our national regional development plans as well. I search the differences in the interpretation of innovation concepts how they handle VET (Asheim, 1996). The main research question is, what circumstances support and what block and reduce the chance to build strong partnership with the involvement of secondary VET institutions. Since despite the fact that the definition of secondary vocational education and training is in the process of being transformed (see the new VET scenarios in CEDEFOP (2020) and Markowitsch et.al. (2022)), in practice, there is still a strong tendency in many cases to interpret and use secondary VET as a means of responding quickly to the needs of the economy, particularly short-term.

The employed research methods are literature review, document analysis and secondary processing of research outputs. The study is planning to focus on international research sources and on the available national outputs.

2. VOCATIONAL EDUCATION AND TRAINING, THE CONTESTED PARTNER IN INNOVATION PROJECTS

2.1. The learning region - theoretical background

From the 1980s onwards, based on a set of inter-directly or indirectly related disciplines, numerous conceptual elements had emerged and strengthened which were favourable for the birth of the multiple disciplines common set of 'learning regions' (LR) concept. Among others, regional sciences (Rechnitzer, 1993), innovation theory (Lundvall, 1992), organization theory (Castells, 1996), management sciences (Bakacsi et al., 2004), direct democracy and bottom-up theory (Ray, 1999) paved the way for the creation of a new concept, which by adjusting the emphases of new scholarly approaches led to the birth of a new structure, using the same building blocks. The appreciation of local knowledge, the function of the local economy, grassroots initiatives, creativity and a broader interpretation of innovation, the importance of implicit knowledge in terms of competitiveness, the role of partnership in the development of a particular area, were already known before the learning region concept has emerged. By linking these elements and rearranging their emphases, the emerging learning region concept created a new quality.

2.2. Common elements and different contexts

All learning region concepts emphasize the importance of learning within and between organizations. This process is a learning partnership that will create added value for the participants. The learning region concepts have some common building blocks, as of dialogue, partnership, recognizing the importance of local knowledge, innovation processes launch, bottom-up initiatives, development and co-operation of networks (Asheim, 1996; Florida, 1995; Lundvall, 1996; Lundvall, 1998; Morgan, 1997; Putnam, 1993). The learning region concept represents a serious promise for development policy in support of lifelong learning. The European Commission supported a number of projects and programs aimed at the creation of that learning regions (R3L + program, Telson, PENR3L, the Learning Regions Network in Germany).

As Hassink points out, 'most scholars consider learning regions as a regional innovation strategy in which a wide range of innovation-related regional actors (politicians, policy-makers, chambers of

commerce, trade unions, higher education institutes, public research establishments and companies) are strongly but flexibly connected with each other' (Hassink, 2010: 51). Emphasizing the importance of partnership and cooperation between stakeholders, the key role of universities as innovation partners, the utilization of local knowledge and the support of bottom-up activities, the concept of learning region easily became a flagship of the university-based regional/urban development activities, the lifelong learning movement and offered an appropriate environment for research projects targeting local development with a wide range of regional instruments.

2.3. Appearance of non-market and non-economic factors

Emphasizing interactive learning in the concept of learning region points to the importance of collaboration, and leads to the importance of non-market and non-economic factors (Putnam, 1993), to the role of social capital (eg. trust) in the economic performance of institutions, regions and nations. In the 'New Economy' learning represents the key, and so it embodies a qualitatively different requirement compared to simple market transactions and exchanges. The fundamental difference is that knowledge creation and learning are essentially social rather than market processes. It includes the development and exchange of tacit, hidden and underdeveloped knowledge, for which there are no markets (Storper, 1993). Instead of nonexistent markets, networks are places where such learning takes place. According to the latest approaches, learning regions can only develop in a way that is compatible with sustainable development (Longworth, 2012). According to this, people and communities in the learning region learn together how to create economic recovery, social capital and ecological sustainability.

2.4. Education and training institutions as innovation partners in some LR concepts

Concerning education and training institutions, the learning region concepts primarily consider universities as innovation partners (Goddard & Chatterton, 1999; Lorenz & Lundvall, 2006), and vocational education and training and secondary education in general are ignored in the concepts. In this way, there is a contradiction in the concept between 'ignoring' vocational education and training and so the 'non-inclusion' of a large group of people, and the 'advocacy' of bottom-up initiatives. Secondary VET institutions, as potential collaborating partners, are present in a much larger proportion of the regions and are available to larger groups of learners than higher education institutions. With ignoring them, especially in underdeveloped microregions, the power to utilize local knowledge in the development of the area is being reduced. In the underdeveloped regions, the proportion of people with tertiary education is insignificant, so the importance of secondary education is relatively highly appreciated there. If it is important to involve local forces in local innovation processes, the involvement of those with the highest level of educational attainment at local level and considering them as potential partners in local innovation processes, can represent a mobilizing force towards the wider local community. The broader range of training institutions - as potential innovation partners - can be found in those approaches of the learning region where the term 'learning region' is interpreted as a regional-based development coalition (Asheim & Gertler, 2005; Lundvall, 2008). This coalition includes a wider range of organizations and institutions that influence and support learning and innovation in a given region (Asheim, 1996; Morgan, 1997). While at the level of theoretical concepts of the learning regions, secondary education and training do not play a prominent role, there are a few examples of development projects where the importance of secondary education appears. In the OECD Learning Region project, five participating European regions considered 'there and then' the development of secondary education as the key to development (Németh, 2014; OECD, 2001). One of CEDEFOP's publications examined the impact of the learning region concept on local development through case studies, highlighting the role of VET and secondary education and training (Gustavsén, Nyhan, & Ennals, 2007).

2.5. The learning city

In spite of the fact, that the concept 'learning region' was rather flexible since it's first appearance, the failure of some large development projects and the changing policy environment could not ensure a supporting atmosphere for learning region projects any longer, and required a new, easier-to-digest and more concentrated spatial approach for the development works which led to the emergence of the 'learning city' concepts (Benke et al. 2018). A very important policy issue contributed to this shift from the regional level to the city level. As the concept of regional equalization has lost it's dominance in the regional development policy, large cities with strong university links – as regional poles – came into the focus of policy interests as the new targets of regional development, and as an evidence of this process, learning cities came in place of learning regions both in terms of policy and project level. A number of international development projects address cities (Pallace, TELC, PASCAL Learning City in 2020) (Longworth & Osborne, 2010), which are intended – among other things – to develop the 'learning performance' of cities. (Hungarian participation has been displayed in the learning city projects, as Pécs has been involved in the development activity of PASCAL (Németh, 2014).) The prominent role of universities in the learning city projects can be considered as one of the most important features of these projects (Gál, 2016).

2.6. The learning community

Along with the continuation of the discourse on learning regions and learning cities, growing attention is being paid to learning communities, as well. According to the 'classic' vision of the learning community, it implies close co-operation of the local economy, local schools, colleges, universities, professional associations and local government to ensure that the community is a pleasant, livable place for members of the community in all aspects (Longworth, 2012). Faris offers the interpretation of the generic term 'learning communities' as a nested concept of social/cultural learning with an expanding scale of learning environments. He identifies the following learning communities: virtual global learning communities, learning communities of place, learning organisations, academic learning communities, communities of practice and learning circles, virtually placed them in a nested 'Russian Egg' (Faris & Wheeler, 2006). Another concept, based on a system approach, starting from the controlled systems is reaching the alive learning systems, deals with the learning communities by considering the principle of sustainable development essential for the future (Clarke, 2009). In accordance with one of the latest approaches of the European Union, the learning communities are evaluated on the basis of how the members of the communities work together and as they utilize the resources of the communities. Non-traditional, new, innovative partnerships have an important role in the formation of these learning communities. Regarding this approach of the EU, all kinds of learning - from the first steps to the highest standard, from the formal to non-formal and informal learning - is viewed as valuable and which enriches the community. Interest and capacity of citizens related to learning are considered the most valuable resources of the learning community (Gejel, 2012).

2.7. Explanations for the absence of secondary vocational education in innovation projects

Australian researchers' outcomes highlight some factors that reduce building partnership with VET institutions. There are contradictions between centralised VET policy and the regional view of local learning communities, and between the short term needs of VET market and the long term needs of trust which serves as a vital force for communities. There is significant tension between the centralised policy frameworks within which VET has come to operate and the focus on regional economic development and community building that is more often the focal point of learning communities. Any meaningful involvement in a community requires mutual trust. While the building of trust develops in the long-term, it has been damaged by the high level of uncertainty, change and instability experienced by many VET organisations in recent years... And, also Kimberley emphasizes the new challenge VET meets in relation to the learning communities. 'VET can meet the postmodern challenge to satisfy the paradox of simultaneously working from the bottom up (learning community

enterprise) and the top down (policy imperatives)' (Kimberley, 2003). I consider the Australian researchers' argument to be of a more general nature, which is also valid for Hungarian VET.

3. THE CHALLENGING SITUATION OF VET IN HUNGARY

3.1. *The impact of regional planning on vocational education and training*

The development processes of the last 10 years suggest that the intention to reduce the development differences of the individual regions has been pushed into the background. Again, the concept is stronger which says that developed regions should be developed, and then they will attract the less developed ones. Researchers worry about the changes to the use of the Cohesion Fund, which has been crucial in reducing regional disparities, could have dramatic consequences. The increasing emphasis and support for developed areas and metropolitan regions are unfortunate because it will lead to a further strengthening of the centre and the final marginalisation of the periphery (Faragó, 2016). In addition, it is likely that one of the negative consequences of increasing centralization is that it will slow down and make impossible internal, bottom-up innovation efforts.

I was planning to compare Hungarian VET centers and EU VET centers of excellence, but because Hungarian VET centers employ a process of top-down management and centers of excellence support a culture of bottom-up initiative, the two completely different operations make it difficult to compare the two systems beyond emphasizing this cardinal difference.

3.2. *Governance in VET*

Following the change of regime on the basis of the acts passed in 1991 and 1993, a rapid and consistent education decentralization process took place in Hungary. The vast majority of previously state-run schools were maintained by local authorities resulting in a decentralized system. With the enactment of the 1994 Chamber Act, the MKIK (Hungarian Chamber of Commerce and Industry) was in a privileged position with regard to Hungarian VET, and its informal and then formally strengthened position lasted until recently. Since the system of VET institutions had become extremely fragmented in Hungary, around 2003 the nature of policy-making changed completely: the government forced VET institutions to associate with one another in order to make the institutional system more efficient. In this sense institutional development was replaced by large-scale central development programs. Between 2005 and 2008, the system of TISZKs (Regional Integrated VET Centres) was formed, in which 86 organizations represented six different models. The new government abolished the TISZK system in 2012 and in January 2013, all schools previously maintained by local authorities were taken over by the state. In 2015, NGM (Ministry of National Economy in Hungary) responsible for VET took over the maintenance of VET schools from the Ministry of Education. The number of these schools was also to be radically reduced, based on a review of their training profiles. Hence the NGM concentrated 380 VET institutions into 44 VET centers (SZC) on a territorial basis. Schools were subordinated to integrated training centers 'for simple, transparent, fast and efficient management' (opinion of the MKIK). For the time being, their level of autonomy and of the individual schools within them, is questionable. In 2019, the ministry deployed chancellors to the centers who, according to the minister, 'provide a stable economic background' in vocational training and whose task is to 'support the directors of the centers with their managerial approach to their primary task of effectively overseeing educational quality'. The law gives the chancellors an extremely strong authority, and the autonomy of the heads of the centers has been significantly reduced (Mártonfi, 2019). In the framework of the dual training vocational training policymakers want to strongly increase the number of apprenticeship contracts. Some researchers worry about that companies are only interested in retaining students who make (higher) profits for them (Mártonfi, 2019).

In Hungary currently, VET operates under the governance of the Ministry of Culture and Innovation. According to a research paper, in this centralized management system, a connected institutional, local and regional mid-term strategic planning system is completely missing (Radó, 2021). New

elements of the system are VET Innovation Council and the Sector Skills Councils. Insufficient information is yet available on their activity.

3.3 The functions of VET

The nature of public education in vocational education has been changing and disappearing in the past decades in Hungary. The study of the disadvantaged shrinks into a marginal topic. The functions of preparing for civic life and for being responsible citizen are dwarfed in addition to the functions of serving the economy and the labor market. Over the last 30 years, youth protection and social aspects have increasingly disappeared from the system, and youth vocational training is almost exclusively determined by economic considerations. In Hungary, the strong demand and pressure from the actors of VET to take non-economic and non-market aspects into account in the field of VET policy has not articulated. Therefore, top-down political and economic decisions and instructions are given a completely green light. The implementation of tasks arising from ad hoc market requirements seems to appear as a given priority in developing Hungarian VET, while the employers are only able to define their medium- and long-term training needs within very narrow limits. Laczik (2015) points out that predicting the demand for skills has become increasingly difficult. A recent study draws attention to the risk that 'leaders or representatives of firms and companies sometimes tend to overstate their short-term needs' (Munkácsy & Scharle, 2021: 42) and often believe that short-term labour shortages are the main obstacle to their future development while suggesting a reduction in the emphasis on basic skills in the curriculum (Munkácsy & Scharle, 2021).

3.4 Prestige and drop-out

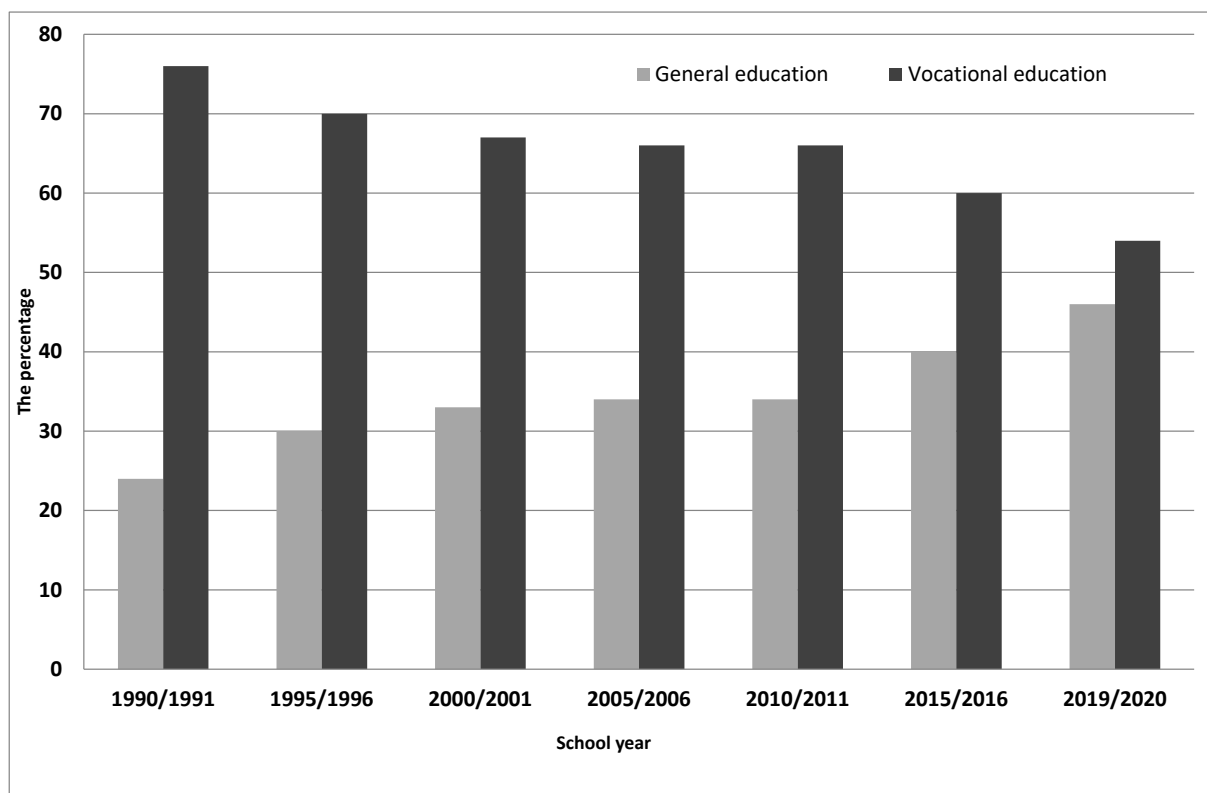
The lower the social status of the profession the school prepares for, the lower the prestige of the preparatory school and the more vulnerable its students in the labor market. There is a close relationship between the knowledge conveyed by initial vocational education and training and the vulnerable social situation of young people leaving VET (Marhuenda-Fluixa, 2017). In Hungary, fewer people participate in vocational training than the European average, and this trend may worsen. 4/5 of the students study in state-run vocational training centers. The concentration of children of low socioeconomic status in vocational schools is relatively high. In 2016, the dropout rate in the lowest level vocational schools was 15.3%, against a 6.5% in the higher level form and 1.1% in general upper-secondary schools (gimnázium). Reducing the number of people dropping out of vocational training remains a challenge, especially in the less developed regions.

The prestige of VET in the light of enrolment data has long been a critical point of Hungarian VET. The government introduced measures that seek to make VET more attractive to young people through various 'facilitation measures' such as reducing general education, and the 'simplified' content and delivery conditions for VET (Horn, 2014; Kunert, 2016; Mártonfi, 2019). As a result, young VET graduates do not have the basic knowledge that would be essential to successfully adapt to the demands of an uncertain future. Obviously, the government's above facilitation attempts to raise the prestige of VET in Hungary have failed as enrolment figures for the last three decades show (compare Figures 1 and 2).



Source: Author based on data from the Central Statistical Office of Hungary

Figure 1. Number of students in post-elementary full-time education by type of school in Hungary (1990-2020)



Source: Author based on data from the Central Statistical Office of Hungary

Figure 2. Percentage of students in vocational and general post-elementary schools in Hungary (1990-2020)

At the same time, prestige problems may arise with the management of secondary VET institutions as partners. On the basis of national experience, the question arises as to how the process of centralization of VET, the behavior of companies and the 'survival strategies' of VET schools can contribute to the emergence of real, meaningful partner roles. Moreover, implementation of tasks arising from ad hoc market requirements leaves very little room for schools to develop meaningful,

genuine partner roles. In recent developments in Hungary, the development of practical training has played a key role, i.e. the most important objective was to meet the needs of the ad-hoc labor market, quickly. At the same time, support for theoretical learning and the needs of LLL has been pushed into the background. The need for a closer partnership arises only in terms of understanding labor market demand and integrating it into vocational training.

The prestige of vocational education - in the light of enrollment data - has not increased despite government rescue operations over the last ten years. The 'facilitations' introduced by force policy, more and more centralization, the content and delivery conditions of vocational training, in fact projected 'dumbing down' students, did not bring the expected results (Györgyi, 2019).

It is feared that due to its low professional and social prestige and weak advocacy, VET sector is not in a position to make a meaningful contribution to the existence of a local VET institution. The role that VET institutions could play in the rise of local society, in stopping the backwardness of a disadvantaged area, is not taken into account behind the primacy of traditional economic considerations. It is a question of why VET does not have the advocacy that can stop this process. The problem is complex: schools often do not have sufficient conditions for democratic functioning, either in terms of sectoral advocacy or in terms of administrative regulation. The teaching profession is divided, and the protection of professional interests is weak, especially in vocational training institutions. At the same time municipalities and their institutions have lost their former power because of the strong centralization process in recent years.

3.5 VET and innovation

The lack of partnerships, the low prestige of a large proportion of VET institutions, the strong centralisation, and the limited role of the institutions do not allow VET institutions to bring together the sectoral actors in their catchment areas. A proactive approach would be needed to enable VET institutions to play an active and coordinating role in their relations with the sectors. Further thinking about the role of VET as a potential partner in local innovation I assume that VET can become an innovation partner in shaping the local economy and society where and when it can break free from the constraints of ad-hoc labour market needs and top-down governance. If it can employ a bottom-up approach focusing on local community needs, presenting a training structure that is constantly renewable and capable of enforcing the diverse needs of both the local economy and local society.

Building a partnership role in underdeveloped areas is a particular challenge. In the future, greater consideration of non-economic and non-market aspects may create new avenues and purposes for VET concerning social innovation. In this respect, the results of a survey in which nearly 90% of VET experts in Hungary would support a more active local role for VET institutions, dialogue, and stronger partnerships with other actors, and stated that secondary VET institutions could play an important role in the life of local communities beyond teaching, was promising.

Another question is whether secondary VET institutions can be involved in local participatory planning processes. The topic participatory planning appears more in Hungary as 'community planning' (Faragó, 2005), and is inevitably connected to the problems of the exercise of power, governance, and the role of local governments (Pálné Kovács I., 2009). As community planning is a form of community learning, it is also related to the problem of community innovation (Márkus & Kozma 2019). In Hungary, the system of regional development tools has been purposefully expanded in the recent period, however, many circumstances adversely affect the implementation of community planning. These include the reduction of resources for community-led local development, the uncertain role of the partnership-based civil conciliation forums achieved in 2004 as a huge achievement, and the decreasing possibility of involving broad public opinion (Benke, 2021). The legislation provided, in principle, a wide opportunity to participate in planning, but provided almost no safeguards for the implementation. My assumption is that local innovation can be successful when local innovation process is actively supported by local education and training institutions. This can be a task for secondary schools in underdeveloped areas, especially for secondary vocational schools. Unfortunately, this question remains open in Hungary in the given highly centralized system.

3.6 An explanation for the failures. From utilitarian economics to capability economics

In the search for a way forward, it is important to remember Hudson's (1999) critique of the learning regions. Hudson interprets the development and use of new knowledge in the capitalist system as a zero-sum game in which the gain to one firm or region is the loss to another. In his view, the prospects of achieving convergence between different regions on the basis of a policy focused on learning do not bode well for success, in light of the forces that lead to unequal economic development.

In summarizing the results of my research on the learning region, the learning communities and also on the basis of my recent investigations into the future of VET, I have concluded that the ultimate driving force which perpetuates the problems and the failures outlined around VET and disadvantage is an overly utilitarian economic approach (Benke, 2020). It reinforces a zero-sum game that is insensitive to social inequalities and does not take into account the values associated with disadvantage. By contrast, there are efforts towards using a new perception, the 'capability approach' (Sen, 1999/2003) (Wheelahan et al., 2019). 'By putting the needs of people first – rather than the needs of the economy – the capability approach emphasises social justice, human rights, and poverty alleviation in VET evaluation' (Powell & McGrath, 2014:126). With regard to local development, starting from the capability approach, Bajmócy draws attention to the limitations of expert knowledge and emphasizes that 'the knowledge of the local community and the expert together are necessary for economic development' (Bajmócy 2012: 25). According to Bajmócy and colleagues, if participation is to be taken seriously and its aim is empowerment, then participation must be 'an attitude that understands empowerment as a fundamental right of citizenship' rather than a 'project-oriented technical tool' (Hickey & Mohan, 2004). In other words, as a process that results in narrowing the gaps in capability and power in society, empowering more people to critically understand their socio-political (and technological) environment, articulate and express their needs, and plan and make decisions (Bajmócy et al, 2019:296). This topic is beyond the scope of my work, but I consider it an exciting area for further research.

4. CONCLUSIONS

In my paper, I have drawn attention to the fact that the operation of vocational training institutions can be of special significance in disadvantaged areas, as vocational training is the highest level of education in those areas. The prestige of VET in the light of enrolment data has long been a critical point of Hungarian VET. However, the 'facilitations' introduced by force policy, more and more centralization, the content and delivery conditions of vocational training, in fact projected 'dumbing down' students, did not bring the expected results. At the same time, prestige problems may arise with the management of secondary VET institutions as partners. It is feared that due to its low professional and social prestige and weak advocacy, VET sector is not in a position to make a meaningful contribution to the existence of a local VET institution. The role that VET institutions could play in the rise of local society, in stopping the backwardness of a disadvantaged area, is not taken into account behind the primacy of traditional economic considerations. In addition, municipalities and their institutions have lost their former power because of the strong centralization process in recent years. I emphasized that the strong centralization of vocational training that has taken place so far leaves no room for bottom-up innovation efforts. I assumed that VET can become an innovation partner in shaping the local economy and society where and when it can break free from the constraints of ad-hoc labour market needs and top-down governance. I have concluded that the ultimate driving force which perpetuates the problems and the failures outlined around VET and disadvantage is an overly utilitarian economic approach, which is insensitive to social inequalities and does not take into account the values associated with disadvantage. The utilitarian economic approach, combined with a strong centralisation of power and institutions, does not create the right conditions for secondary VET institutions to play a meaningful role in reducing social and regional disadvantage. By contrast, I draw attention to the 'capability approach', which by putting the needs of people first and not the needs of the economy, emphasises social justice, human

rights, and poverty alleviation in VET evaluation. Launching experimental research in this area would be very useful.

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357 The Application Living Space Is the Future of the Economy and Society

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Abstract

Research on application living spaces does not have a long history. The concept has been defined in recent years. WeChat and Alipay are the two main representatives of the system, which is mainly present in China and East Asia. These financially based, app-based living spaces are fundamentally shaping the social, economic and financial system. They provide users with a high level of security and convenience, and the state with tools for economic, social and political control. Western societies are, however, sceptical about the system, seeing more disadvantages than advantages.

Keywords

application living space, Alipay, Wechat, financial revolution, economic system.

1. THE APPLICATION LIVING SPACE

The global financial system is changing, and online formations are emerging that are transforming people's lives and going beyond the world of financial services. Online payments and online financial services are becoming increasingly important in international financial life. PayPal, ApplePay, GooglePay, or even SimplePay and VoxPay in Hungary, are all known and used by online electronic financial system users in Western countries. However, although " *the most extensive financial ecosystem has been created by Ant Group, the financial arm of the Chinese BigTech, Alibaba*", (Zetzsche & Birdthistle & Arner & Buckley, 2020) namely Alipay. The other major player is WeChat, owned by Tencent. However, these two services are not just apps, but much more than that.

The application living space is not the same as the increasingly online living space. The characteristic feature of the online living space is that everything is shortened (Farkas, 2018). The online living space is therefore a constrictive one. In the online living space, human interaction is minimised. While the user in the online space is disconnected from real life. The application-life-space, however, is not a pseudo-life, but satisfies the real needs of the user. In addition, it performs social, economic and commercial functions. Thus, the application life-space is a financial-based service system that allows the service provider to measure detailed consumer habits. And the application-life-space allows political leadership and law enforcement services to apply extensive social control. The social and national economic nature of the system is clear.

Definition of an application living space: a financially based framework application built on a set of economic sub-applications that provides the user with access to and cashless payment for general economic and social services necessary for daily life, as well as the possibility to measure consumer habits and to exercise broad social control (Kasznár & Balogh 2022).

2. THE APPLICATION LIVING SPACE

At present, app living spaces are mainly based in China and partly in East Asia. The two most mature forms are Alipay and WeChat. Research started in 2022 by Hungarian experts to explore the specificities of the app living spaces. A key objective is to assess the opportunities in Europe. Hungarian researchers are involved in the work, many of whom live in China and have first-hand experience of the system.

Hungarian researchers are involved in the work, many of whom live in China and have first-hand experience of the system. The research is conducted in parallel on a domestic base and an international base. In the international research, we are involved in the processing of Chinese literature, liaising with Chinese experts and empirical research. The main focus of the Hungarian research is on the analysis of the Hungarian legal framework and questionnaire sampling. Further, the targeted analysis of the European Union legal system is also part of the research.

The first task was to define the application living space. This was made possible by the fact that the two researchers involved in the task (Attila Kasznár and András Zoltán Balogh) were living in China at the time of the task.

The Alipay and Wechat systems were used as a model for the definition. However, the main focus was on Alipay. Alipay can be said to be a typical example of an application living space. *“E-commerce giant Alibaba launched Alipay in 2004 as a web-based payment tool to facilitate transactions on its e-commerce website Taobao (a service similar to Amazon and eBay in the US). In 2008, Alipay was redesigned as a mobile payment app and was then officially licensed to offer “third-party payment” services in China in 2011. In 2013, Alipay started to offer money market accounts on its platform. It soon built that business into the world’s largest money-market fund”* (Shen & Faklaris & Jin & Dabbish & Hong, 2020).

Alipay introduced QR code payments in 2018, making it a major player in the mobile payments world. This has led to the introduction in China of a fast, convenient and secure payment solution that bypasses the traditional banking system. It is faster and more convenient than cash payments. All the steps of a traditional payment can be done within the Alipay system from within the app, with the ability to instantly credit the money sent to the seller within the system. The Chinese financial system was thus simultaneously transformed into one of the most modern, virtually entirely online structures in the world, in which the role of cash was minimised. At the same time, a financial structure has emerged which has skipped several stages of development and which could be dangerous in the long term. Alibaba has created a perfect service-centric application living space that can continuously assess a user’s financial and other (non-social media) activity, and based on this, can also provide the user with the most personalised credit, insurance and investment offers based on a directly accessible and realistic risk “map” generated from complete consumer, spending and lifestyle habits. *“Ant funds itself through fees, sales of data, and borrowing in China’s Interbank Bond Market, China’s electronic bond and money market platform. It then lends to individuals to help them buy products through Alibaba and other vendors while also providing credit to businesses to enable them to expand their operations, income, and profits. Ant in turn securitizes those loans and is one of the largest issuers of asset-backed securities in China, which it in turn sells to investors in the Interbank Bond Market. Ant also now sells insurance, including a new mutual-aid platform that gained one hundred million customers in a year”* (Zetsche & Birdthistle & Arner, & Buckley, 2020).

Alipay as an application living space is a good way to show how many services a framework can include. The main services of Alipay:

1. Online payment facility, e-wallet.
2. In-store shopping with QR code.
3. Mini apps. User interfaces to other providers running within Alipay's mega-application.
4. Digital financial services. Asset management, insurance, (
 - Ant Fortune: online wealth management platform
 - Ant Insurance:
 - MYbank: business finance application
 - Huabei/Xinyonggou: consumer credit service
 - Jiebei / Xinyongdai: small credit loans
5. Digital technologies
 - AntChain: blockchain
 - ZOLOZ: A security infrastructure for the digital economy
 - OceanBase: a database management service.
 - SOFAShield: Cloud-based Platform-as-a-Service
 - mPaaS: mobile-Platform-as-a-Service

- MORSE: One of China's earliest privacy computing products.
- Topnod: for buying, viewing and sharing collectibles

6. Global products

- Alipay+: the international version of the Alipay payment system.
- WorldFirst: one-stop digital payment and financial services platform for SMEs

In the second part of the research, the legal background in Europe and Hungary was analysed. This part of the research is partly published and partly awaiting publication. The possibility of EU recognition: *"As can be seen above, the European Union is also looking for ways and means to achieve a more integrated internal market. These aspirations and ambitions take different forms... In many respects, the structural organisation of the European Union, the way in which it is defined by its Member States, the mindset and values of its societies, and the diversity and complexity of its operations and decision-making processes do not allow for the introduction of technological solutions with the degree of integration that is possible in countries with a unitary or centralised structure."* (Hágen & Mayer, 2023).

The third phase of the research is to assess the needs and expectations in Hungary and analyse the data. This phase of the research is ongoing. In this part, a questionnaire survey was conducted to measure the attitudes of Hungarian citizens towards the application living space.

3. CONCLUSION

Application living spaces are spreading globally, and the online space and the internet are creating new and new opportunities. The online space is transforming the everyday life of humanity and the application living spaces are expected to be the future.

Application living spaces can also play an important role in security. In the 21st century, in a global society plagued by terrorism, security and maintaining a balance between freedom and security is a crucial issue. Public demand for security is constantly increasing. However, the opposition to the restriction of freedom is also dominant, at least for the European-American. Asians are much more willing to give up their freedom if the state protects them. The statist or caring state is much more expected in Asian countries, including China, than in Europe or North America. The application of Lebensraum allows the state to control large masses. Control is what gives overall security in these countries.

The app living space will give users access to more and more services. The functioning of the application living space will significantly facilitate users' daily lives and allow them to access previously unreachable segments of the service industry. The application-based virtual living space could also open up a range of new opportunities for the service industry, opening up unprecedented possibilities for entrepreneurs.

However, Western societies are strongly divided on the issue. They want to enjoy technological progress and comfort. But Western society demands civil liberties and protection of personal data and privacy. It is not clear at this stage which way Europe will go in the future. What is certain is that without an app-enabled living space, Europe will be left behind in the fields of social, commercial and organisational life.

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359 The Future of Electric Cars in Hungary and the Economic, Social and Spatial Aspects of the Transition

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Abstract

The spread of electric cars is taking place worldwide. The transition takes place in different directions and platforms. We can meet hydrogen-powered, hybrid-powered, purely electric-powered or even self-driving vehicles. At the John von Neumann University, they are already dreaming and realizing the future with solar cars. The presentation focuses on electric cars. The presentation examines the electric car market as a cluster and as a value chain. As a starting point, the presentation examines the current Hungarian passenger car stock and car market, new and used car sales, and changes in the stock. When selling passenger cars, we examine the income situation, saving and borrowing habits of the population.

Keywords

Electric cars, green transition, market, automotive industry, fuel.

1. INTRODUCTION AND HYPOTHESES

We propose three hypotheses.

1. The transition can be considered optimal if all actors in the cluster have the same expectations regarding the change.
2. A transition that is slower than the expectations of the economic actors causes social cost losses for the production and service companies of the value chain.
3. In the development of the infrastructure of electric cars, those participating in road transit traffic passing through Hungary will play the role of a catalyst.

2. THE FUTURE OF ELECTRIC CARS IN HUNGARY AND THE ECONOMIC, SOCIAL AND SPATIAL ASPECTS OF THE TRANSITION

One of the important transformations of our days is the expansion of electric cars. There are many reasons for the spread of electric cars. We will highlight only three of these: the expected depletion of crude oil reserves, the fear of the effects of climate change, and the automotive industry's own technical development. There are also several conditions for the spread of electric cars. The three most important of these are: where will sufficient electricity for electric mobility come from and whether the electrical networks will be able to handle the appropriate load? Where will there be enough light metal and metal alloy suitable for electric charging of batteries? At the same time, the spread of electric cars has many consequences that are not yet fully predictable. Perhaps the most important of these are:

1. The future of the petroleum industry. What will happen to the equipment and infrastructure of crude oil extraction, land and sea transport, refining, and sales?
2. What will happen to the hundreds of millions of gasoline and diesel cars currently in circulation? How do they switch to electric cars? Recycling of scrapped old passenger cars, how will it happen?
3. How is the market for fuel or, more precisely, electricity developing compared to the current fuel market? Who will be the new salespeople? Parking garages, car repair shops, shopping centers or old gas stations?

For most countries in the world, questions about electric cars end here. But at least as important is the transformation of the economies of the current car manufacturing superpowers. Compared to current cars, electric cars can be simpler and require fewer parts. Compared to previous gasoline or diesel engines, electric engines have a simpler structure. In addition to the previous large car factories, new manufacturers specializing exclusively in the production of electric cars have also entered the market, such as the American Tesla or the Chinese BYD.

Hungary's situation is special from several points of view. It does not have its own brand of car production. However, all of the car manufacturers operating or building in Hungary are involved in electric car production. But neither the developments nor the companies' strategic decisions are made here. So now Hungary is also in a dependent or vulnerable situation from the point of view that it has to convince the car factories operating here again to remain here during or after the transition. The other reason why we are talking about a special situation is that the majority of motor vehicle traffic in Hungary is only transit traffic passing through the country. As a member of the European Union, bordering 7 neighboring countries, Hungary is a small and open economy country. Routes and highways affected by transit traffic must be built to serve electric cars, even if otherwise the turnover of the Hungarian vehicle stock does not justify this.

3. THE HUNGARIAN MOTOR VEHICLE STOCK

Regarding the quantitative, qualitative and territorial characteristics of the Hungarian vehicle stock, a wide variety of data can be processed and analyzed. The distinguished attention of researchers is justified for several reasons. Following the 2008 financial and credit crisis, passenger car sales in Hungary collapsed. The number of new and used cars put on the market for the first time in Hungary was 274,000 in 2003, while in 2010 it was only 61,000. The sale of new cars was 204,000 in 2005, but only 46,000 in 2010.

The large number of passenger car sales between 2002 and 2008 can be traced back to two reasons. The first was optimistic expectations accompanying Hungary's accession to the European Union. Because of this, many people dared to take out larger loans for the purchase of a car or apartment. The second reason, the spread of currency swaps in Hungary, created a cheap and abundant supply of loans on the Hungarian banking market. Foreign-owned Hungarian banks sold cheap Swiss franc loans taken from their parent banks on the Hungarian market. The repayment installment of the annuity Swiss franc loans with the same initial capital and term was on average 40% cheaper than the HUF loan. Before 2008, market participants did not deal with the risks of exchange rate changes. During the 2008 financial crisis, the HUF-CHF exchange rate changed from 140 to 240. Repayment of loans taken up to the maximum creditworthiness after 2008 put the budgets of many borrower families in a difficult situation. During the long-term management of the financial crisis, Hungarian households were left with only one rational choice, the postponement of the purchase of high-value assets.

Looking at the total number of passenger cars in Hungary, however, an interesting phenomenon can be observed. In 2001, there were 2,482,000 passenger cars in circulation. In 2023, it will be 4,168,000. The increase was 1685 thousand passenger cars. Between 2001 and 2023, this increase was achieved by placing 2,726,000 new and 1,730,000 used cars on the market in Hungary. Between 2001 and 2023, an annual average of 204,000 new cars were put on the market and an average of 125,000 cars were withdrawn from the market each year. However, during this time, the Hungarian passenger car stock was almost entirely replaced.

However, the replacement of the fleet was only accompanied by quality improvement and a decrease in the average lifespan of passenger cars until 2010. In 2010, the average age of the Hungarian passenger car fleet was 10.4 years. 15.8 years in 2023. Outdated car brands from former socialist countries, such as Polski Fiat, Trabant, Wartburg, Zastava, and Lada, are slowly but surely being worn out. Dacia and Skoda, bought by Western car manufacturers and now of relatively good quality, are still popular brands. The average age of the stock of Western European car brands is between 15 and 20. Except BMW. Japanese car brands are mostly between 10 and 15 years old. South Korean brands and Dacia have it for under 10 years.

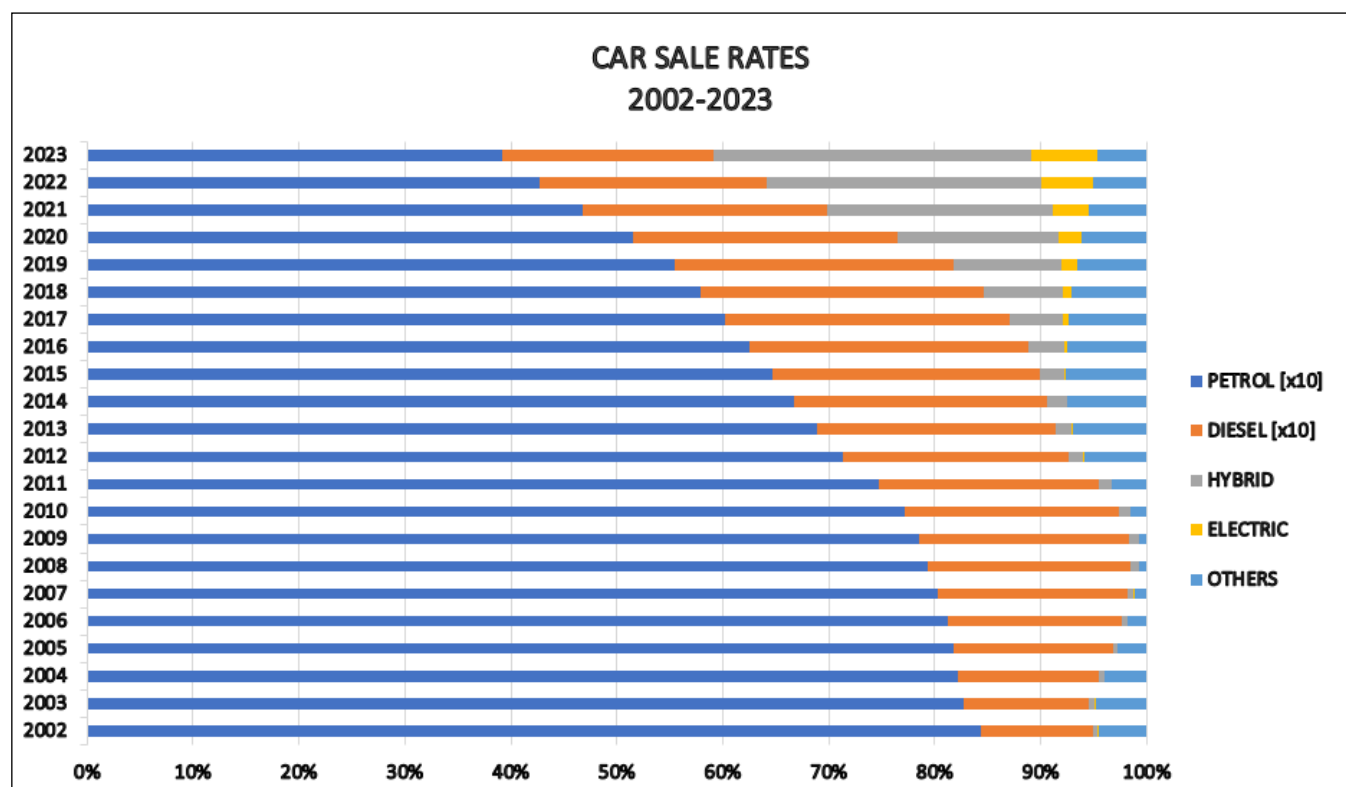
It can also be observed that Hungarian car buyers choose based on the prestige of a brand rather than the age or technical level of the car.

4. MAJOR TRENDS OF THE HUNGARIAN ELECTRIC CAR MARKET

In this chapter the last 10 years of car and electric car sales will be analyzed in the Hungarian market in order to predict the rate of development, which is important if we think about the service infrastructure.

4.1 2002-2016

In the last 10 years the total number of cars has increased one and a half times, even though the 2008 economic crisis was a turning point. From 2002 to 2008, the number of cars in Hungary increased by around 2 percent per year. After the crisis, the number of cars decreased slightly until 2012, then after 2012 it started to grow again and peaked in 2017, when the number of vehicles increased by 4.7%. After 2017, it returned to the previous annual growth of around 2%.



Source: Hungarian Statistical Office database www.ksh.hu download: 2024. 03.01.

Figure 1. Car share line diagram (KSH, 2024)

The number of annual electric purchases increased from 500 cars (2002) to 41,212 by 2023. This means that the purchase of electric cars increased 85 times during this period. The 2008 crisis also marked a low point in the stock of electric cars, and it had an impact on the electric vehicle market until 2012. After that, the growth began to accelerate continuously, and in 2022 the share of electric vehicles reached 15%. (KSH, 2024).

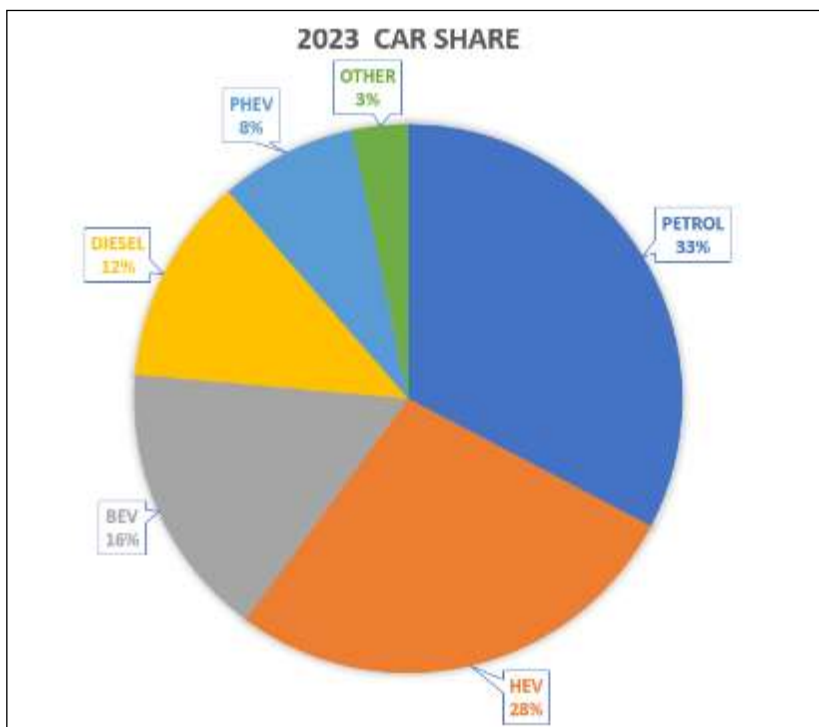
4.2. 2016-2023

Until 2020 there had been a more than fivefold increase in the demand for partially or fully electric vehicles in Hungary since 2016. Simultaneously, the sales of diesel cars have been consistently decreasing, and this trend has extended to gasoline-powered cars as well. Consequently, the market share of plug-in and hybrid cars has been steadily rising.

Between 2016 and 2018, Hungary's proportion of such vehicles in the fleet surpassed the EU average. The COVID-19 epidemic caused a significant drop in the electric car market, although sales figures for the second quarter of 2020 remained considerably higher compared to the previous year. In Hungary, there has been a continuous increase in the number of green license plates.

The significant increase in new car registrations by 15.7% during the first eleven months of 2023, reaching nearly ten million units, reflects a robust growth trend in the European Union (EU) automotive market. The growth was widespread across most EU markets, with only Hungary experiencing an exception. The four largest markets, namely Italy, Spain, France, and Germany, notably contributed to this positive trend, with substantial growth rates observed in each country. 2023 was a year full of economic difficulties, to mention some of the most important were high inflation, low GDP growth, recession in some places, and high interest rates. In Hungary, the total car market shrank by 3.4% in 2023 compared to the previous year, but the number of electric cars increased by 24.1%, plug-in hybrids by 14.1% and hybrid cars by 6.9%.

This may be partially driven by the fleet replacement of multinational companies, as well as state policy supports the green transition. (ACEA, 2023)



Source: Hungarian Statistical Office database www.ksh.hu download: 2024. 03.01.

Figure 2. Car share in Hungary in 2023

The loss of space by old European carmakers in the global car market has accelerated as new electric car makers take their place. In this process, the disadvantage for Europe is the rising cost of energy, the disruption of global supply chains, and the lagging behind of local manufacturers in software innovation and lately the Ukrainian war. The loss of market space can primarily be attributed to the software disadvantages of EU manufacturers, considering that foreign manufacturers also install their factories to Hungary and the circumstances are the same for them.

5. FUTURE PROSPECTS FROM 2024

The Ministry of Energy made an official announcement in 2024 about a program supporting the purchase of electric vehicles by businesses in Hungary. (Ministry of Energy, 2024) The program represents a proactive approach towards addressing environmental challenges and supporting sustainable development in the transportation sector. By providing financial incentives and promoting the use of green energy, Hungary aims to accelerate the transition towards a cleaner and

more efficient transportation system while stimulating economic growth and innovation in the electric vehicle industry.

Participants domestic companies in the programme are eligible to claim a non-refundable state contribution from a budget of HUF 30 billion for the purchase of purely electric cars, vans, or minibuses. This financial support aims to incentivize businesses to invest in electric vehicles and contribute to reducing emissions in the transportation sector.

Depending on the capacity of the battery, businesses can receive a grant ranging from 2.8 to 4 million HUF for the purchase of electric vehicles. This tiered approach encourages the adoption of electric vehicles with larger battery capacities, which typically offer longer driving ranges and greater versatility. This initiative suggests a holistic approach towards sustainability, aiming not only to promote electric vehicles but also to incentivize the adoption of renewable energy sources for charging these vehicles.

The program is in line with broader global initiatives aimed at reducing carbon dioxide emissions and transitioning towards a greener economy. As a result, it is anticipated that market in Hungary will experience expansion, leading to rapid growth post-implementation.

6. MODELING THE SPATIAL DISTRIBUTION OF ELECTRIC CARS

The Hungarian Statistical Office only publishes national data on the quality composition of the passenger car stock. License plates are issued and registered at the national level. The register is carried out by the Ministry of the Interior.

Thus, we only have available national data on the number of electric cars. This certainly makes it difficult to estimate the duration of the transition from conventionally powered passenger cars to electric powered ones.

If we assume a point economy and a homogeneous market, then we have two indicators at our disposal.

1. The number of cars put on the market for the first time in Hungary in a given year and the ratio of the total car stock. Due to the property and income situation of the Hungarian population, this indicator in itself is more than 20 years. That's all it would take to replace the entire fleet of vehicles based on sales data after 2021. But this is only the lowest estimate of the duration of the transition to electric cars. In this case, we assume that all passenger cars put on the market for the first time will be electrically powered. However, this is not the case. The European Union itself plans to ban conventionally driven cars only after 2035 in the case of newly manufactured and sold cars. The expected duration of the transition will be extended by at least 12 years from now.

Another peculiarity is that an increasing proportion of passenger cars put on the market for the first time in Hungary are used vehicles. Among the measures planned by the European Union, it is not yet clear when gasoline and diesel-powered passenger cars will be banned on the international secondary market of passenger cars. In the case of Hungary, in the case of vehicles put on the market for the first time, only then can we talk about the share of electric cars reaching 100 percent.

We can also talk about a regulatory dependency here. The European Union wants to make transport climate neutral by 2050. The drafters of the European Union regulation calculate that if the lifespan of passenger cars is 15 years, then by 2050 all passenger cars manufactured before 2035 will have disappeared from circulation. This may be true in Germany, Austria, the Netherlands, and France, but certainly not in Hungary, Romania, and Bulgaria. In Hungary, the average lifespan of used imported passenger cars exceeded 15 years in 2022.

2. The other indicator point follows from this. The average age of the passenger car stock in each country can also provide a clue for estimating the transition time. Here, however, we are faced with the fact that the passenger car stock has aged over the past 15 years, its average lifespan has increased from 10.3 years to 15.8 years during this time. The average lifespan of the Hungarian stock of Alfa Romeo, Audi, Chevrolet, Citroën, Fiat, Ford, Honda, Lancia, Land Rover, Mercedes, Mitsubishi, Opel, Peugeot, Renault, Saab, Seat, Subaru, Suzuki, Volkswagen brands is between 15 and 20 years there is By the way, this may be somewhat surprising because AUDI, Mercedes and Suzuki

individually produce as many cars in Hungary as they sell new cars in total. Only a very small percentage of the cars manufactured in Hungary will be sold to Hungarian consumers.

Based on the two indicators, taking into account the data of the last 20 years, the shortest expected duration of the transition is 10.3 years, which is based on the sales statistics of 2007. The longest is based on sales statistics for the year 2010, which is 64.7 years! The duration of the transition to electric cars will be somewhere in between.

7. MARKET DIFFERENTIATION

The market assumed to be at one point and homogeneous must be segmented. When segmenting, we must also state that the car costs money. Money is a limited commodity available to buyers. Buying and exchanging a car also has transaction costs. The introduction of these two conditions is necessary in order to see that an infinite number of transactions or car sales cannot take place in a short or infinitely short time. If the number of transactions in a unit of time cannot be infinite, then the duration of the transition can be interpreted.

When segmenting the market, we looked for a similarly sought-after consumer durable that is widespread nowadays. The criterion for selection was that the dynamics of its spread and the number of affected households should be of comparable magnitude. The penetration of televisions, microwave ovens and mobile phones now exceeds 100% in all income groups.

Instead of the further spread of refrigerators and separate freezers, the use of combined refrigerators and freezers is now spreading. The population penetration of home cinema systems, digital cameras, high-value alarm systems, and air conditioners is still very much in its infancy. Desktop computers have entered 40-50% of households, but their availability is still declining.

Laptop computers are the best for examining and comparing the distribution of passenger cars. Both are still in the growth phase in terms of penetration. There are groups where their penetration per 100 households is already over 100. There are many types of laptops and cars. The price ratio between the two is 1 to 20 or 1 to 30. A laptop costs money, but so does a car. Even if someone buys it used. But the 10-order-of-magnitude difference in price still results in different consumer behavior. You can buy a laptop with one monthly payment, so that the reduction in other consumption will last for one or two months. In Hungary, for most households, buying a car means a multi-year project, savings or taking out a loan. This period is on average 3-5 years.

8. MICROECONOMIC APPROACH – SUBSTITUTION AND MARGINAL UTILITY

What follows from this?

Let's go back to microeconomics! More specifically, let's return to the marginal benefit theory. Although we are talking about two very different products, the purchase, operation and maintenance of both require effort on the part of the purchasing household. In the optimal case, we are talking about when the marginal benefit per unit of money of the two products is equal. Assuming that people living from work receive their salary every month, the marginal utility of the money income available to them must be the same every month. So, if a household is faced with having to buy a laptop and a car at the same time, then the money spent on buying a laptop in a month should be roughly equal to the monthly costs of buying and maintaining a car. This includes the repayment installment of the loan, the loan interest, insurance premiums, taxes, monthly parking fees, and average monthly service fee.

The changes of 2019 and 2020 provide the best data for microeconomic modeling. Until 2019, the preferences of households that preferred car purchases and regarded laptop purchases as secondary have suddenly reversed. The introduction of digital education and learning from home very quickly increased the demand for laptops in families with children.

Families with one-parent children had to carry out a particularly large proportion of laptop purchases. Laptop penetration did not reach 70 in single-parent families. This is thirty times less than the laptop provision of two-parent families raising one or two children. However, the immediate introduction of digital education in March 2020 had a very strong coercive force. Laptop penetration

in single-parent households increased from 69 to 95 in one year. This year, this group bought 11 times as many laptops as cars. The interchangeability of the two products is best demonstrated by this example. Financial resources are scarce, the budget limit is tough. The external constraint almost completely resulted in one of the extreme values in the two product spaces describing the purchase decision. It was not the middle of the indifference curve that gave the optimal solution, but the extreme point that ensured the maximum of laptops.

In the four years after the credit consolidation following the financial crisis of 2008, but before the outbreak of the Covid 19 epidemic in 2020, the situation was different for the purchase of laptops and cars. Between 2015 and 2019, laptop penetration in this group increased by 30, and passenger car penetration by 20. This is in the middle of the indifference curve. In the group in the most difficult financial situation, car penetration increased by 20 in 4 years. From this, we can hazard an estimate that even parents in the most difficult situation, who are raising their children alone, will be able to replace their cars in 5*4 years. But with Hungarian conditions and conditions unchanged, it means replacing an older used car with a newer, but still used, car.

If we continue to take as a basis that only gasoline and diesel passenger cars can be manufactured and sold in the European Union until the end of 2034, and 20 years later, the Hungarian social group in the most difficult situation will still be operating them. Then the duration of the transition is another 30 years. This is true if the real wages in Hungary do not increase during this time or if the legislator does not restrict the trade of used cars. A faster transition would require a directive on the trade of used cars, which would limit the sale of gasoline or diesel-powered cars after 2040.

The segmentation of the passenger car market and stock can be solved in several ways. However, one thing we must not forget is that a car can go anywhere during a sale. The passenger car market is not fixed to one location.

9. MARKET SEGMENTATION WITH AND WITHOUT SPATIAL DIMENSION

The segmentation of the passenger car market and stock can be solved in several ways. However, one thing we must not forget is that a car can go anywhere during a sale. The passenger car market is not fixed to one location.

We can segment the market based on the following aspects:

- the brand of the car,
- age of the owner,
- the marital status of the owner,
- the educational qualification of the owner,
- the income situation of the owner
- according to the owner's place of residence.

Actually, only this last aspect is truly a territorial issue. But, if we also examine the other factors and their territoriality, we get a complex mosaic picture.

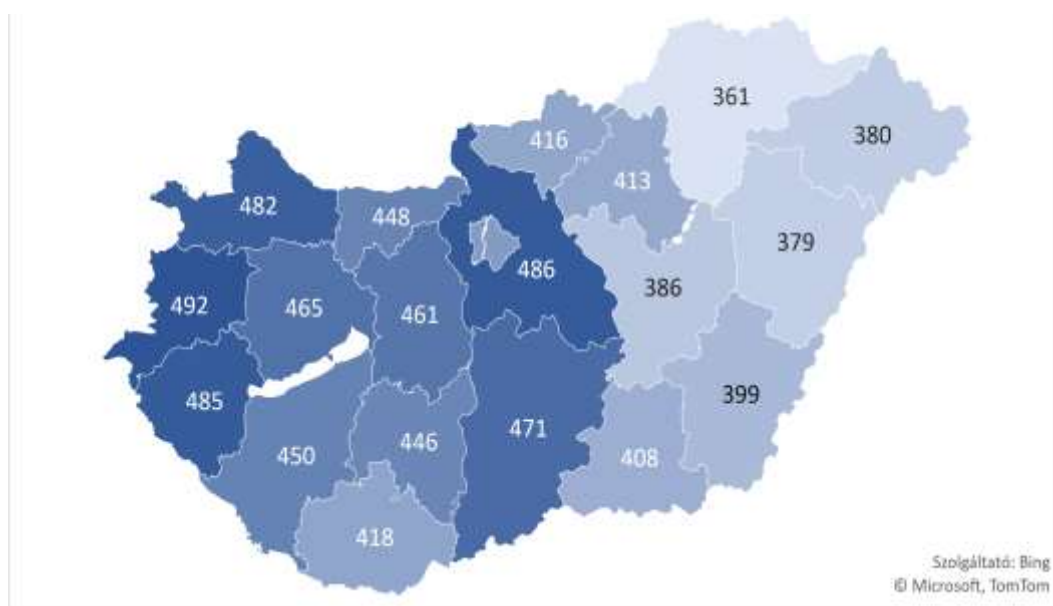
1. The brand of the car is a status symbol in the eyes of many owners. Many buyers are looking for a passenger car with an older life span, but they don't give up on the brand. On what basis do we choose a car? Very few people read the technical description of a car. They usually look at 6-8-10 key data: price, color, consumption, etc. In everything else, the opinions of trade journal writers, opinion leaders, relatives, friends and faith in the brand matter.
2. The age of car owners is also important when segmenting the market. The number of cars owned by young people between the ages of 18 and 25 increased most dynamically. Between 2015 and 2020. Car penetration has doubled in their circle. While the increase in the number of passenger cars in the age groups between 25 and 64 barely exceeded the value of 1.4 times. Car purchases by people under the age of 25 include the purchase of a young graduate's own car or the taking over of an older family car. Although the source of the increase has not yet been researched, it is clear that it is in this age group that having one's own car becomes the most expected.
3. The market segmentation according to marital status has already been discussed in part. In the case of two groups, we can talk about the dynamic expansion of passenger car supply

between 2010 and 2020. More precisely, the increase only took place in the period between 2015 and 2020. The two groups are two-parent families with one or two children and young singles. In the case of both groups, there are already 110-114 cars per 100 households.

4. This was partly due to the division of labor within the family. The majority of Hungarian male employees go to work by car even if the proximity, the small geographical size of the settlement or the high-quality local public transport do not justify this. In many families, the mother is responsible for mobility tasks such as transportation to her workplace, taking the children to school and kindergarten, organizing their afternoon programs and shopping. This is the main motivation for the purchase and maintenance of a second family car for families living in larger cities or for more affluent families. In the case of parents raising their children alone and families raising three or more children (94), however, the availability of a car is lower due to the increasing risk of poverty. In the case of single-parent families, this risk is higher and the penetration is lower (53 pcs). Among all family types, the provision of a car is the lowest for women living in single-person households (22).
5. According to data from the Central Statistical Office, educational level has a demonstrable relationship with car ownership. 29% of families with a maximum of primary education had a car. It is true that the number of these families is decreasing every year. 72% of households with a skilled worker certificate own a car. 82% of families with a high school diploma have a car. For families with at least one degree, this is 92%. This is possible for several reasons. A car is a status symbol that appears to the outside world. No one shows off the diploma or graduation certificate, but our car still conveys our perceived or real self-image to the world. On the other hand, according to official statistics, higher education goes hand in hand with higher incomes. But it should also be noted that the proportion of people with both high school diplomas and diplomas is increasing in Hungary. If we assume unchanged consumer behavior, then the increase in the education level of the population will cause a further increase in the number of passenger cars. This will cause the largest increase in the number of vehicles in the county seats, the capital and its agglomeration, where the proportion of graduates is the highest.
6. The change in the number of passenger cars based on the income position of the owners shows interesting phenomena worthy of further consideration. The data was prepared based on the table showing the income deciles published by the Central Statistical Office. On a national average, between 2010 and 2020, household car penetration increased by 23 or 46%. Only those belonging to the first, sixth and ninth income deciles achieved a greater increase in their proportions. There are two questions here. Who is included in each income decile? What kind of cars do people in each decile buy?
7. The answer is given by changes in the income of those belonging to individual income deciles. Only three deciles have a per capita income above the national average. But the fastest income growth can be observed in the 1st decile. Nationally, nominal wages per capita increased only 2.2 times between 2010 and 2020. We ignore the very significant inflationary effect over 10 years, and therefore it is important to compare the per capita income of the deciles with the national average. On the other hand, the nominal income of those belonging to the first income decile increased by 5.4 times. This increase at that level of living standards and incomes has resulted in a very significant increase in discrete income not seen before. In their use, however, they followed the consumer patterns of the majority of society: they bought a car, a mobile phone or a laptop. Here, the important thing was not the age of the car, but its existence at all, and the rise in status associated with it. Passenger cars over 20 years old can be found here.

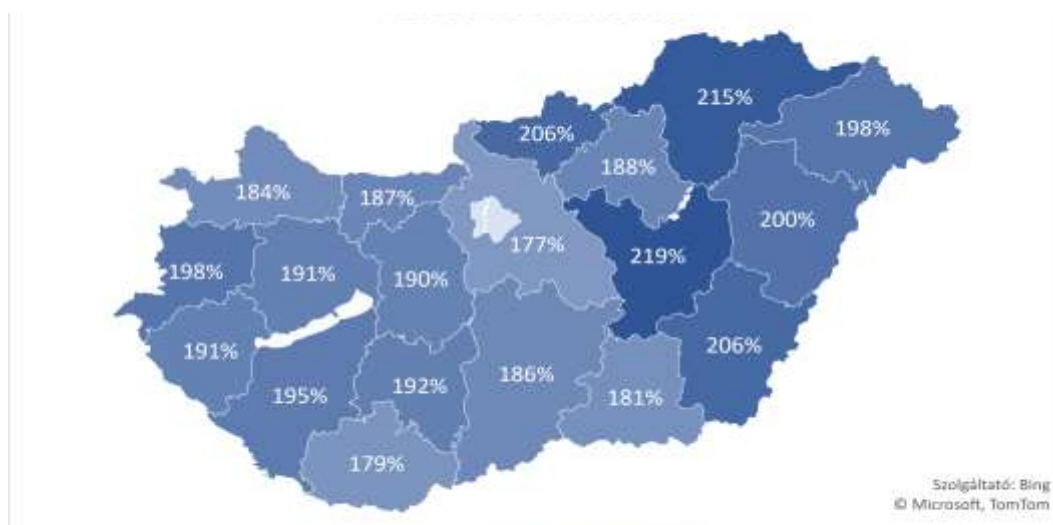
Compared to the neighboring deciles, the nominal wage growth of the 6th and 9th was faster, about 2.3 times. In these deciles, the growth rate of the passenger car stock over 10 years was over 60% instead of the national average of 46%. While the national data show that personal car availability has increased in all income categories due to lifestyle changes and status symbols, the higher-than-average growth rate only occurs in groups with relatively high discrete incomes compared to the previous.

8. The territorial distribution of the passenger car stock and its changes are also noteworthy. The biggest difference in the number of cars per 1,000 people is between Borsod-Abaúj-Zemplén (361) and Vas (492). With its value of 426, Budapest slipped from first place in 2001 to 10th place among the counties. The east-west division of the country can also be seen on the map. The European Union is the 20 poorest NUTS II. of the 4 Hungarian regions - Southern Transdanubia, Southern Great Plain, Northern Great Plain, Northern Hungary - only Bács-Kiskun County's data reaches the level of the Transdanubia counties. In 9 of the 12 counties belonging to the EU's four most backward regions with the lowest GDP per capita, the provision does not reach the national average. Low incomes here result in a nationally low supply of passenger cars. At the same time, it is surprising that the growth rate of the passenger car stock is the fastest in these counties - the highest in Nógrád and Jász-Nagykun counties. The high supply of Pest County is partly due to its young and growing population. On the other hand, the suburbanization processes around Budapest and the daily commute make it necessary to own cars.



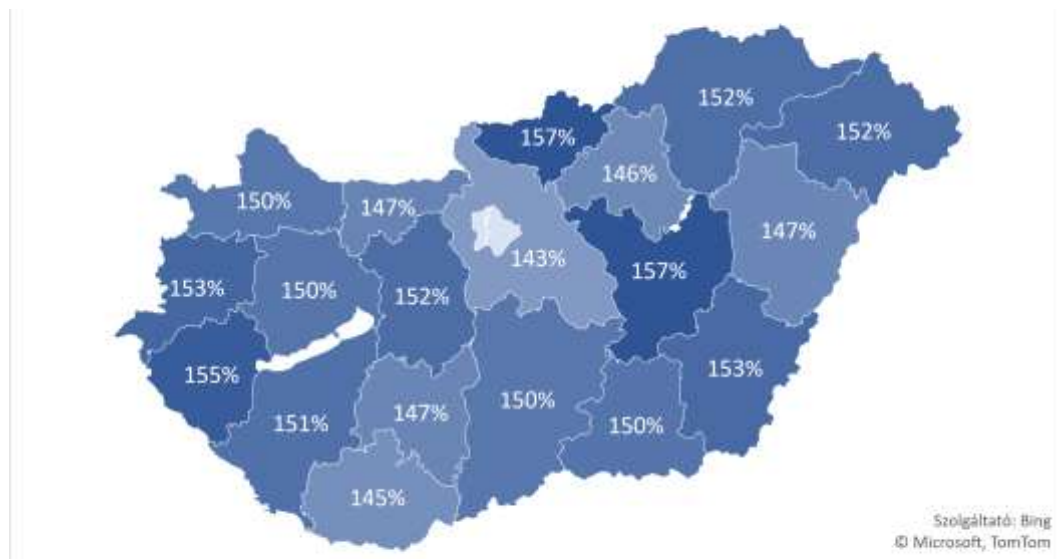
Source: Hungarian Statistical Office database www.ksh.hu download: 2024. 03.01.

Figure 3. Number of cars per 1,000 people in 2023 in the counties of Hungary



Source: Hungarian Statistical Office database www.ksh.hu download: 2024. 03.01.

Figure 4. Percentage increase in the supply of passenger cars per 1,000 people between 2000 and 2023 in the counties of Hungary



Source: Hungarian Statistical Office database www.ksh.hu download: 2024. 03.01.

Figure 5. Percentage increase in the supply of passenger cars per 1,000 people between 2010 and 2023 in the counties of Hungary

10. EXPANSION OF CHARGING INFRASTRUCTURE

Based on Mckinsley analysis, it is evident that there will be a considerable escalation in the demand for electricity stemming from both passenger and commercial electric vehicle (EV) charging. The data suggests a trajectory from nine terawatt hours in 2021 to an anticipated 165 terawatt hours by 2030. This indicates an impressive annual growth rate of approximately 40 percent in EV-specific electricity consumption. Despite this surge, it is projected that EVs will represent only about 6 percent of the total electricity consumed in the EU-27 region by the end of the decade. This underscores the imperative for the development of infrastructure, grid expansion, and the implementation of effective energy management strategies to cater to the burgeoning demand. Moreover, this trend underscores the ongoing dominance of traditional combustion engine vehicles in the transportation sector's energy consumption landscape. (Conzade, Schaufuss, 2022)

The spatial aspect of the EVs growth is highly connected with the charging infrastructure development and parking related incentives. (Csonka, Csiszár, 2022) The charging infrastructure has been growing gradually but in the Central-European region this tendency is just enough to place Hungary to the bottom of the average development status. Taking into account the financial situation of society, it is unlikely that middle-, and lower-income households - which represent the vast majority in Hungary - can afford to install charging stations at home. This means that especially in the urban environments a significant public charging infrastructure is needed around the country and the grid system will have to support the energy needs of these growing amount of stations.

In Budapest 43 % of EVs are registered and 57% in the countryside. (Csonka, Csiszár, 2022) It shows the dominant focus was on Budapest infrastructure development, the efforts in the countryside were manily focused on the bigger cities, especially those located around the international transit roads, and the north-western part of the country.

There might be two major way of the development policy from which the ambitious direction termed the demand-driving route, a plethora of charging stations will be established to expedite the uptake of electric vehicles (EVs). This strategy predicts lower utilization rates for individual chargers owing to the increased number of available stations.

Consequently, it is anticipated to diminish the profitability of charging-point operators (CPOs), as some charging stations may become economically unviable.

Conversely, the utilization-oriented approach focuses on strategically deploying charging points to meet the current rate of usage growth. This pathway ensures that most charging stations remain profitable by aligning infrastructure development with existing demand. CPOs are inclined to favor this approach to mitigate the risk of operating unprofitable stations. Although it may not drive EV

adoption as aggressively as the demand-driving path, the utilization-oriented strategy offers a more sustainable and financially sound business model for charging-point operators.

The network of electric charging stations in Hungary is expanding dynamically. There are nearly 200,000 public charging points available in the European Union, with approximately every tenth being a fast charger. (Conzade, Schaufuss, 2022) However, the growth of the charging network is struggling to keep pace with the spread of electric cars, indicating a potential challenge for infrastructure development.

11. WILL LITHIUM OR COBALT BE THE NEW OIL?

Although electric vehicles (EVs) appeared on the market head to head with internal combustion engines (ICE) on the eve of the twentieth century, about a hundred years later they still count as somewhat of newcomers. Their widespread use however is expected to shift the power dynamics of resource exporters, as well as traditional car manufacturer countries. According to some sources, the ulterior reason behind the promotion of EVs (and green revolution in general) is the drive for energy independence of the West and China, rather than environmental protection. (Hakes 2008, Friedman 2009). Divesting from oil has been on the top of political agendas as a mean to curb the political clout of OPEC countries and Russia.

In contrast to ICEs, which are heavily reliant on fossil fuel derivatives, the energy powering EVs can stem from a wide range of sources, like solar, nuclear, or geothermic. On the other hand, a new type of resource demand emerged due to EVs, that is for lithium and cobalt. Although they are often labeled as lithium-batteries due to the technical difficulties of working with the alkaline metal and power thereof, cobalt has been an equally crucial component of these systems. Battery production soaks up more the half of these metals produced globally, buoying them to be among the most important strategic resources of the century. (Greim 2020, Gulley 2022) Fears of newly come dependence on lithium- and cobalt exporters are not unreasonable, but the situation of the metals are utterly different. Resources of lithium are more evenly distributed around the Globe, but the metal seems to be an irreplaceable part of EVs for the foreseeable future. (IEA 2023) On the other hand, the dominant source of cobalt remains the Democratic Republic of Congo, which has been unable to squander its situation for economic progress before the market started to shift to batteries employing more abundant elements (like iron phosphate). (Walvekar 2022)

Forecasts suggest that the price of batteries will hit the \$100 US per kWh threshold by 2024, making electric cars a more economically viable option compared to traditional fuel vehicles.

12. CONCLUSION

After this, what can be said about the expected spatial spread of electric cars in Hungary?

The fastest spread is to be expected in Budapest and its settlements with the highest per capita income - Budaörs, Budakeszi, Telki, Szentendre. Here, you can expect the fastest spread among young graduates and families with small children.

The relatively rapid spread of electric cars can be expected in the car manufacturing cities of Győr and Kecskemét and in their agglomerations.

A relatively fast spread can be expected in Győr-Moson-Sopron, Vas and Zala counties. At the same time, in the already mentioned 8 eastern Hungarian counties, a very slow transition, which is expected to accelerate only around 2035, is likely.

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360 Budapest 150. Budapest and the Geography of Talent

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Abstract

Budapest, as an education and innovation center, is Hungary's leading city. At the same time, there are huge debates about the role of Budapest not only in Hungarian regional science, but also in political public life. Applying the Swedish Gunnar Myrdal's theory, we are looking for the answer to whether the absorption effects or the spreading effects are typical in the case of Budapest. The question is, does Budapest drain talent from the rest of the country or does it contribute to the development of the countryside? The research methodology is based on the processing of theoretical literature, the analysis of statistical data and the examination of successful individual life paths within the STEM⁹⁴ disciplines.

Keywords

Knowledge draining, success, tertiary education, Budapest, place of study.

1. INTRODUCTION

If you look at the structure of a country, in most cases you will find 1 or 2 poles of centralisation, one of which is usually the capital. This can be a very good research target for practitioners, as it can raise interesting questions about regional imbalances, the development of companies and innovative centres, among other things. It can also be observed that larger cities or metropolises have more of everything (population, shops, hospital care, jobs, salary levels, educational institutions, etc.) and are therefore also more likely to be home to knowledge transfer, so that the so-called success rate can also move to some extent along the axis of centrality. In the present research, we look at the case of Hungary, since for decades there has been much debate about the role of Budapest as a capital city in the development of Hungarian regions and the development of imbalances. A preliminary impression of the capital's absorptive effect is that talented people born in Hungary or in the Hungarian language area who achieve professional success tend to end their careers in Budapest, presumably largely founded by studying in Budapest. So, the questions are: what is the role of Budapest in education in Hungary? How does the place of study contribute to the professional success of individuals? How attractive is Budapest as a centre of education and innovation for people who want to be successful? Based on this, the main question of our research is: does Budapest drain talent from the rest of the country, or does it contribute to the development of the countryside?

In terms of the methodology of our research, we will set up the necessary theoretical background in the secondary research, in which we will identify the economic inequalities in Hungary, discuss the knowledge drain effect, and present the structure and importance of higher education in our country. As primary research, we analyse statistical data on higher education in Hungary as recorded by the Hungarian Educational Authority, and we take our own sample of successful Hungarian entrepreneurs from the "100 SelfMade Hungarians" list of the Hungarian Forbes Magazine 2022, supplemented by a list of the "Hottest Hungarian start-up founders of 2023" also from Forbes Magazine.

⁹⁴ Science, Technology, Engineering and Mathematics. In this paper: including Business & Economics but excluding Medical & Health field of studies.

2. LITERATURE REVIEW

A centre-periphery theory⁹⁵ can serve as a theoretical background for the analysis of the relationship between Budapest and the rest of Hungary, since Hungary is a highly centralised country, and thus shows uneven levels of development, while in many respects it is considered small in the world. Among the classics, we highlight the polarisation theory of Swedish economist Gunnar Myrdal, whose starting point is cumulative causation⁹⁶ and focuses on how economic inequality and spatial segregation evolve in societies. More developed regions are more attractive to people, i.e. the drain of labour, knowledge, demand, capital, has a spill-over effect of making less developed, poorer regions even poorer (Myrdal, 1957). In contrast to neoclassical economics, this theory defines the free market as the source of inequality. Thus, Myrdal's theory that the free market may in fact contribute to deepening inequalities and spatial segregation highlights that market mechanisms do not always lead to a reduction in inequalities or to a fairer society. The theory of cumulative causation, on the other hand, assumes that positive or negative effects do not interact. A region is affected by either positive or negative effects, which tend to be independently reinforced. A positive feedback loop is created, which in a system means that an existing process continues, for example, if someone becomes poor, they will find it difficult to get out of it. Absorption effects are seen in the migration of labour and capital from peripheral regions to the centre. These are the main resources, which become concentrated in the centre regions. In contrast, dispersion effects have a positive impact on peripheral regions, as innovations, productive capacities or services move from the centre to the periphery (Myrdal, 1957; Benedek, 2016). It is the role of the state to mitigate the factors that contribute to rising inequalities. The unregulated behaviour of free-market economies is consistent with Myrdal's observations of increasing inequality and the relative backwardness of poorer regions in the absence of intervention. The state can intervene through a variety of measures, including microeconomic interventions such as location choice, macroeconomic policies that affect tax revenues and investment, and coordination mechanisms. Szabó et al. argues in their paper for the innovation policy to focus on access to knowledge and the promotion of learning to reduce the gap between social groups. Universities are to be transformed into development poles, while applying the concept of a circular economy to align economic development with global trends, building on the cultural traditions of the region. National laboratories can be an important tool for this, as well as maintaining the knowledge-centred role of educational institutions while keeping them up to date (Szabó et al., 2023). Based on all this, we assume that in case of Hungary, Budapest as a centre of education and innovation will not only absorb the relevant knowledge-centred population, but will also, over time, re-inject it back into rural areas, which is a priority for the country.

Several studies have shown that educational institutions play a key role in the economic development of regions in knowledge-based economies, and it is therefore important to examine them. As well as providing a well-educated workforce, they promote innovation and research and facilitate communication, networking, and linkages between economic actors (Rodríguez-Pose & Crescenzi, 2008). And in terms of networks, it has also been found that entrepreneurs with higher network capital can access more resources and thus attract more people into their ventures, i.e. they can be more successful themselves and their ventures (Dubini & Aldrich, 1991). This is supported by Banerji and Reimer (2019) in their analysis of start-up founders. Imre Lengyel (2023) points out that when analysing higher education institutions, it is customary to analyse them from two perspectives: the demand and the supply side. "On the supply side, there are short term effects, triggered by

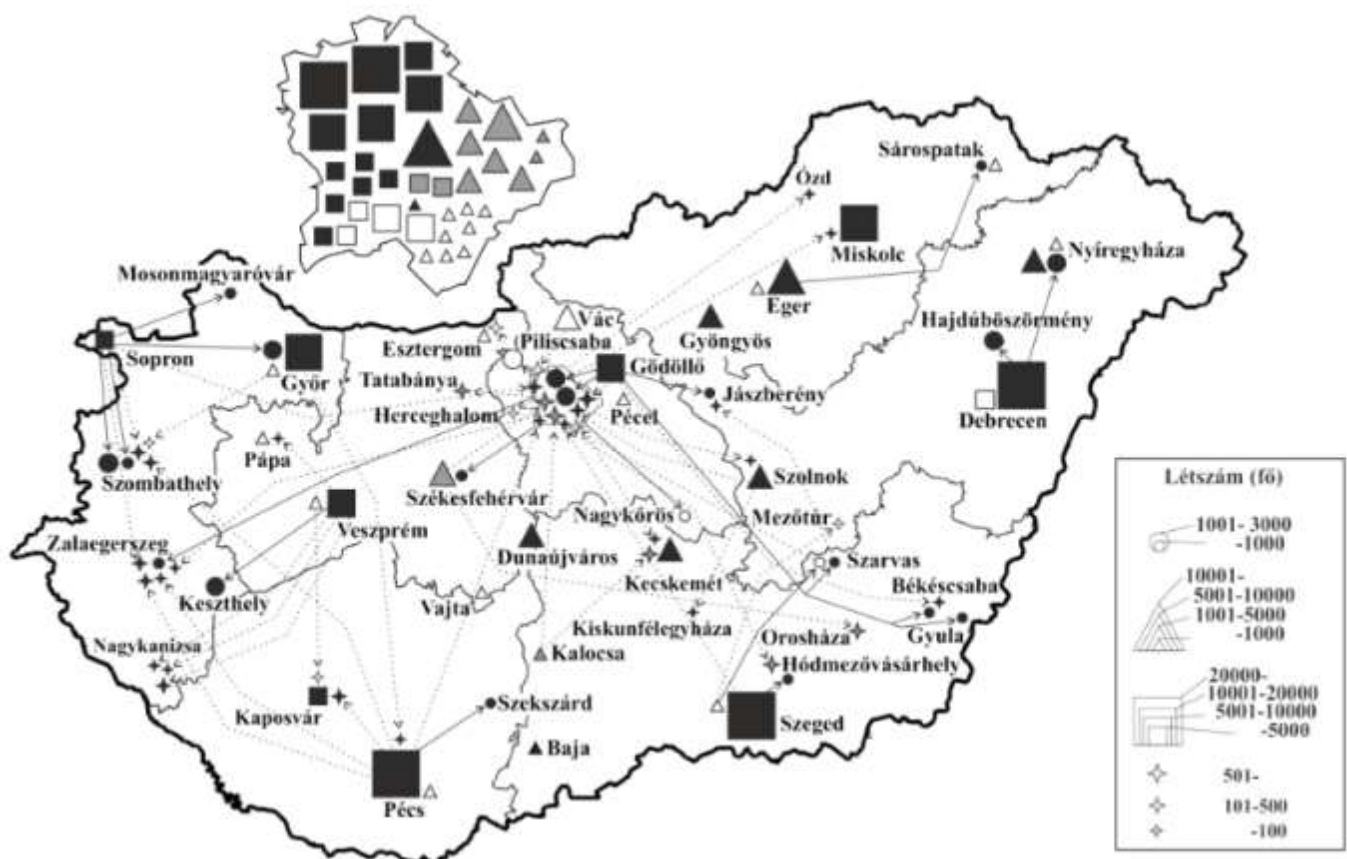
⁹⁵ "Centre-periphery models are a prominent category of theories explaining unequal geographical development, which has lost much of its influence in recent decades, mainly due to the popularisation of neoliberal concepts that dominate public policies (Benedek, 2016, p. 1)."

⁹⁶ "The theoretical model of Gunnar Myrdal, which also plays a key role in the models of the new economic geography, to a large extent also named after Paul Krugman (Krugman, P. 1991b), which states that if growth is triggered in a given area by some development impulse, then a self-reinforcing spiral of benefits can trigger further growth and development processes, partly directly and partly indirectly related. As a consequence, centre-periphery relations and concentrations are created, one of the driving forces of which is the so-called backwash effect (the pumping of resources out of the surrounding areas and their concentration in the centre), the other element is the spread effect (the emergence and exploitation of the benefits of links with the central area in the surrounding area) (Jeney et al. eds., 2013, p. 18)."

institutional payments (maintenance of buildings, teachers' salaries, etc.) and student spending (rent, food, transport, etc.), which, like tourism, increase demand for local services. On the demand side, however, there are longer-term effects. New firms are attracted to the skilled workforce, entrepreneurship is boosted, start-ups are created, R&D contracts are awarded from outside the region, etc. While supply-side effects can be observed in all regions where higher education is located, demand-side effects are mainly observed in regions where research/science universities are located, where institutions are also integrated into global knowledge networks (Lengyel, 2023, p. 53)." It would be important from all perspectives that these institutions are spatially balanced across the country so that spatial disparities are mitigated over time, but efforts to do so have not proved successful either, with apparent reductions in student numbers in rural training locations (Lengyel, 2023).

3. STRUCTURE OF HIGHER EDUCATION IN HUNGARY

In Hungary, since the introduction of the Bologna system in 2006, high school graduates have been able to apply for three levels of education: BA/BSc bachelor programmes, undivided programmes, and tertiary educational vocational training. Between 2019 and 2021, the country again underwent a major change, with state institutions being taken over by trusts and new institutions being created, while smaller ones merged (Derényi, [s.a], Lengyel, 2023). To illustrate, the following figure shows the state of Hungary's higher education system in 2016, with a spatial distribution.

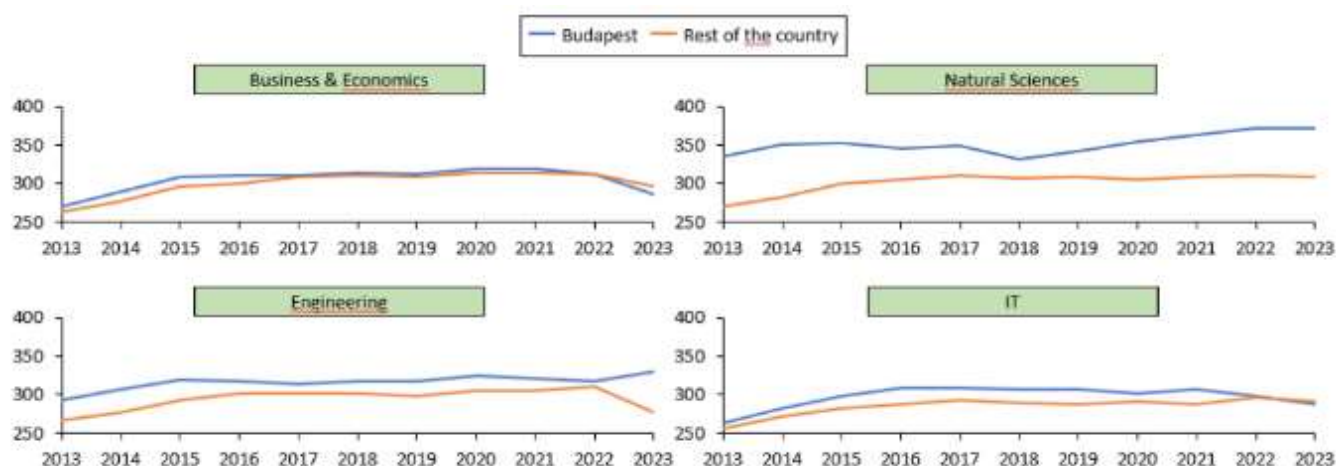


Source: Emberi Erőforrások Minisztériuma (in short: EEM, 2016, p. 9)

Figure 1. Map of tertiary education institutions in Hungary

Icons with black fillers represent public institutions, empty icons represent religious institutions and grey icons represent private institutions. Note that the enlarged area at the top represents Budapest, where there are many institutions, while in rural areas, universities are mainly located in the larger cities (EEM, 2016; Derényi, [s.a.]). In 2023, 53 institutions were open for applications in Hungary, of which 35 offered training places in Budapest.

When choosing a training course, there are many aspects to consider when applying. There have been several studies on what these criteria might be. In addition to the area of interest, the location of the training, the reputation of the educational institution, the services offered to students and a general cost consciousness, the cost of the training and the expected income after the placement are important (Rechnitzer, 2010; Rámháp, 2017). Admissions data from the past 15 years show that from 2012 onwards, more people applied to Budapest in the first place than to rural areas (Polónyi, 2018). In 2023, more than 52 thousand new entrants to the system, not considering master's programmes, applied in the first place to a course, and more than 26 thousand of those applicants chose an institution in Budapest as their first choice. The minimum admission point requirement is an important factor, as it determines the admission of students to courses. For high school graduates it is calculated based on a combination of academic and final examination points.



Source: Educational Authority – Felvi.hu, (in short: EA – Felvi), 2023

Figure 2. Average minimum point requirement for BA/BSc, undivided programmes and tertiary educational vocational training by field of study and place of study between 2013-2023

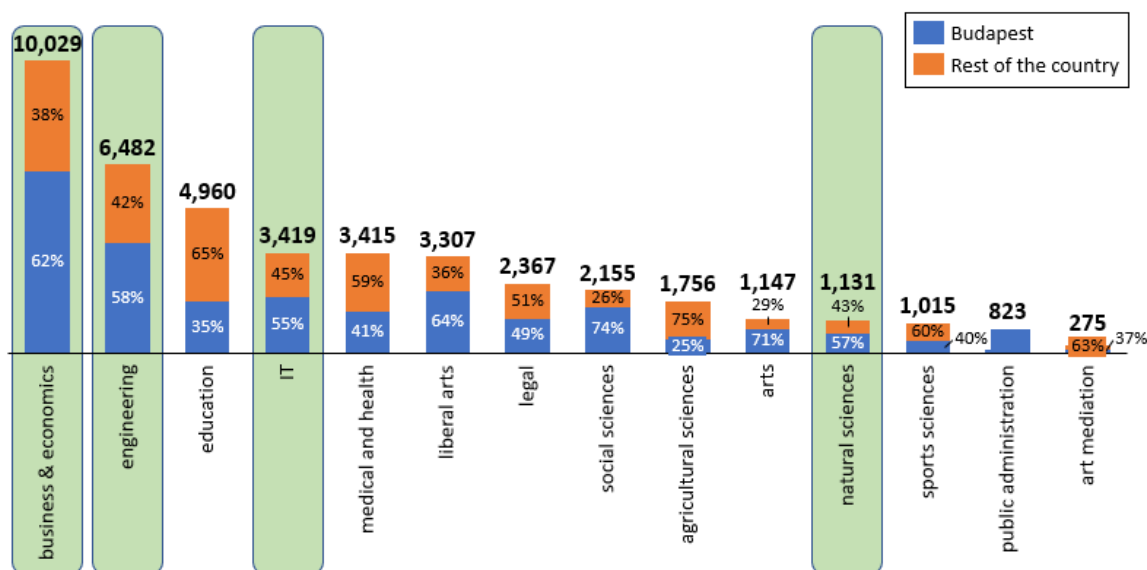
Figure 2 shows how the average admission scores in Budapest have evolved over the last ten years. It can be assumed that the more demanding a degree programme, the higher its threshold. In the case of economics, the average score thresholds in Budapest are marginally higher, but in the other fields, with one or two exceptions, the average score thresholds in Budapest are higher.

4. STEM EDUCATION IN HUNGARY

In September 2023, courses in economics, natural sciences, engineering, and computer science were launched in 33 rural cities outside Budapest (EA - Felvi, 2023). Just over half of applicants chose Budapest as their first place of study when applying, while the proportion of graduates who studied in Budapest was even higher at 57% (EA - GCTS, 2023).

One extreme aspect of the post-graduation "return" can be to achieve really big success. Several empirical studies confirm that education has a positive and significant effect on career outcomes (Van der Sluis et al., 2008). Measuring and comparing successful careers is a difficult task even for people in the same field, and almost impossible for different types of careers. We therefore narrowed our analysis to four of the 14 fields of study in Hungarian higher education: economics, technology, information technology and natural sciences, i.e. STEM (Science, Technology, Engineering and Mathematics). Medicine is also part of STEM but is not included in our analysis. There are some aspects that might make a medical career more successful, such as winning the Széchenyi Prize, but we do not look at these here. At the same time, STEM did not originally cover economics, but has since been extended to include this branch. So, we were looking for types of talent where genetics does not play a primary role and where the results can be measured to some extent by the market. A certain degree of subjectivity remains, but we have tried to select a successful and talented pool where the spatial, temporal, quantitative and measurable criteria for the group's work have been

met. In our study, we attempt to compare these successful careers in a particular field, which are recognized by the public, with statistics from national application and tracking databases. Through this, we illustrate the knowledge draining effect of Budapest.



Source: EA - GCTS, 2023

Figure 3. Graduates in 2020/2021 by field and place of study

Focusing on the STEM fields of education, Figure 3 shows the evolution of the number of graduates in 2020-2021 by field of education and by Budapest region. We have highlighted the training areas that will be addressed in the analysis. For all four areas, the proportion of graduates in Budapest is above 55% (EA - GCTS, 2023).

5. RESEARCH AND METHODOLOGY

The available statistical data on tertiary education in Hungary were used as a basis for monitoring the knowledge absorption effect of Budapest. The source of the data used for the analysis is the Graduate Career Tracking System (GCTS), which is maintained by the Educational Authority. The GCTS is a data integration module that links data stored in the Higher Education Information System (HIS) with data in other government systems through the Integration of Administrative Databases (IAD). This allows a more detailed analysis of the labour market situation of graduates. The most recent version of the database is for 2023 and contains information on all levels of education. The time series show a clear predominance of Budapest, both in terms of number of institutions, share of students and number of graduates.

We also attempted to examine knowledge in relation to professional and economic success, for which we took a sample as follows. The concept of success is relative, its measurement and ranking are subjective, but there are lists or collections that are widely recognised. We supplemented a part of the list of "100 SelfMade Hungarians" (Ács et al., 2022) published by the Hungarian Forbes Magazine in February 2022 and the founders of the most promising Hungarian start-ups in 2023 (Gólya & Knittel, 2023), also compiled by Forbes Magazine, and used them for our analysis. Only a subset of the "100 SelfMade Hungarians" list was included. Careers from fields where genetics may play a primary role in determining talent or where performance or success is rather subjective were not included in our database. These were mainly people working in the arts and culture, in the "Culture" and "Excellence" sections. Careers in the following fields are included in our database: "Business", "Money", "Impact on society", "Green", "I came to America". To this list we have added the founders of the most promising start-ups of 2023. The rankings were compiled by scoring start-ups with a Hungarian founder and less than 10 years old on a multi-category criterion system.

Since we list the place of first degree in our sample, we have filtered out data on master's degrees from the GCTS database. It is important to note that while one of our manifolds is the set of 2020-21 graduates, the successful careers and year of first degree in the collected database span a longer period.

6. SAMPLE DATA

For our study, we first built a database of publicly available data on individuals on the Hungarian Forbes Magazine lists. An extract of the basic data of the database is presented in Table 1. The table contains the distribution of the following data: whether the person has a degree, in which field of education he/she obtained his/her first degree and the place of education.

Table 1. Attributes of the sample on the first degree of successful careers

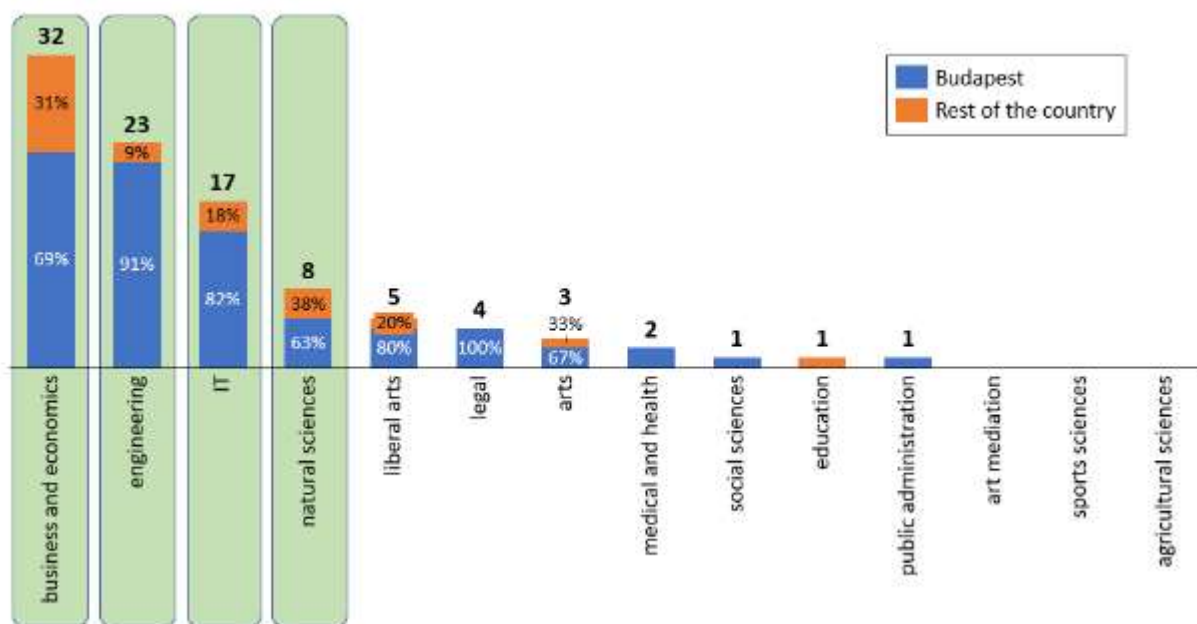
Angle	Category	Number of people
Graduated		
	yes	98
	no	5
	n/a	7
Field of Study		
	business and economics	32
	engineering	23
	IT	17
	natural sciences	8
	other	17
	n/a	12
Place of Study		
	Budapest	77
	Other city in Hungary	11
	Abroad	9
	n/a	13

Source: own data collection and editing, 2024.

The database of successful careers includes 110 people. For 7 persons, data on higher education studies were not available, 5 persons did not have a tertiary education and for 1 person the place of education was not available, only the field of education. It is also important to note that there are 9 persons who obtained their first degree abroad. The results for the sample and the database are presented below.

7. CONCLUSIONS

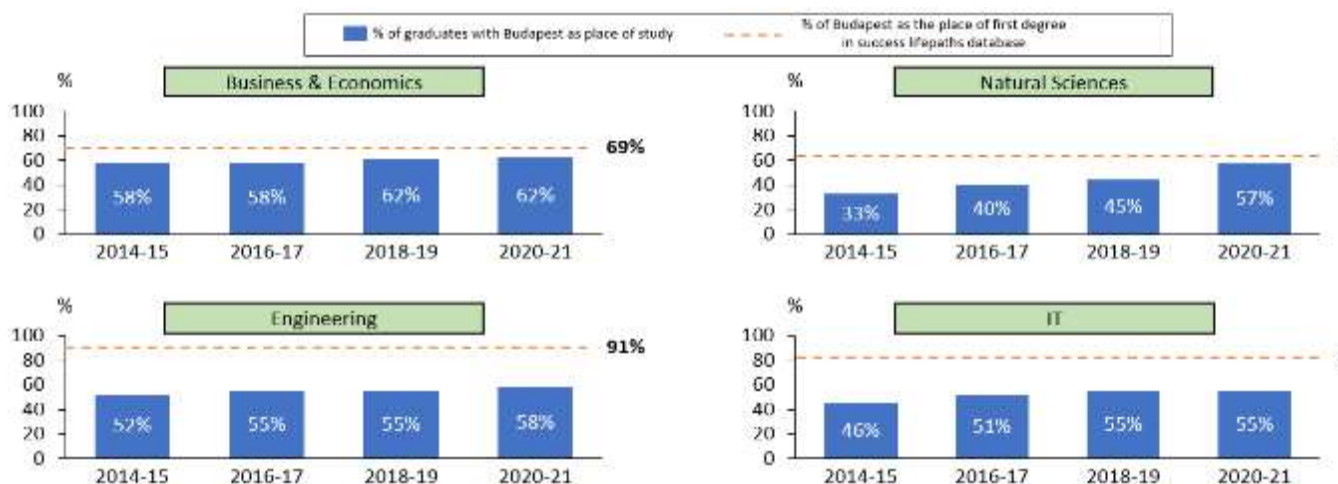
Figure 4 shows the distribution of first degrees obtained by successful careers between different fields of education and between Budapest and the rest of Hungary. It can be seen that Budapest's share is consistently higher than that seen for all graduates in the 2020-21 academic year for the fields of study examined. If we consider only the fields of engineering, economics, science and IT, the proportion of Budapest graduates for all graduates is 62%, while for the sample on successful careers it is 78%. From the analysis we see that the proportion of Budapest graduates in the successful sample is higher than for the 2020-21 graduates. It is necessary to highlight two phenomena that have already been highlighted in the literature. The first is the knowledge and talent drain explained by the centre-periphery theory, and the second, also linked to this, is the social capital that is inherent in the development of a centre and can be a major driver of success.



Source: own creation, 2024.

Figure 4. First degree of successful lifepaths by field and place of study

The question is also whether these phenomena need to be regulated in order to reduce territorial disparities or whether they should be allowed to develop organically. To do this, we looked at how the completion rates in Budapest and rural areas in STEM fields have evolved over the last 10 years compared to the rates in our sample, according to the national database.



Source: based on own work (EA - GCTS, 2023), 2024.

Figure 5. Ratio of Budapest as place of study and first degree by field

The time-series plot shows that for all STEM fields, Budapest has a higher proportion of successful careers than in the GCTS surveys. This leads us to conclude that, although success is not guaranteed for graduating from an institution in Budapest, a successful career pathway is more likely to include a visit to a higher education institution in Budapest than in another county. Within the field of natural sciences, there is a significant increase in the proportion of graduates from Budapest from period to period, while in the other fields there is no strong increase, only a minimal steepness.

8. SUMMARY

This study has shown that education, as a centre of innovation, plays a key role in the life of an economy. In Hungary, we can observe a centre-periphery theory based on the factors examined, which is also predominant in the case of higher education courses and institutions. The number of enrolments and graduates shows that Budapest is predominant compared to the rest of the country. So, proportionally, many people apply and graduate in Budapest, but the presence of the capital city in terms of success is even stronger.

By developing the following points, more precise correlations between the location of training and success could be established:

- 1) defining and measuring success more precisely
- 2) increasing the number of elements in the sample through targeted research
- 3) by conducting in-depth interviews
- 4) using a multi-sided approach (successful people, people about to choose a career, already in university, etc.)

Other questions that could be raised include the extent to which perceived career paths, successes and, through this, the location of training, may influence individual career choices, and the level of need for public intervention in relation to spatial inequalities.

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370 The Regional Inequalities between the Budapest Metropolitan Region and the Large Urban Regions in Hungary

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Abstract

The purpose of the study is to present the regional inequalities between the Budapest metropolitan area and the country's rural largest urban areas with a population of more than hundred thousand inhabitants. To reveal the disparities in development between the capital city and its region and the rural metropolitan areas and explain the causes. The economic and population predominance of Budapest and its region is not a new phenomenon, it can partly be explained by historical reasons. However in recent decades, there were regional development policy ideas, it was not possible to strengthen our rural regional centers and large cities out of the capital metropolitan area, which could have ensured a more balanced territorial development. In recent years, centralization processes have intensified in the country, which is also indicated by the fact that the Budapest urban area concentrates an increasing proportion of the country's population and economic power. At the same time, it can also be seen that a significant part of the rural cities can't maintain their population, especially the most educated groups. With the help of relevant social statistics and the latest 2022 census data, the paper presents the demographic, social and economic processes taking place in the metropolitan area of the capital and the eight rural metropolitan areas.

Keywords

Regional disparities-Budapest metropolitan areas-large rural urban areas.

1. INTRODUCTION

We can observe as a global phenomenon that countries' capitals and catchment areas are able to attract and retain population, knowledge and capital the strongest. These city regions are the most competitive. They can also integrate successfully into the global world economic system and global city network in many ways. Budapest is the largest metropolitan area in Hungary, with over a million people, even on European scale.

Budapest, as the country's capital, is in a central and privileged position. 27% of the Hungarian population is concentrated in Budapest and its urban area, and 48% of the country's GDP is produced in this area. The proportion of graduates in the Budapest metropolitan area is twice as high as in other regions, and 67% of the research and development potential is located here (Budapest 2030 long-term development concept, 2013).

The population and economic weight of the capital and its region within the country is constantly increasing, while that of large cities with a population of more than 100,000 people in the countryside is stagnating as a whole.

The eight rural cities and their regions (Debrecen, Szeged, Pécs, Győr, Miskolc, Kecskemét, Nyíregyháza and Székesfehérvár) followed different development paths. They started from a different situation, had a different, inherited economic and social structure, their internal and local resources were available to different extents, and not least their geographical location determined their development opportunities after 1990. As a result, their economic and social situation as well as their

social competitiveness differed and still differ from one another to this day. (Szirmai, 2009, Szirmai, 2014, Rechnitzer-Páthy-Berkes, 2014). According to the facts, those rural metropolitan areas were able to integrate more successfully into the European and global economic networks, where foreign operating capital appeared early on (e.g. Székesfehérvár, Győr, Kecskemét).

However, in the long term, those metropolitan areas where internal resources are available have been able to prosper and are still able to prosper.

In recent decades, population loss has become a serious problem in the majority of rural metropolitan areas, one of the important causes of which is the increase in emigration. The common feature of these metropolitan areas is that they have been struggling with structural economic and social conflicts for decades, and their separation from other large cities and the capital is increasingly significant.

This paper undertakes to present the existing inequalities between the metropolitan area of Budapest and the eight rural metropolitan areas with the help of the analysis of demographic and social conditions or economic indicators, highlighting the processes of the decade between the last two censuses.

2. POPULATION TRENDS IN BUDAPEST AND RURAL METROPOLITAN AREAS

2.1 Budapest metropolitan area

Hungarian cities and their regions have a strong population concentration potential. This is especially true for Budapest, where the population and the share of the city region in the national population growth have been continuously increasing in recent decades. (Schuchmann-Várad, 2014, p. 112).

In 2000, it concentrated only 17.5% of the Hungarian population, in 2008 it was already 25%, in 2018 it was 27%, and based on the latest data, it will be 28% in 2022. Within the Budapest urban area, the development of the population of the center and the agglomeration zone is different. The population of the capital Budapest shows a slow and slight decreasing trend, while the population of the agglomeration zone is increasing spectacularly.

One of the reasons for this is the increase in the number of people moving out of the capital, as a result of residential suburbanization.

Due to the big city problems affecting the city-centre districts (congestion, noise, lack of green areas, homelessness, parking and traffic problems), a significant number of Budapest residents left the city-centre and moved to the green areas around the city, accepting the increase in distance between residence and workplace and the ever-increasing costs of commuting.

This type of residential suburbanization is primarily aimed at the most prestigious settlements in the agglomeration zone, North Buda, Buda. Another part of them moves out to the settlements of the agglomeration zone with lower property prices precisely because of the ever-increasing housing costs in the city center and rising real estate prices. There is also a poverty suburbanization in the Budapest agglomeration, which is directed to the closed gardens of the agglomeration settlements, to former small gardens located on the outskirts.

The people who move here are mainly those who have lost their downtown apartment or rental due to debt or other reasons (e.g. job loss, divorce, rent increase), and they only have the financial resources to buy an apartment in the private garden of a settlement in the agglomeration area (typically without any local public services) (Vígvári, 2022).

The increase in the population of the agglomeration zone is not only due to residential suburbanization, but also partly to moves from Pest County to the settlements of the agglomeration zone, and partly to moves from other regions of the country to the Budapest agglomeration area. If we look at the capital and its agglomeration as a whole, the region as a whole also shows an increase in population (See: Table 1).

Table 1. Changes in the population (per capita) of the capital city of Budapest, the agglomeration area and the Budapest agglomeration (%) and the proportion within the country (%)

	2008	2011	2018	2022
population of the outskirt zone	817210	854895	877723	964238
Capital city	1733685	1729040	1749734	1685342
population of the Budapest metropolitan Area	2550895	2583935	2627457	2649580
Share within the country population (%)	25	26	27	28

Source: TEIR database.

The migration indicators clearly show that the increase in the population of the agglomeration zone results from positive migration.

While the migration balance of Budapest turns negative from 2015, the indicator is overall positive in the sectors formed by the settlements belonging to its agglomeration zone. The number of people moving in increased particularly strongly and dynamically in the eastern (Gödöllő, Veresegyháza, Szada settlements), the southern (Érd, Diósd, Törökbálint, Szigetszentmiklós, halásztelek settlements) and northwestern sectors (Szentendre, Pomáz, Leányfalu). As well as in the settlements on the Buda side of the western sector (Tinnye, Pilisvörösvár, Nagykovácsi).

In addition to the already mentioned processes, the COVID-19 pandemic also contributed to the relocations from Budapest in 2020-21. During the two years of the pandemic, due to fear of infection, closures and curfews, those who could moved to the less crowded garden cities.

This process was also helped by the mass teleworking, so commuting was not a problem for those moving out either. In 2021-22, a slight decline in the dynamics of emigration and immigration can already be seen, the reason for this being the protracted economic crisis following the pandemic, which also affected people's mobility and relocation opportunities

2.2 Demographic processes of the Budapest and eight rural metropolitan areas

In 2022, 68% of the Hungarian population lived in cities, of which 20% lived in cities with county rights, and 31% lived in other cities. The eight rural metropolitan areas concentrated 14% of the country's population (based on 2022 data, 1,385,191 people lived in them).

Previous analyzes have already shown that the population processes of the capital region and rural metropolitan areas differ. Between 2000 and 2012, between the metropolitan area of Budapest and the eight rural metropolitan areas, it was already shown that while the population of the capital city and its region (especially its agglomeration zone) increased dynamically, the population of the rural metropolitan areas, with a few exceptions (Győr, Székesfehérvár, Szeged), saw a decrease, or showed stagnation (Miskolc, Pécs, Debrecen).

A 2014 empirical research focusing on large domestic metropolitan areas also highlighted that the decrease in the population of rural large cities was not only caused by emigration, but also by suburban processes within the urban area. A part of the population of the big rural cities did not leave their hometown, but only moved to the suburban settlements, also to the more developed parts of them.

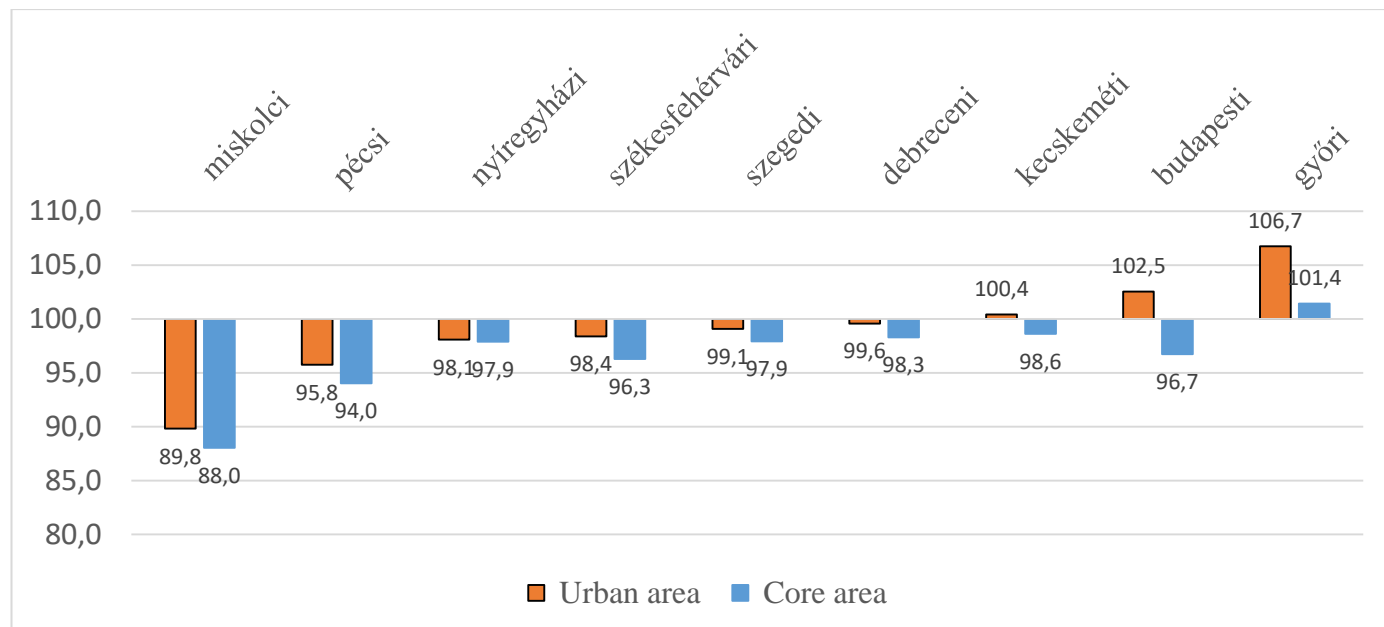
The results of a questionnaire survey carried out in nine metropolitan areas in 2014 also established that the main reasons for moving to rural metropolitan areas were better job opportunities and higher earnings (49% of those living in rural urban areas answered this, while in Budapest, only 30% of them).(Schuchmann-Váradi, 2014, page 116).

Based on the results of the previous research in 2014 and the processes of the decade between the last census (2011 and 2022), three important conclusions can be made.

- The trends of the previous decades have not changed: the same three metropolitan areas, Budapest, Győr and Kecskemét, could and do increase their population, while those of the other rural cities are decreasing, although not to the same extent.
- While previous research results showed that the centers of rural urban areas lost their population, while that of their urban surroundings increased, this seems to change by 2022. Today, even the suburbs cannot show such a population increase as to stabilize the population of the entire urban area. In the case of seven rural urban areas, the entire urban area (the

center and attraction area) is losing its population, which is due to the natural decline and aging of the population on the one hand, and negative migration processes on the other.

- The population decline in the area of two big rural cities has accelerated: The population loss of the two big cities most affected by the negative processes, Pécs and Miskolc, was drastic in the last decade. The population of Miskolc decreased by 20,000 people, while the population of Pécs decreased by 10,000 people.



Source: HCSO datas

Figure1. Changes in the population of Budapest and the eight rural metropolitan areas between 2011 and 2022 (%)

3. MIGRATION PATTERNS

Hungary's population decline continued over the past decade (between 2011 and 2021 -242,915 people fell), falling by 2.4%. Out of this population loss, emigration (not counting foreign migration) accounted for 139,795 people. There are different migration processes between Budapest and the majority of Hungarian metropolitan areas. We see positive migration in only three of the eight rural metropolitan areas (Győr, Kecskemét and Székesfehérvár), where more people move in than leave. The number of people moving in is the most spectacular in the Győr metropolitan area. It belonged to Győr, the country's economically strongest urban area (the second after Budapest). In 2021, there will be 16,000 more people than in 2011. The attractiveness of Győr goes beyond its region and is of national importance. The clear reason for moving in is the economic strength of the city, the stable operation of the Audi factory, the developments, the presence of István Széchenyi University, and the proximity of the Austrian and Slovak borders.

In the last decade, the number of people commuting between Hungary and Austria on a daily basis for the purpose of work has increased. The settlements on the western border, especially Győr, became national migration destinations after the country's accession to the European Union in 2004 and the opening of the Austrian labor market in 2011.

In the last ten years, Miskolc and its region suffered the most severe population loss due to emigration. Out of the eight large rural cities, most people emigrated from here, the city's population decreased by a total of 8,677 people due to emigration.

4. QUALIFICATION CHARACTERISTICS

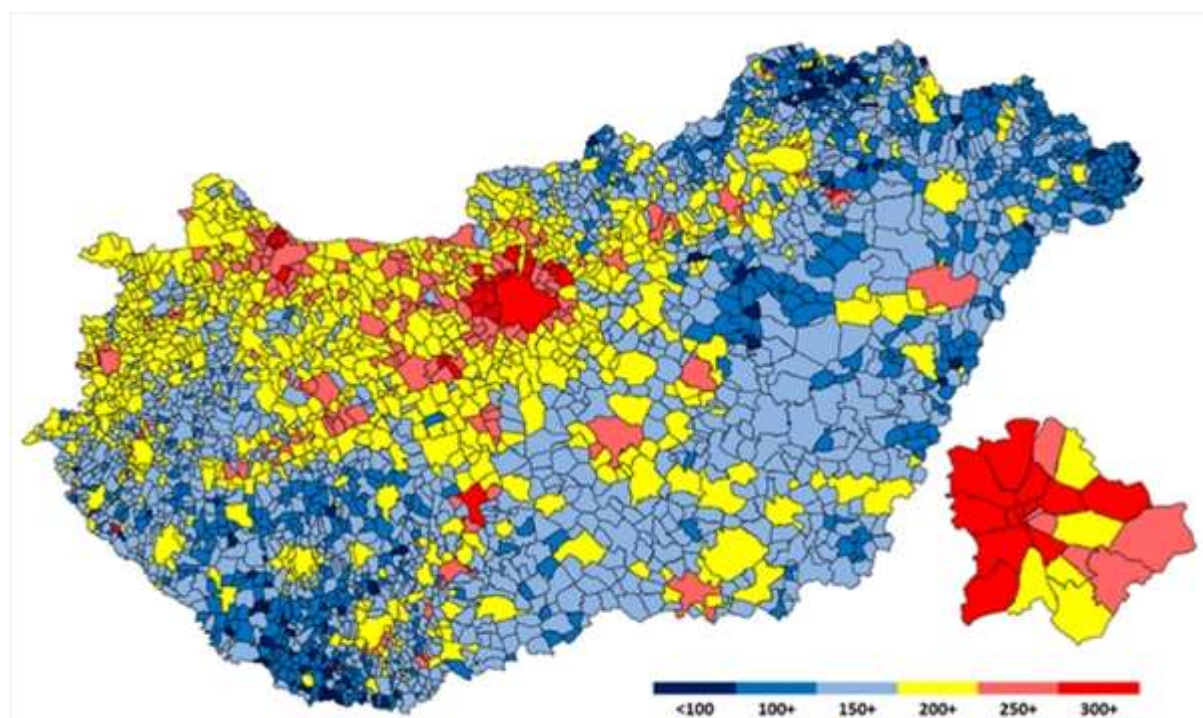
The differences in development between the capital and the rural cities are also reflected in the educational conditions of the population. It is a favorable trend that between 2011 and 2022 the

proportion of graduates increased both at the national level and in the nine metropolitan areas. At the same time, the proportion of graduates in the capital in 2011 and 2022 was almost double the national values, and in the Budapest agglomeration zone it far exceeded the national and the similar values of the eight rural metropolitan areas. In 2022 the proportion of the highest educated people was 37% in the capital city of Budapest, 29% in the Budapest metropolitan area. The country average was 19%.

The strong concentration of graduates in the capital and its region remained. The differences in the proportion of graduates between large rural cities and the Budapest metropolitan area remained, and even slightly increased.

5. INCOME DISPARITIES

An analysis based on recent 2021 settlement-level income data shows income polarization between different parts of the country. The map clearly shows the income inequalities between the northwestern, central and eastern half of the country. There are significant differences between the capital, cities with county rights, as well as smaller towns and villages. There is no change in the worst-hit areas of the country either. For decades, the lowest income and standard of living have characterized the villages and small towns of the eastern and northeastern parts of the country, as well as the small settlements of the Croatian-Hungarian border area. In terms of incomes, the country seems to be clearly divided into an exceptionally high-income capital and its region, and the North-West region, and a low-income North-East and South Hungary.



Source: https://hvg.hu/gazdasag/20221123_gki_fizetes_nav

Map 1. average monthly net earnings per settlement in 2021

6. CONCLUSION

The purpose of the study was to present the inequalities occurring in the demographic, social and economic processes of the Budapest metropolitan area and the eight rural metropolitan areas. The study analyzed the trends of the last decade. Regarding the demographic trends of the Budapest metropolitan area and the rural metropolitan areas, we experience similarities in some characteristics.

Three important processes can be seen in the development of the population:

- 1.) In the past decade, the decline in the population of rural metropolitan areas has accelerated, the population of Miskolc and Szeged, which previously exceeded two hundred thousand people, fell back to the hundred thousand category. Their capacity to maintain their population weakening.
- 2.) In the last decade, apart from the Budapest metropolitan area, only one rural metropolitan area was able to "show" population growth, the Győr urban area on the western border. Migration trends are also similar. In the case of large rural cities, only Győr saw a significant immigration, Székesfehérvár and Kecskemét could only stabilize their population due to the immigration process. The other large urban areas lost their population due to a massive outmigration.
- 3.) There is significant polarization in the level of incomes between the capital region and the rural large urban regions, as well as between the rural urban areas. There are many reasons for the significant differences in the social and economic development of rural metropolitan areas, but it is clear that those rural metropolitan areas can prosper where the share of foreign companies in the local economy is significant.

The presented demographic, social and economic characteristics in the study draw attention to the fact that the spatial concentration of both population and economic development has further strengthened, clearly in the metropolitan area of Budapest and the area of the western border metropolis, city of Győr. Other rural cities continue to lag behind. Most of the rural urban areas are still unable to retain their (younger and educated) population. In the recent years, there have been efforts to strengthen the rural cities (see more: Modern Cities Scheme⁹⁷), the results have only been partially realized, and they have mostly involved residential infrastructure developments or spectacular investments (sports center, stadiums).

The national territorial policy must deal with the challenges of the massive population decline and outmigration from the rural urban areas in order to contribute to a more balanced regional development in Hungary.

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373 Presentation of Agricultural Knowledge and Innovation Systems - The Role of Knowledge Transfer in (Interactive) Innovation

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Abstract

The Agricultural Knowledge and Innovation System (AKIS) is a system that supports the spread of innovation and digitalisation among agricultural actors through the transfer of agricultural knowledge and is a key element of agricultural modernisation. In today's agriculture, we are observing a project culture paradigm shift in which innovation is based on bottom-up initiatives. This will be achieved through capacity building of consultants/advisors, training courses, which will provide European good practices and highlight good examples to the national agricultural actors. The so-called "innovation brokers" are advisors involved in the specialised training programs, equipped with new types of innovation skills, will be able to identify farmers' needs for development furthermore connect them with other stakeholders in similar fields to find a common solution to a given problem. In agriculture, interactive innovation has a huge potential to increase productivity, support sustainability and improve food security. The aim of the study is to summarize the structure and the operation of the AKIS model, to introduce the actors and stakeholders of the Hungarian system.

Keywords

AKIS model, knowledge transfer, interactive innovation, bottom-up initiatives.

1. INTRODUCTION

Investing in research, innovation and technological development is essential for competitiveness, both nationally and internationally, to increase labour productivity and remain competitive (Wicaksono & Illés, 2022). To improve innovation performance, it is necessary to harness available knowledge and mobilise human resources for research and innovation. To achieve this goal, the European Commission and the Member States of the European Research Area are continuously working together to develop and implement Europe-wide policies to stimulate innovation.

The Agricultural Knowledge and Innovation System (AKIS) is a horizontal system, i.e. covering all agricultural sectors, which serves the competitiveness of the European Union through knowledge transfer and knowledge sharing in agriculture. In these projects, agri-advisors have increasingly emerged as knowledge brokers in innovation. In agriculture, the quality of the actors of the AKIS model and the quality of the relationships between them helps to respond rapidly to the challenges of everyday farming (e.g. climate change, economic crisis).

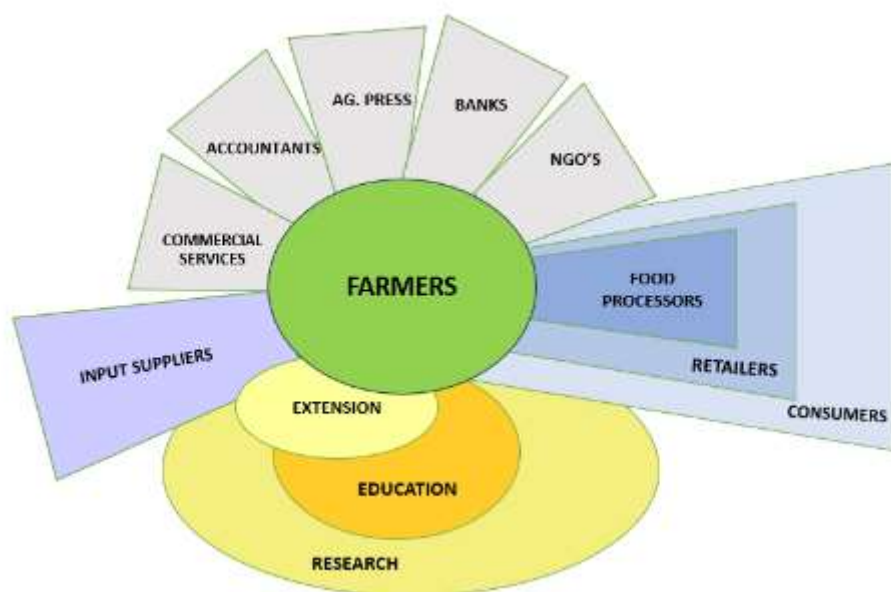
The central actor of the system is the human being (farmer, researcher, university lecturer, trainer, adviser, entrepreneur, financial expert, etc.), and its operating medium is cooperation. In this system, the consultants are the knowledge brokers, the ones who 'transfer', share or even transform knowledge between academic and practitioners. In the context of the new Common Agricultural Policy (2023-2027), the EIP-AGRI (European Innovation Partnership) projects will increasingly focus on the use of an interactive innovation model across Europe. Interactive innovation approach was defined by the European Commission, which essence is emphasising cooperation among various actors and sharing their knowledge to fill the gap between science and practice (EC, 2017). The paper

outlines the actors and characteristics of the AKIS model and the importance of interactive innovation.

2. STUDY BACKGROUND: KNOWLEDGE TRANSFER AND INNOVATION IN AGRICULTURE

The research focuses on the impact of practice-oriented knowledge transfer and innovation systems at the international level. This commitment covers a wide range of sectors, including agriculture, forestry, and food processing. Recognising the limits of available resources and the need to feed 10 billion people on earth by 2058, calls for an increase in food production, which must become more sustainable, while considering social impacts, environmental protection and financial considerations. Achieving this goal requires a change of mindset, system innovation and innovative investments (Zeifman et al., 2022). For these reasons, the European Commission's Standing Committee on Agricultural Research (SCAR) has set up a Working Group for AKIS to review the links between knowledge and agricultural innovation in Europe, with a view to building an EU-wide knowledge and innovation network putting farmers' interests first. To this end, the Commission saw the need to redefine the concept of AKIS and to identify the actors and their interlinkages. It also noted that the different disciplines of agricultural research are not interlinked and that there is a significant "gap" between theoretical research and farmer practice (EU SCAR, 2012).

The AKIS was last defined in 2018 as a concept that describes a system of relationships between people and organisations, describing how people and organisations are connected to each other to facilitate mutual learning, knowledge and information creation and sharing about agriculture (Defour, 2018). Generally, the actors of the AKIS model (Fig.1.) are farmers, educators and trainers, researchers, service providers, input suppliers, traders, media, bankers, NGOs, as well as food producers, retailers, and consumers. EU SCAR report (EU SCAR, 2012).



Source: self-edited based on EU SCAR (2012)

Figure 1. AKIS model with relevant actors for innovation

In Europe, and in Hungary, agricultural advisors, and within them, consultants have a key role to play in accessing the opportunities offered by the Common Agricultural Policy (CAP) in accessing subsidies, and in complying with the strict environmental and administrative requirements. According to the CAP Strategic Plan, consultants and advisors will play a key role in coordinating the administrative and practical aspects of this new approach to project management (Ministry of Agriculture of Hungary, 2022).

A significant number of EU Horizon 2020 projects in the field of innovation, knowledge transfer and digitalisation helped to identify the AKIS actors and strengthen the quality of the link between them. The so-called interactive innovation model, which is about cooperation between AKIS actors in knowledge transfer and information sharing, has been in operation since 2014 in the European multi-actor projects of Horizon 2020 and the operational groups of the European Agricultural Innovation Partnership (EIP-AGRI) funded under the CAP. AKIS actors collaborate on a project to find innovative solutions to a practical problem. These solutions are more likely to be more usable and marketable in practice because stakeholders (farmers, consultants, researchers and other professionals) are involved in the process. The term interactive innovation model was coined in the EIP-AGRI and Horizon 2020 multi-actor projects (EIP-AGRI, 2017).

3. THE HUNGARIAN AKIS NETWORK

In order to accelerate development of partnership between stakeholders, the National Chamber of Agriculture, the Széchenyi István University and the Institute of Ecological Research joined in 2019 one of the largest H2020 projects of the European Union, the i2connect project (<https://i2connect-h2020.eu/>), which aims to promote innovation in agriculture and forestry through the network of advisors (i2connect, n.d.)

The primary objective of the i2connect project is to develop the soft skills of consultants who play a key role in interactive innovation processes, broaden their horizons, and learn about new work cultures at the European level, with a focus on new challenges in agriculture and forestry. The H2020 project aims to put the interactive innovation model into practice by encouraging collaboration between researchers, academics, and practitioners, i.e. farmers, with scientific knowledge, through the involvement of consultants and advisors. The essence of this technique is to support grassroots (farmer practitioner) initiatives. Its aim is to address the problems posed by climate change and other economic impacts, to tackle specific challenges and to disseminate the resulting innovations, first to a smaller and then to the wider community.

The Hungarian AKIS country report was conducted on the basis of the aforementioned University of Hohenheim methodology, using interviews and data collection research.

As a result, the actors of the Hungarian AKIS have been identified in the project as follows: farmers, foresters, food producers are in the focus, supported by researchers, educational institutions within and outside the school system, farmers' organisations, chambers of commerce and governmental and non-governmental organisations. In addition, financial institutions, media and other information channels, EU and non-EU networks, etc. are actors in the system. Consultants, advisors and technical consultants appear in this space as knowledge brokers, transferring, sharing or even transforming knowledge back and forth between academia and practitioners, so, all actors. So, all actors who produce or transfer knowledge in agriculture are actors in the AKIS system. These actors contribute to the achievement of the objectives through their complementary knowledge and their network of contacts.

The authors also examined the relationships between AKIS actors. As a result, they concluded that these relationships could be systematic or contingent, indirect or direct. The organisation of conferences, expos, other events, information forums, thematic knowledge transfer platforms, online platforms, workshops, the publication of information booklets, the regular distribution of information news can greatly facilitate the information of AKIS actors through the development of a system of managed or independent contacts (Gáborné et al. 2021).

The tool of the project is the so-called interactive innovation in practice. This is a process where actors with complementary knowledge (academic, practical, entrepreneurial, etc.) work together to develop solutions to specific challenges, translate them into practice and disseminate the results to a wider audience. Interactive innovation involves existing knowledge not only scientific knowledge but also practical experience. In this sense, it encourages the co-creation of practical knowledge and innovative practices (Wielinga & Sjoerd, 2020).

The project is pioneering the development of a structure and framework for the so-called AKIS country reports (21 consortium partners and 8 European countries), which will allow for the AKIS

system to be described in a standardised and comparable way, to identify AKIS actors and to explore the interconnections between them.

4. CONCLUSION

Overall, there is a growing need for innovative solutions to innovate products, services and technological processes for new production. Such solutions are most effective when the actors themselves are directly involved in these processes (interactive innovation) and the results they generate can be disseminated widely throughout Europe, locally, nationally, and internationally. In this respect, the beneficiaries of grassroots initiatives are the actors involved in the process. New solutions and innovations resulting from interactive innovation can be directly beneficial at the level of farmers but can also be indirectly or directly beneficial at the level of society.

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375 Quality Management as the Engine of Competitiveness in the Hungarian SME Sector

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Abstract

The purpose of the article is to define competitiveness as a concept related to my research topic, and to assess the situation in Hungary with regard to digitalization as a competitive advantage based on the DESI results. Hungary needs to significantly increase its efforts in the field of digitalization. Additional investment incentives and framework conditions supporting measures for the digital transformation of small and medium-sized enterprises (SMEs), especially in the area of skills, are necessary to accelerate the digital transformation of businesses. This includes increasing the use of digital technology by SMEs and developing digital startups. The world around us has undergone drastic changes, and a well-functioning management system is a crucial element for competitiveness, adapting to changes, data-driven decision-making, and promoting employee commitment. Nowadays, the efficiency of innovation is a central theme in every industry. At the same time, production needs to become more sustainable for the sake of people's health, the protection of our planet, and profitability. Due to the continuously changing economic environment, there is an increasing demand for innovative solutions to renew products, services, and processes for reproduction. To increase efficiency, such solutions work best when the stakeholders involved collaborate to create results that can be widely disseminated at a European level.

Keywords

Competitiveness, Digitalisation, Quality.

1. CONCEPT OF COMPETITIVENESS

Competitiveness is an economic concept with which the abilities of companies, corporate groups, or national economies to sell products and/or services in a given market are compared.

According to the OECD definition, competitiveness of a national economy indicates how capable a country is of producing goods and services under free and fair market conditions that are sought after in the international market, and thus how well it can sustainably increase the real income of its inhabitants (Csath, 2016; Chikán et al., 2018). The definition by the IMD (Institute for Management Development) Swiss research center is similar. According to this, competitiveness indicates how well a country can create an environment in which businesses generate added value while simultaneously increasing the standard of living and quality of life of the population (IMD, 2018)

Some economists argue against the comparability of the competitiveness of national economies. Krugman argues that competitiveness cannot be interpreted at the national economic level and questions whether the welfare of a country depends on its global performance (Krugman, 1996). There is no unified definition for the concept of competitiveness, and its content is often interpreted differently by economists, researchers, or research institutions. Because the theoretical foundations of competitiveness analyses differ or are not clarified, this makes it difficult to compare their results. Török (2014) divides macro-level competitiveness analyses into three groups: in supply (a) and demand-side (b) approaches, the main determinants of competitiveness are the cost factors of foreign economic performance (a) and the value of the performance itself (b), while according to the third approach, competitiveness is comprehensive, an indicator of the general state of the economy (c). This latter approach is also represented by institutes (World Economic Forum, IMD) that

regularly publish competitiveness rankings of countries annually (Török, 2014). These institutes work with partly different but developed methodologies, and their global and area-specific results are well assessable (Vargha et al., 2019).

In the long term, economies are competitive where the following important conditions are available (Palotai and Virág (2016): (1) stable and predictable economic policy; (2) good governance (quality institutions, transparency and accountability, quality of legislation, stability of the judiciary, etc.); (3) improvement of the quantity and quality of human capital: availability of well-trained, creative, healthy workforce; (4) high capital accumulation, growth of productive private investments; (5) flexible, evolving companies adapting to constant competition; (6) an efficient financial sector providing financing; (7) strong innovation and adaptation capabilities; (8) growth-promoting stable tax policy, etc.

Reversing a negative competitiveness trend, initiating improvement, and making it sustainable are complex and long-term tasks. Eco-innovation, i.e. sustainable innovation methods help this process, but it needs well based experiences and knowledge sharing for the players of the economy (Al-Hanakta et al. 2023). Reforming and operating large systems efficiently are essential. In addition, taking smaller steps in certain areas can also improve the conditions of competition. These include improving the business environment, conditions for business establishment, economic administration, energy supply, building permits, tax administration, bankruptcy and liquidation procedures, dissemination of digital services, improving the legal competitive environment, etc..

2. DIGITAL DEVELOPMENT IN HUNGARY

The European Commission started monitoring Member States' digital progress through the Digital Economy and Society Index (DESI) reports in 2014. DESI country profiles are prepared yearly, which support Member States in identifying areas requiring priority action and also offers a European-level analysis across key digital areas (European Commission, 2022). The digital revolution results not only in the widespread adoption of IT applications but also in the transformation of market structures and value chains, demanding comprehensive adaptation from most businesses. High employment rates and increased wage levels force all players in the economy to increase productivity. It is a Hungarian peculiarity that the generation that became entrepreneurs during the regime change reaches retirement age en masse within a few years. In the coming years, about half of domestic businesses will undergo ownership and leadership generational changes.

The DESI index is calculated based on five main dimensions (Table 1.)

Table 1. Dimensions in DESI index (2018)

1 Connectivity	Fixed broadband, mobile broadband and prices
2 Human Capital	Internet use, basic and advanced digital skills
3 Use of Internet Services	Citizens' use of content, communication and online transactions
4 Integration of Digital Technology	Business digitisation and e-commerce
5 Digital Public Services	eGovernment and eHealth

Source: own table based on DESI (2018).

According to the DESI country profile in 2018 (DESI, 2018), Hungary's combined level of digital development in both the economy and society ranks among the lowest in the European Union. According to comparative surveys conducted by the European Union, small and medium-sized enterprises (SMEs) in Hungary use digital technology to a limited extent. In the European Union's Digital Economy and Society Index (DESI), considering the comprehensive evaluation in 2018, Hungary ranks 23rd out of the 28 member states. Hungary performs well in Connectivity and the Use of Internet Services, due to terms of widespread availability of high-speed and ultra-fast broadband, but the Index is significantly dragged down by other 3 dimensions: Human Capital (inadequate digital skills among the population), Integration of Digital Technology (sporadic use of ICT by businesses), and the very poor performance in Digital Public Services.

For 2021, according to the 2022 DESI Country Profile (DESI, 2022), Hungary ranks 22nd out of the 27 EU Member States, and in the past few years, it progressed in line with the EU. The overall score is In the 2022 DESI Report only 4 dimensions were analysed, Human Capital, Connectivity, Integration of Digital Technology and Digital Public Services. Digital Public Services have improved significantly, due to a massive development program initiated by the Hungarian state. Table 2 summarizes the developments between 2017 and 2021 based on the two reports (2018 and 2022). Only those dimensions are presented which are displayed in both reports.

Table 2. Developments in DESI dimensions (Hungary, 2018 and 2022)

Dimension	Rank	Score	EU Score	Rank	Score	EU Score	Trend
Overall	23	46,5	54,0	22	43,8	52,3	
Connectivity	18	31,7	62,6	13	57,6	59,9	↑
Human Capital	21	48,0	56,6	23	38,4	45,7	↓
Integration of Digital Technology	25	25,1	40,1	25	21,6	36,1	↓
Digital Public Services	27	40,4	57,5	21	57,4	67,3	↑

Source: own summary based on DESI (2018, 2022).

Hungary primarily ranks among the lowest performers in two main areas: Human Capital and Digital Integration of Businesses.

In terms of basic digital skills, the EU's main goal is for the number of ICT professionals to reach 20 million, as well as to achieve gender balance and for at least 80% of the population to attain basic digital skills.

Another area where we show significant disadvantage is in the digital transformation of businesses. We lag behind the EU average the most in this area. Hungarian businesses need to develop in the following areas (1) Technology Adoption: using cloud services, artificial intelligence, or big data); (2) Innovators: strengthening growing innovative businesses); (3) Late Adopters: in terms of digital intensity, more than 90% of SMEs should reach at least the basic level.

3. SUMMARY

Hungary needs to significantly increase its efforts in digitalization. Further investment incentives and framework conditions supporting insurance measures for the digital transformation of SMEs, particularly in the area of skills, are necessary to accelerate the digital transformation of businesses, increase the use of digital technologies by SMEs, and develop digital startups.

The world around us has drastically changed, and a well-functioning management system is an important element of competitiveness, adaptation to change, data-driven decision-making, and promoting employee commitment. Nowadays, the efficiency of innovation is a central theme in every sector. Production, however, must become more sustainable for the sake of people's health, the protection of our planet, and profitability.

Due to the constantly changing economic environment, there is an increasing demand for innovative solutions to renew products, services, and procedures for reproduction. In order to increase efficiency, such solutions are best developed with the involvement of the stakeholders themselves, which can then be disseminated widely at the European level.

As a result of the expected research, I aim to test the effectiveness of the system developed among various domestic businesses, and then rank the success factors based on the results obtained. As a expected conclusion of the research, it will be possible to explore the differences between various industries and activities based on the success factor ranking established.

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378 Academia–Industry Relationships in Hungary – Institutional Performance and the Role in Researcher Career Path

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Abstract

The study focuses on university–industry relationships and aims at revealing what role these collaborations play in individual research careers in different scientific fields. Researchers play the main role in the academia, their motivation, involvement and results exert an impact on the projects connected to the institutions, so they also play a significant role in academia–industry relations and the performance of such collaborations.

In the analysis we rely on semi-structured, professional career interviews conducted with 10 researchers of different gender and academic stage engaged in the fields of either engineering or medicine and life sciences, and 3 management interviews from the same institutions' technology transfer units. In the identification of collaboration forms, we applied Perkmann's (2007) typology of university–industry links, while the impact on individual career paths was examined via the external (scientific field, organizational culture, organisational structure, supporting / mentoring programs) and personal dimensions (such as gender, age, academic stage, competences, and motivation factors) aligned with recent international literature.

We have found that academics are motivated more strongly by intrinsic than extrinsic reasons. As for the main results, the level of involvement with the industry may vary; engineering typically maintains a wider and more long-term network of connections with industrial partners. Regardless of research field, most of our interviewees speak favourably of collaboration projects. The main advantages include challenging, innovative tasks (if connected to their own research topics), a chance to adopt new perspectives, and reliable supplementary income. The results reveal that for most researchers' economic applicability is not the major attraction of academia–industry cooperation. Instead, they are urged on by the chance to pursue their own research objectives on a different level.

Keywords

Academy – industry relationships, patent, publication, researcher careers, third mission.

1. INTRODUCTION – INITIAL TYPOLOGY OF UNIVERSITY-INDUSTRY COOPERATIONS

University–industry cooperation is based on the approach that universities as possessors of knowledge have a so called *third mission* to share this knowledge with society and make it economically applicable. In the past decade, thanks to conscious policy-making the third mission activity of universities has increased both in Hungary and on an international level Zomer-Benneworth (2011). The introduction of diversified policies aimed at urging and accelerating cooperation among different sectors went side by side with the transformation of tender management to stimulate more intense academia–industry collaborations with a special focus on innovation. Perkmann (2007) provides a detailed typology of university–industry links based on the participants' level of involvement. Our study uses his categories as guidance to identify forms of collaborations.

2. UNIVERSITY-INDUSTRY links AND RESEARCHER CAREERS

2.1 Recent changes in academia-industry collaborations

The collaborations between the academic and industrial fields have become the focus of professional and scientific interest in the last decade, expanding the scope of the academic field in several dimensions and raising their management to a strategic level (Klofsten et al., 2019). Achieving sustainable priorities by implementing human-oriented innovation might be a trademark for the universities, but this requires new cooperative models, as well. This can be well supported by the application of The Quintuple Helix Model (QHM) (Carayannis et al., 2012), which is already proven by many actual practical examples (Morawska-Jancelewicz, 2022; Roncancio-Marin et al., 2022). A systematic literature review by Figueiredo et al. (2022) divided the study areas of academic and industrial collaborations into the following four main clusters: (i) motivations and barriers to cooperation, (ii) determinant factors, (iii) government measures, and (iv) intersectoral technological cooperation. Going beyond the previous structure, Rybnicek et al. (2019) arranged the components that can make academic-industry collaborations successful in a novel conceptual model. Based on their approach, on the one hand scale, level, phase, discipline of cooperation are important dimensions, while at the same time institutional factors as "flexibility", relationship factors as "honesty", output factors as "clarity", and finally the framework factors, as "awareness" are decisive, also. However, it is important that the focal point of cooperation must be primarily its effect on knowledge and technology transfer, which has many supporting and inhibiting factors, from them the most prominent is the organizational culture that defines the institution (de Wit-de Vries et al., 2019). Klofsten et al. (2019) claim that the entrepreneurship of the academic field - in addition to organizational factors - is mostly determined by the synergistic use of environmental elements, the effectiveness of entrepreneurship education, a transparent goal setting, and their appropriate breakdown and communication within the institution. The research of Scaliza et al. (2022) confirmed the decisive role of institutional culture in the retention of knowledge. According to the researchers, it showed that adhocracy culture most influences the adoption of open innovations while hierarchy culture discourages it. The management of organizations and their culture are also of decisive importance from the point of view of researchers who create and nurse innovations, itself.

2.2 Dimensions of Researcher Careers

Researchers play a crucial role in the field of academia, their results exert an impact on the projects connected to the institutions, so they also play a significant role in academia-industry relations. The working conditions and climate of the researchers, in addition to the special features related to the added scientific field, are also influenced by many other factors. As a main character for researchers in academia field, Huang et al. (2020) claims, that there is several evidence of gender differences in academia, highlighting that women are underrepresented in most scientific disciplines, but at the same time, all this general picture also hides the nuances of reality, which shows a much more fragmented picture. In addition to gender, of course, characteristics that are much more closely related to individual abilities and development paths can also be examined in the subject. Skakni et al. (2022) examined the career competence among junior researchers who are about to obtain a PhD degree and who have already obtained it. The investigation revealed that career competencies for within and outside academia are sharply contrasted. An interesting result of the research was that PhD students perceived having more career competencies in preparation for careers outside academia than PhD holders did, while most PhD holders pursue careers beyond academia. Skakni et al. (2022) suggested the establishment of the future researcher base supported organizational programs and the operation of ongoing mentoring systems. One of the main measures of the performance of researchers working in the academic field today is linked to publications and science metrics. Checchi et al. (2021) revealed in this regard that this kind of pressure encourages researchers who are more capable and more successful in terms of publications to make more effort, while it has a discouraging effect on those with yet weaker results in this field. Armond and Kakuk

(2022) investigated the relationship between the effect of publication pressure and the career stage, scientific field, and gender in Hungary. The result of research showed that there are no significant disciplinary differences in perceived publication pressure, while PhD students perceived a much greater lack of resources compared to that of postdocs and professors. The findings also showed that female researchers perceive greater stress than male researchers, which once again draws attention to the management of gender differences in the academic field as well. At the same time, we cannot forget about the knowledge transfer, which is the other important task of the academic field, as a natural connection point between the academic and business fields. Orazbayeva et al. (2020)'s research drew attention to the fact that academics are motivated more strongly by intrinsic than extrinsic reasons, while only social and educational orientations emerging as significant motivations form the monetary, the career, the research, the educational and the social ones. This finding basically directs attention to how different the motivation set of the academic sector is compared to other workers.

In addition to the availability of different collaboration forms at various academic institutions and to various research motivation dimensions, in this study we were interested in whether researchers felt motivated by these projects and how industry collaborations fit into their personal life and career. The results reveal that for most researchers' economic applicability is not the major attraction of academia–industry cooperation. Instead, they are urged on by the chance to pursue their own research objectives on a different level – however, there are some differences of attitude depending on the specific form of collaboration.

3. RESEARCH DETAILS

3.1 Research Objectives

In accordance with the above, this paper analyses innovative academia–industry collaborations in Hungary with a special focus on what role such projects might play in academic careers depending on the researcher's scientific and institutional background. Relying on Perkmann's typology (2007) we identify the forms of links that come up in our interviewees' personal narratives and we look at the way how they describe, contextualise and evaluate these within their individual career paths.

We focus on the following questions:

- Which forms of academia–industry collaborations are present within the Hungarian academia?
- What role do these collaborations play in individual career paths and how researchers themselves reflect on this?
- What kind of institutional units have recently emerged to aid such innovative collaborations? What attitudes researchers have towards such facilities and how might they be improved?
- What external (to the individual) effect do characteristics within the organization or the cooperation model, such as organizational culture, organizational structure, or even mentoring programs, have on the career path and the involvement of researchers?
- What influence do individual (internal) characteristics such as gender, biological year (age), academic status have on the personal career path and the involvement of researchers?
- And we also wanted to explore the importance of competences (knowledge, skills, abilities necessary to manage one's own work, learning experiences to achieve the desired entrepreneurial goals) and the factors determining an individual's motivation (such as monetary, career, research, educational and social) from the point of view of the career path.

3.2 Methodology

Relying on the subjective approach in analysing academic careers (Arthur – Khapova – Wilderom 2005), the paper focuses on researchers' subjective perception of their career paths and the role of academia–industry collaborations within.

Reading through the interview transcripts, we identified the various forms of collaborations according to Perkmann's typology (Perkmann, 2007), we collected the ways researchers describe these forms, we compared how they place and evaluate such projects within their professional career, and this way we drew our conclusions about the role of academia–industry cooperation in research career paths. Relying on the transcripts we also attempted to outline how researchers perceive the institutional, the management background and practical operation of these collaborations.

Our qualitative analysis relies on semi-structured, professional career interviews conducted with PhD level university staff.

In a quantitative follow up we measured the publication and patenting performance of the examined universities and other Hungarian universities with similar scientific profile as examples for governmental measures and possible indices of intersectoral technological cooperations Figueiredo et al. (2022). In this section we have used the Espacenet patent database and the Hungarian Science Bibliography for the publications to examine the performance of the Hungarian universities by these two dimensions, searching for the results of the explored management interventions. Our focus was on the 2009 to 2023 period for both capital and regional universities, examining how governmental actions and sectoral collaborations might influence these outputs. The Budapest University of Technology and Economics emerged as a leader in patent numbers, while Semmelweis University showed a notable uptrend in prestigious Gold category publications, highlighting the varying impacts of these collaborations across different scientific fields as it is stressed in Section 4.3.

3.3 Interviewees

As previous research shows academia–industry collaborations can greatly differ depending on research areas and institutions (Degl'Innocenti – Matousek - Tzeremes 2019; Pálinkó 2016). In selecting our sample, we pay attention to these differences and try to cover various fields and institutions. Table 1 shows the affiliation and gender of interviewees.

Table 1. Affiliation and gender of interviewees

Institutions	Interviewees
BME (Budapest University of Technology and Economics)	4 researchers (3 females, 1 male) 2 managers
SZTAKI (Institution of Computer Science and Control, a member of the Eötvös Loránd Research Network/HUN-REN)	3 researchers (all male)
SOTE (Semmelweis University – medicine and health sciences)	4 researchers (1 female, 3 males) 1 manager
Sum	14 people

In accordance with our research objectives, the interviews were conducted focusing on:

- 1) careers of researchers and university professors in engineering, academia–industry collaborations in practice, institutional background in BME and SZTAKI
- 2) careers of researchers and university professors in medicine and life sciences, academia–industry collaborations in practice, institutional background in SOTE
- 3) the management approaches and interventions for facilitating academia – industry collaborations at the same institutions (management interviews)

We only included researchers who have considerable experience in academia–industry cooperation. We tried to select our interviewees from mid-career researchers, but paid attention to include some early-career and senior researchers as well. With regard to gender, we aimed for a balanced sample with 6 women and 7 men out of 13 interviewees. The youngest interviewee is 32, most of them are in their forties and there were two in their late fifties. In the frame of the management interviews we asked the leaders from the same institutions' technology transfer units.

4. RESULTS

4.1 Academia–Industry Cooperation in Medicine and Life Sciences

4.1.1 SOTE Interview Results

We conducted four interviews with researchers affiliated to SOTE: three men and one woman. They are from three different departments, but all of them specialise in molecular biology and cell biology and their main research topics are closely connected to molecular biology, diagnostics, pathology, oncology and tumour biology – all related to clinical medicine. One of the interviewees is head of institute, another one is leader of a research group. All four of them teaches university courses and also have personal experience in academia–industry cooperation via tenders, contracts of appointment or in other forms.

All interviewees have a positive attitude towards these collaborations, the younger the more overwhelmingly positive, nevertheless they all formulate a couple of doubts and difficulties according to the publication pressure.

Beyond the scientific and economic applicability, they highlight the following advantages:

- direct applicability in clinical medicine
- learning new perspectives
- practice-oriented attitude, an urge to simplify and utilise knowledge
- supplementary income for researchers

The female interviewee mentioned that she has never experienced negative discrimination because of her gender in academia – industry cooperation but in her scientific career in the academia.

Based on the SOTE researcher's career narratives, *research services* seem to be the most common form of collaboration with industrial partners. According to Perkmann's typology, this relationship is typically initiated by the industrial partner and consists mostly of contracted research tasks and counselling. Researchers also mention *academic entrepreneurship*, *commercialisation of property rights* and *patenting*. The latter two appear relatively rarely and our interviewees express various doubts about them. Researchers also refer to two promising and already very successful spin-offs: 3DHistech and Turbine. Both firms are dedicated to digital pathology and digital cell modelling. University cooperation in the development of digital pathological instruments belongs to the category of *research services*. Its results bring both practical applicability and scientific innovation, hence all of the interviewees highly appreciate this form of collaboration. In this field of science QHM approach, Carayannis et al. (2012), seems to be the most welcome in case of collaborations.

Nevertheless, many researchers express concerns about *academic entrepreneurship*: there is a substantial number of risks to be taken, entrepreneurship is hard to fit into an academic career and its main goals, it requires a different approach to innovation. Some of our interviewees also mention that with time, spin-offs' connection to their original university loosens and there is less chance for a long-term collaboration between them:

*"I have never seen the university truly benefit from these spin-offs"*⁹⁸

With regard to the *commercialisation of property rights* and *patenting*, we also received mixed or rather negative responses. The patenting process is complicated and most researchers lack the time, the ambition and the required knowledge:

*"I have seen such things obtaining patents, I would never even thought that it is possible, but I would not feel any better if I myself had any patents, I don't know, this holds no real value to me."*⁹⁹

We have found that the barriers of the collaborations are derived from the missing connection with the core research focus, the missing and often refused entrepreneurial/management knowledge and the publication pressure (Armond and Kakuk, 2022). All four SOTE researchers spontaneously mention the Innovációs Központ (Innovation Centre) as an institutional unit to coordinate university-industry cooperation. Three researchers claim to have a dynamic working relationship with the Centre and have a positive attitude towards it. One researcher, however, feels that the Centre

⁹⁸ „én azt még nem láttam, hogy ezekből a spin-offokból jól jár az akadémiai közeg” (translations of the original Hungarian transcripts were made by the authors)

⁹⁹ „láttam olyan szabadalmaztatott dolgokat, nem is gondoltam volna, hogy ilyen lehet, és nem érezném jobban magamat attól, ha lenne ilyen, és nem tudom, hogy hát ennek annyi értelme van, hogy semennyi”

provides little help in his work, yet he suspects that this is mostly due to the characteristics of his research field which offers little to know practical applicability. Our interviewees mention a variety of the services provided by the Innovációs Központ: they professionally negotiate with industrial partners through the patenting process, they educate both students and professors in business studies, and they also provide counselling in patenting.

In one case, mentioned by a researcher, the aid provided by the Centre proved especially helpful: they intervened into the negotiation process with an industrial partner in an NVKP (National Competitiveness and Excellence Programme) tender, and successfully convinced them to let the university keep a certain percentage of the commonly created intellectual property. According to the researcher, this would have been impossible without the Centre's professional help.

The Centre also organises workshops, all of our interviewees have heard about this, one of them also participated at such events.

The leader of the Innovation Centre mentioned many knowledge focused innovation management facilities they provide to the researchers both at the production and utilisation phase such as management support in finding and maintaining collaborations with industrial partners, enhance the performance of these collaborations and the utilisation of the researchers' results. They have developed a pre-screening system of publications for better patenting practices. They also provide management service or advices for the researchers in this processes. Their goal is to educate and support the researchers to successfully collaborate with industrial partners and utilise their research result outside the academia. They help them to stay within their research fields and topics, in comfort, without forcing them to do so. The management seemed to have recognised the importance of such values as flexibility, honesty, clarity and awareness Rybníček et al. (2019), and the role of institutional culture in the share of knowledge. Most of the mentioned elements and the way they provide these to the researchers belong to the adhocracy culture which can better influence innovation and successful cooperation Scaliza et al. (2022).

4.2 University–Industry Cooperation in Engineering

4.2.1 BME (Budapest University of Technology and Economics)

At BME four interviews were conducted with one male and three female interviewees. Two of them are in their forties, one is 36, another person is 58 years old. The youngest, a woman with children has not yet defended her PhD, all the others have already obtained it. Two of them are mechanical engineers, another two are involved in bioengineering – all of their research topics can easily be utilised in the industry. All interviewees teach at the university, do research and all of them have experience in academia–industry cooperation via tenders, contracts of appointments or in other forms.

All of them feel that collaborations with the industry are an integral part of their academic career. Each interviewee expresses a positive attitude towards these projects, yet they all highlight that from a professional perspective basic research is prioritised over academia–industry cooperation. In addition, all interviews call attention to the fact that industry collaboration projects take time from basic research and publication.

The most frequently mentioned advantages are the following:

- the chance to work on practical issues
- interesting and challenging, professionally-relevant tasks
- dynamic, short-term tasks
- supplementary income
- a chance for students to test their knowledge in practice

Main disadvantages:

- the administration of collaborations is slow and time-consuming and thus is an unnecessary burden on researchers who would rather focus on the actual tasks

- it is hard to find the right balance of teaching, researching and partaking in industry collaborations, especially if you want to simultaneously proceed with your research and have financial stability

According to the interviewees, larger companies are unlikely to commit themselves to long-term projects, smaller firms, if they have the funding, are more ready to engage, but there are few that actually enter into cooperation.

With regard to Perkmann's categories, two of the interviewees mention *research partnership*, this intense, dynamic, long-term commitment through a common research group. Both of them really appreciate this collaboration type, yet they admit that most Hungarian companies are unwilling to take on such long-term commitments. The most common forms of cooperation include *research services* (short-term contracts of appointment, counselling) - so much so that most researchers only describe these when asked about university-industry collaboration.

Opinions on patent application vary, yet no outstanding success story is mentioned. Researchers frequently highlight the difficulties of the administrative process, admitting that in many cases they do not possess enough information to initiate a patenting procedure:

*"not typical, of course we do have patents, we had negotiations with multiple companies to utilise our intellectual property, but we couldn't convince them"*¹⁰⁰

*"our former head of department... urged me to... but I had no idea what this was and how to do it, so I would say it is not common"*¹⁰¹

The researchers in engineering seem to be more familiar with collaborating with industrial partners as *research services* are part of the organisational culture. Engineers mostly mention departments for such cooperations, only in one case was the FIEK (Higher Education Innovation management and Cooperation Centre) mentioned by them spontaneously as facilitator.

The former and recent leader of the BME FIEK said they want to stay in the background being available for only those who needed and ask for them and communicate widely. They mentioned many innovation management services offered for the researchers both at the knowledge and innovation production and utilisation phase. In engineering collaboration with industrial partners has a long history – so besides this Centre all departments has partners and contracts with many entrepreneurship, FIEK keep them flourish. In this organisational structure short term contracts used to belong to the departments level, so the centre is responsible mostly for more intense cooperation types: *research partnerships*, research and innovation funding such as Horizon Europe and *commercialisation of property rights* and *patenting*. This latter is recognised as the least welcome and understood by researchers so the aim of the Centre is to provide proper and operative help in patenting, entrepreneurial education and management services for the researchers according to their needs.

4.2.2 SZTAKI

At SZTAKI we conducted interviews with three men, all engineers (mathematical engineer, mechanical-IT engineer and mechanical engineer), all of them are mid-career with an academic degree, the youngest is 32, the others are in their forties. Even though one of them works in a field that has a limited industrial applicability, all three are in dynamic cooperation with industrial partners both through SZTAKI and other connections.

All three interviewees were urged to pursue an academic career by SZTAKI-affiliated supervisors. Similar to the BME researchers, they think that while the industry limits creative thinking, the academic sphere provides diversity, broader perspectives and also some truly challenging industry-related projects:

*"The tasks we are working on are highly innovative."*¹⁰²

¹⁰⁰ „nem jellemző, tehát vannak szabadalmaink, és tárgyaltunk is több céggel, hogy hasznosítsák, de nem sikerült őket eladni”

¹⁰¹ „a korábbi tanszékvezető ... engem is noszogattott... fogalmam se volt, hogy ez mi, meg hogy, úgyhogy erre azt mondanám, hogy nem jellemző”

¹⁰² „A projektek, amiken dolgoztunk, tényleg ilyen innovatív jelleggel bírtak”

At SZTAKI, academia–industry collaborations are integrated parts of the institution’s basic operation: industry collaborations are included in positions offered by the institution, thus researchers are flexibly and simultaneously involved in basic research and academia-industry projects.

Main advantages mentioned by the interviewees:

- practical problems,
- usability of results;
- interesting professional challenges
- above-average income on a regular basis.

Difficulties:

- unlike software firms, the research centre is unable to provide a 24-hour helpdesk for their software
- the high costs of obtaining and maintaining patents (no guarantee of later pay-off, negotiations in order to sell intellectual property take time from basic research)
- researchers have a limited chance of publishing their results achieved in industry collaborations (trade secrets, patent applications)
- users on the industry side need a more detailed description of technical solutions (e.g.: a user-friendly software interfaces, easily understandable documentation, etc.), this requires time at the expense of research

From Perkmann’s typology, our SZTAKI interviewees have experience in *research partnership* and *research services*, they mention examples from their personal career and other colleagues at the institution. True research partnership is uncommon; international companies are said to rarely bring their innovative projects to Hungary. One of our interviewees explains this phenomenon with the fact that Hungary is seen “a country of assembly lines.” Nevertheless, when available, research partnership seems to be a well-liked form of collaboration due to the intensity and long-term commitment it offers.

More frequently seen are those smaller projects that SZTAKI repeatedly receives from certain companies (these seem to be close to Perkmann’s *research services*). In years, such short-term tasks accumulate into long-term collaborations. For instance, SZTAKI has been cooperating with the Japanese firm, Hitachi for 12 years. Even though SZTAKI has no common laboratory with the company, their relationship is intense and has brought significant innovative results.

All of our interviewees identified SZTAKI’s common venture with Fraunhofer as *academic entrepreneurship*. However, this firm was not founded by researchers, it is a non-profit, in which SZTAKI and Fraunhofer researchers work together on innovative projects – and as such it could also be seen as a form of *research partnership*. This collaboration form is highly appreciated by the researchers, especially due to the professional opportunities it involves. According to our interviewees, thanks to SZTAKI being highly supportive of academia–industry collaborations, it is uncommon for SZTAKI researchers to establish spin-offs.

The commercialisation of property rights is also a well-known procedure for the interviewees, but it is the least welcome. They complain about the long and complicated process of obtaining a patent, not to mention the high costs and the risk of it ever bringing actual profit. All of our interviewees have patents that resulted from industry collaborations, but they would not wish to improve in this field. Common *scientific publication* with industrial partners is also part of our interviewees work routine, but in most cases, publication is preceded by patenting which significantly delays the possible release date of publications. In addition, researchers are required to remain confident about all trade secrets while releasing their scientific results – however, this is a skill relatively easy to learn as our interviewees report. One of the researchers also highlights that some problems presented by the industry can be solved merely through a deeper knowledge of the relevant literature, therefore even a better understanding of current publications may lead to innovation.

The organisational structure at SZTAKI equally include academy - industry collaborations as well as basic research. The tasks shared flexible among researchers to involve them balanced in both research types. The continuous intense communication about tasks, and that the supplementary

wage built in the monthly salary (which this way higher than the Hungarian researchers' average) makes this model successful and the researchers satisfied.

4.3 Patent and Publication Performance of Medical and Engineering Universities in Hungary

We have examined the patenting and publication performance of the medical and technical universities in Hungary to detect the possible effects of the management interventions applied by the abovementioned knowledge transfer centres. Among the two Budapest universities studied, Semmelweis University of Medical Sciences has relatively few patents compared to other universities, but the increasing trend here is the most significant. Since 2016, there has only been one year with fewer patents than the previous year. Last year's 17 patents were particularly impressive. The ratio of the marked publication types over the years does not change at Semmelweis University, except for the Gold category, which can boast an increasing trend.

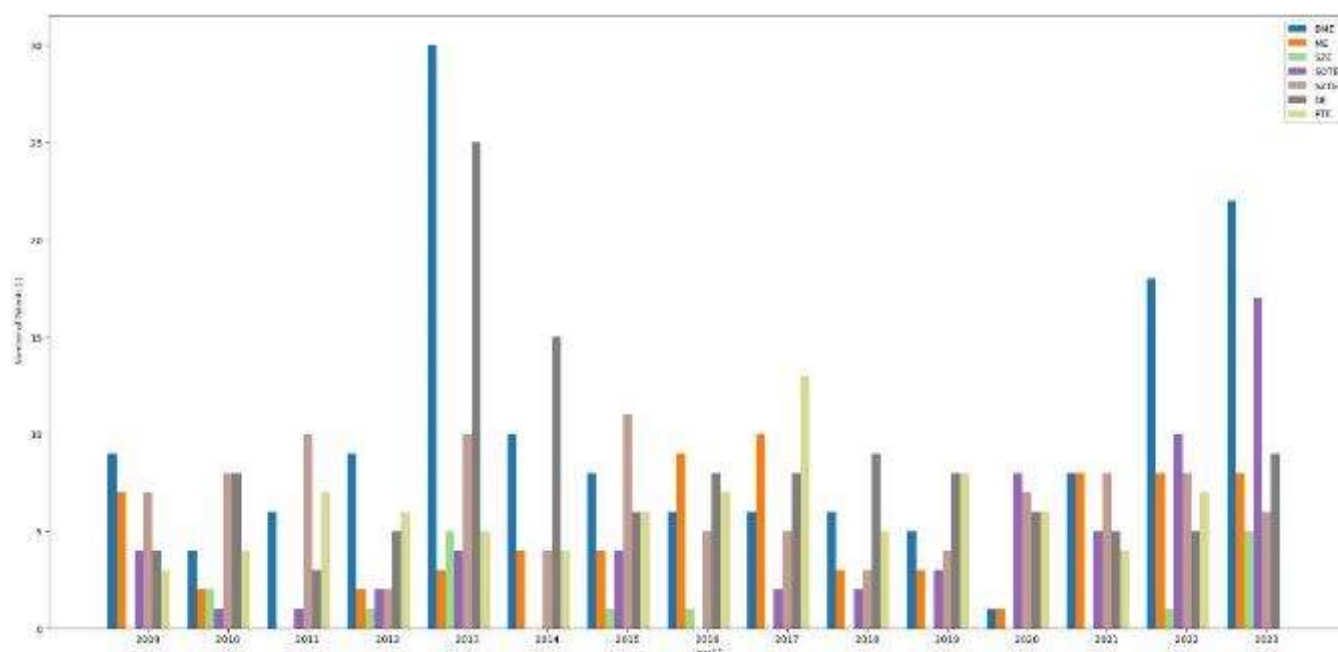


Figure 1. Number of Patents from 2009 to 2023

Budapest University of Technology and Economics is the clear leader among the seven universities listed. The last 5 years have been characterized by significant growth, but in general, it's evident that the annual number of patents observed here is substantially higher than elsewhere. The two highest numbers of patents from the 15-year period studied are 30 (from 2013) and 22 (from 2023). In terms of publications, BME is not as outstanding, but the growth and proportion of Gold category publications are significant and increasingly dominant.

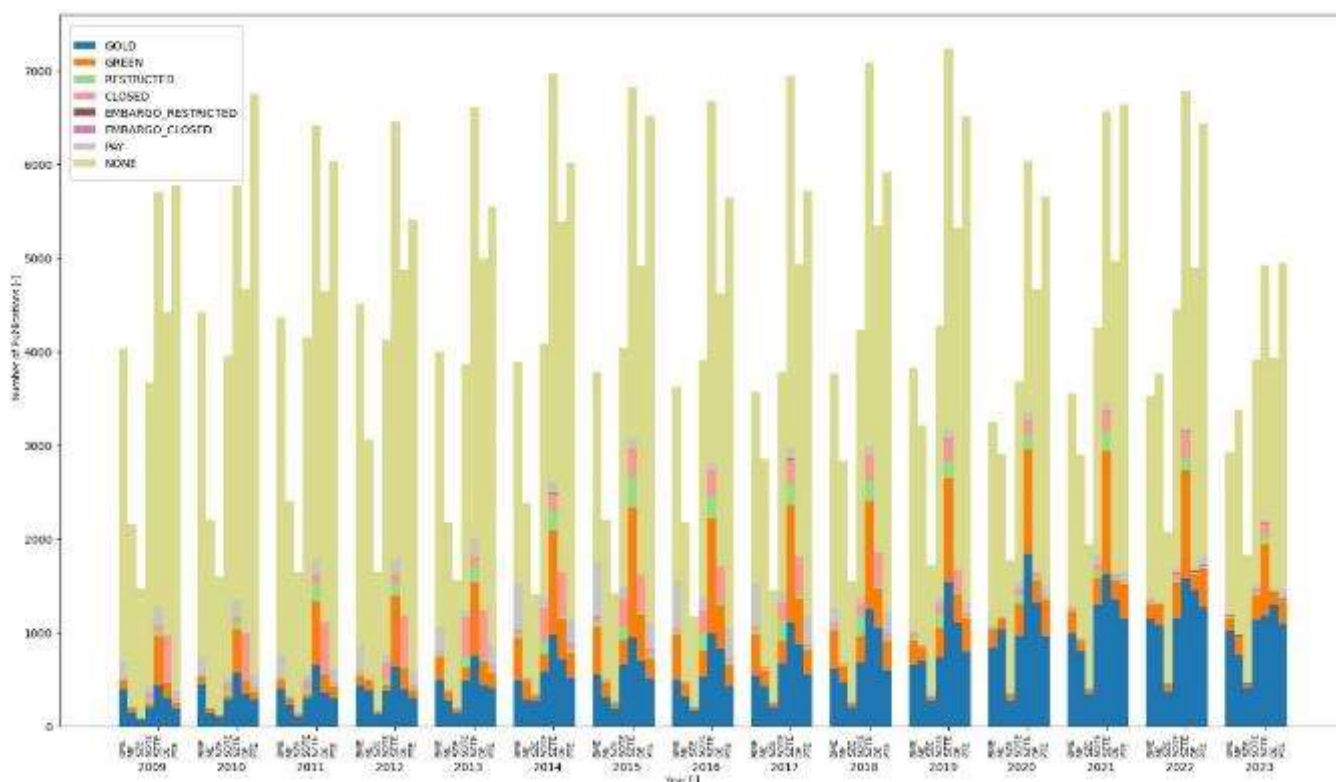


Figure 2. Number of Publications from 2009 to 2023

Looking at the correlation coefficients between patents and Gold publications for each university separately, it's clear that patents correlate best with the most prestigious publications at the Budapest universities. The figures for BME and Semmelweis University are 0.365 and 0.677, respectively, while for University of Miskolc, Széchenyi István University, University of Szeged, University of Debrecen, and University of Pécs, they are 0.196, 0.133, -0.117, -0.166, and 0.046. This illustrates that, contrary to universities in regional centers, in Budapest, the numbers of the most prestigious publications move more closely with the numbers of patents. This is also supported by the Cooperative Doctoral Program Scholarship, specifically established in 2020 to strengthen the connection between the best research and the industry.

5. CONCLUSION

Most of our interviewees feel that academia–industry collaborations are challenging, exciting and innovative, nevertheless researchers of all examined fields mention that these tasks take time from basic research, and publication Armond and Kakuk (2022). Similarly to international experience, Hungarian researchers experience difficulties in fulfilling requirements both in teaching, researching and in industry collaborations (Sánchez-Barrioluengo 2014).

The advantages of academia–industry collaborations mentioned by researchers in the covered fields were similar: applicability in practice, dynamic work, new perspectives, and higher income.

If we compare engineering to medicine and life sciences it turns out that the latter field offers less opportunities for industry collaborations due its special characteristics, methodology and history. Researchers in medicine are generally not expected to enter into such cooperation, and unlike institutions in engineering universities focused on offering medical studies are unlikely to maintain a long-term connection network with the industry. Even though, especially in the younger generation, most researchers in medicine and life sciences are clearly open to the challenges of university–industry collaborations.

Interviewees with a PhD in life sciences especially highlighted that they engage with the highest motivation in university–industry collaborations with the aim of raising their research to a new level (D'Este – Perkmann 2011; Perkmann 2007). According to our interviews, this is also a strong

motivation for people in engineering so academics are motivated more strongly by intrinsic than extrinsic reasons Orazbayeva et al. (2020).

Engineers, especially mechanical engineers, are frequently offered short-term and relatively easy tasks from the industry (e.g.: test measurement), our interviews presented these as part of their normal working routine. These extra tasks might consume their time at the expense of career advancement (e.g. less time for publishing) Armond and Kakuk (2022), yet the supplementary income they provide seem attractive to our interviewees. This attractiveness is high because of the structural patterns of researchers' wages in Hungary (Pálinkó 2016). Most of these are routine work, but from time to time innovative tasks may appear that clearly fall into the R&D – the latter are more welcome.

For engineers employed in the research centre, academia–industry collaborations form a part of everyday routine as well, but compared to researchers working at universities, these tasks seem to be more closely intertwined with the individual career path: results of projects are more frequently realised in patents or collaborative publication and the research centre provides all its employees with a reliable, above-average income. Here the flexible and clear organisational culture provides basics for such processes Rybníček et al. (2019)

From the various forms of university–industry links, *research partnership* and *research services* clearly proved to be the most popular among our interviewees. Researchers systematically link these two categories to their own research goals and even to basic research (D'Este – Perkmann 2011) through gaining knowledge from the industry in the form of new ideas, new perspectives and a more dynamic working environment Orazbayeva et al. (2020). Besides learning, supplementary income is the leading attraction of industry collaborations both on a personal and on an institutional level. In line with international experience, our interviewees find that *research services* are the most common form of cooperation (Perkmann 2007), whilst a pure form of *research partnership* seems to be the most attractive but still extremely rare in Hungary.

Collaboration forms with a chance of marketing prospects, such as *commercialization of property rights* and *academic entrepreneurship* are seen by researchers of all fields as less attractive, slow and problematic. However, the institutional units responsible for R&D and academia–industry collaboration are aware of this, and they started projects to provide their employees with aid and education regarding patenting.

Regarding the organisational structure and management relevance the main findings of the interviews:

- the more synergistic the industrial cooperation with the basic research,
- the better developed such collaborations at the institutions historically,
- the more flexible the organisational structure Rybníček et al. (2019),
- the more communicative and adhocratic the organisational culture Scaliza et al. (2022), de Wit-de Vries et al., (2019),
- the more transparent the goal setting Klofsten et al. (2019), and
- the better tailored, communicated and provided the entrepreneurship education and management services
- the more academia – industry collaborations are welcome and satisfying for the researchers, and more productive in terms of institutional performance measures.

In addition to the insights gained from our interviews, a comprehensive examination of the patent and publication performance across Hungarian universities underscores a pronounced trend towards enhancing the innovation landscape through academia–industry collaborations. Particularly, the Budapest University of Technology and Economics stands out for its substantial patent numbers, while Semmelweis University shows a remarkable uptrend in prestigious Gold category publications, illustrating the tangible impacts of such partnerships on scientific output and development. This quantitative evidence not only validates the experiences and perceptions shared by our interviewees but also highlights the critical role of strategic management interventions and initiatives like the Cooperative Doctoral Program Scholarship in fostering a more integrated, innovative, and productive scientific community in Hungary.

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385 The Good, the Bad and the Ugly - Didactics of Settlement Marketing

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Abstract

In the spirit of centralisation to ensure a strong and efficient state, the role of the local government has been reduced since 2013 in Hungary, and its most important task, apart from its social, cultural, and local community-building functions, is to promote local capital attraction. Settlement marketing, which was born in 1996 in the Netherlands, is still in its infancy in Eastern Central Europe, and it might not be uninteresting to present a prototype of settlement marketing to be followed, the "good" one, and two prototypes that are unfortunately often found, the "bad" and the "ugly" one, in the context of a didactic lecture. The study tries to distinguish three practices from the perspective of local government in a didactic, visual way: the good, the bad and the so-called ugly - referring to the title of Sergio Leone's 1966 blockbuster film. The study introduces the factors of municipal marketing, the municipality, and the target groups of customers: the local population, the managers, the capital operators, the developers, who are the main target of municipal marketing, as they can create jobs and infrastructure that, generate additional target groups (migrant workers, university students, patients seeking medical treatment and, above all, tourists). The four types of municipal image (internal, external, partner and professional) and branding are presented before the good practice. According to good practice, selling to the first target customer cohort is the basis for reaching developers through managers. Without this, successful municipal marketing is not possible. Among the other target groups, tourists are of particular importance, as they strengthen the reach of the manager target group. Bad practice is when the self-government neglects or does not bother to sell to the local population - in this case the municipality is one of the losers in the competition among municipalities. Finally, the "ugly" practice is one that unfortunately also has many examples: the municipality confuses municipal marketing with tourism marketing, identifying tourists as the main and primary target group of customers. This practice may have limited results in the competition between the municipalities.

Keywords

Urban marketing, urban development, tourism marketing, selling the city.

1. ROLES

From 2013 onwards, in the spirit of centralisation to ensure a strong and efficient state, the role of local governments in the administration has been necessarily reduced, and in addition to their social, cultural, and local community building tasks, their most important task is to attract investment to the local area. The tool for this is settlement marketing. Settlement or urban marketing, born in the Netherlands in 1996, is still in its infancy in Hungary, hence it would be interesting to present a settlement marketing prototype to be followed within the framework of a didactic study, including the good and the unfortunately often observable, bad and the ugly.

The actors of settlement marketing are the seller and the customer. Although some elements of settlement marketing, such as the first appearance of the settlement on the Internet, were usually initiated by enthusiastic amateurs and local patriots; whom cannot be considered sellers of a settlement. The seller in a market sense can even over praise their goods in certain consumer protection and ethical frameworks, emphasising the advantages and hiding the disadvantages of the

goods. When it comes to the 'selling' of the settlement, only the local government authorised to represent the state may be considered the seller. The local government, even if it enters the market as a seller or as a merchant, cannot afford to distort, exaggerate, or hide the facts, because the local government is also a local authority. Thus, settlement marketing is a 'competence' marketing, i.e. a settlement can only be sold by a competent legal entity – the local government or the mayor acting on its behalf.

There are seven types of target groups, just like the villains in the fairy tale. Among them some are the first, the most important and some are essential. The first target group is always and, in every location, the local population. A local government that does not know or does not want to 'sell' its settlement to the local population should not even attempt settlement marketing because it is doomed from the start. If the local population did not buy its settlement, then why would others? Which customer will buy a product that the seller does not want? So, the first target group is the local population (1). The fact that the local population has bought the settlement is indicated by the settlement's clear natural and social environment (there is no environmental pollution, no crime, but there is an orderly environment and public security, property security).

The most important target group is formed by the capital owners who can invest in the settlement, and, create jobs, while providing the local government with local tax, which can improve the settlement infrastructure and the standard of living of the population. Despite this it is not the capital owners or potential investors who form the target group in second place. This is because the local government cannot normally address them directly, due to not knowing them. In general, it is not known who owns the individual strong, multinational companies, or who makes up its ownership or decision-making body. Therefore, the local government needs to first contact the target group that is familiar with the decision-makers or the decision-making bodies of potential investors. They are the managers, who are the second target group (2). They are the operators, movers of capital, they are the counsellors of decision-makers; they are responsible for helping the company make a good decision, make investments in appropriate places, and recover those investments. Therefore, the offers must be addressed to them: in relation to what the settlement has to offer for the types of investment. If they believe that the settlement is good for their business, they can convince the most important target group (3), the decision-maker of the capital owner, the investor, the developer, to invest in the settlement, i.e. also 'purchase' the settlement.

The fourth target group is represented by those who spend several years in one settlement; there they rent an apartment and use the services of the settlement. By doing so, they also contribute to the increase in local income, although they are not local residents. They are the migrant workers (4) and the university students and pupils (5). We can mention, which is relevant in Hungary, the patients who want to heal, who spend only a few weeks in the sanatorium or thermal spa of the settlement, but use costly services with which they boost the local tax base (6).

In addition to the first and most important target group, we also need to talk about the essential target group. They are the tourists (7), who spend very little in the settlement: they eat one or two dinners, consume a few drinks, pay a few nights' hotel bill, and buy some tickets. This does not greatly increase the local tax base of services, and even in places frequented by many tourists, they only contribute 10% of GDP at local, regional, and national levels. That is why it is not called the key sector. In addition to encouraging the service industry to develop, tourists are or would be the key actors or a driving force in settlement marketing. Capital operators are generally well paid and young who travel a lot, too. On the one hand, they are tourists themselves, and on the other hand, there know a lot of tourists among their acquaintances. The most effective marketing is not the newspaper, the TV, or the Internet, but by word of mouth. In other words, tourists are the most efficient and free marketing tools – provided they are satisfied and had a pleasant and enjoyable experience. This is true also for the contrary: it can cause enormous damage if a tourist leaving the settlement is disappointed or angry, does not communicate with the operators of the capital investor or dissuades them from considering the settlement as a potential investment location. That is why it is necessary for the local government to make every effort to ensure that tourists enjoy themselves in the

settlement, or at least that they don't leave disappointed – but alive 😊, seeing that we are referencing an iconic wild west symbol in the title of our study.¹⁰³

2. MIRROR, MIRROR ...¹⁰⁴

When a seller wants to sell something, it is a basic requirement that they know the goods. When it comes to selling its own settlement, the local government wants to make potential customers believe they can trust in the settlement. If the customer - whether it is a resident, an investor, a migrant worker, or a tourist - believes what the local government says about its settlement, then it has already bought the city and acts accordingly. The local population does not move, still lives, works, spends money, and pays tax in the settlement, and more importantly: gets to know, loves and protects the environment of its settlement. It identifies with it at a cognitive, emotive and action identity level.

When operators, and through them, capitalist organisations believe the claims of the local government regarding its settlement, large-scale investments and infrastructure developments will start - with the settlement becoming more liveable. When job seekers and students believe the statements of the local government regarding lucrative jobs in the settlement or its world-class secondary and higher education programmes, they will move there for a few years and consume. And finally, when the essential tourists believe the communications of the local government regarding its settlement, they travel there for a few days looking for an experience, and if the experience is positive, they take with them and spread the good reputation of the settlement as volunteer workers. This, in addition to generating more tourists, is important if they do it among operators, and they convince them voluntarily and enthusiastically that yes, what the local government claims is true, and the settlement is really suitable for investment.

What does the local government claim about itself? That the settlement is optimal for living, working, investing, healing, studying and for recreation. The easiest way it can achieve this is with a short phrase, which can be well and easily communicated, or with a pictogram. This is the brand that can be displayed in the shop window. Where's the place where the future is being built in Hungarian context? It is Győr; because, according to the brand "the future is in Győr." Which of our cities is the capital of the summer season? Siófok; because "the capital of summer is Siófok." These are successful brands. To create a good, creative brand for a settlement, we must have a picture, an image of our settlement. When we mention Los Angeles, Moscow, Hong Kong, Prague, Vienna, Nyíregyháza, Makó, Tata, and Pilisszentiván – there is always a diverse, amorphous image in our mind. If we have already come about to that settlement, then our subjective good or bad experiences dominate this picture, feeling, and image. If we have not been there, then the image is dominated by information that has been captured in our active consciousness through our studies, readings, or friends' experiences, perhaps movies, films, and advertisements. When the local government wants to brand or advertise the settlement, it has to look in the mirror to see the reflection and image of the settlement.

There are four kinds of images: internal, external, partner and professional. The internal image is what is reflected in the social consciousness of its own population; with a necessarily distorting effect, depending on whether the local population has already purchased the settlement? Depending on whether the purchase created the local identity, to what extent do they feel that the settlement is theirs? Do they know it? Do they like it? Are they willing to protect the physical and social health, values, and purity of their settlement? In good cases, the inner image is distorted in a positive

¹⁰³ As a response to the question on, for example, how a mayor can prevent a tourist from leaving the city disappointed, here is an American anecdote in which the sheriff protects the interests of the city. A man who was transporting a donkey on his trailer drove into a pothole on the road of a settlement, the car overturned, the man was injured, and the donkey died. After a few weeks, the man filed a claim for damages against the municipality. The defence counsel of the settlement started the hearing by stating that he did not understand why the plaintiff is asking for compensation when at the time of the accident he stated the following – according to the report – in front of the sheriff: "thank you, I'm fine, everything is OK". The plaintiff then asked to speak: "Honourable court, after the accident, when I was lying under my car, the sheriff came to me with a smoking rifle in his hand and said: your donkey was so badly hurt that I had to shoot it. And you, how are YOU feeling?"

¹⁰⁴ "Mirror, mirror, on the wall, who's the fairest of them all? You, my queen, are fair; it is true. But Snow White is even fairer than you." According to the story of the Grimm Brothers, the truth can only be shown by a magic mirror, because a reflection, a photograph, or a painting all usually distort the truth.

direction: most of the locals are local patriots, and therefore consider their own settlement more beautiful and valuable than neighbouring settlements – in an understandable, biased way.¹⁰⁵ In spite of this, the local government needs to receive feedback through local surveys, to know the image of the settlement reflected in the local consciousness of the population, even if it is only in relation to the political elections. The expectations of the first target group must be known.

Another image is the external image of the settlement. The external image that the inhabitants of other settlements hold in their minds about our settlement, is less influenced by the local government. This is often measured by university students seeking the views of tourists visiting their settlements. Tourists are an essential target group, but not the most important. Getting to know the opinions and expectations of the operators and managers would be more important.

During settlement marketing, the local government first - with specialists - audits the natural resources, cultural values, economic opportunities, geographic location of the settlement, and then determines which sector's investors would be interested in the settlement and through which manager and operator they can be contacted or addressed. They need to convey an image of the settlement that draws attention to these qualities, values, and opportunities. This is an industry specific or professional image which is located on the settlement's multilingual website. It shows a necessarily distorted image, even if it cannot hide the disadvantages, because the local government is not a market but an official seller. Thus, the professional image is distorted positively, while the external image, which emphasizes not only the tourism benefits, but also the opinion of the inhabitants of the neighbouring (competitor!) settlements, also distorts. Representatives of competitors (settlements with similar dimensions and capacities) focus on negative things in the urban competition for capital investments like the rubbish, or the streets that have been worked on continuously, traffic jams, homeless people in public areas, and street violence. The Bible says, "In the eyes of another we notice the smallest speck, but in our own we cannot even notice a beam¹⁰⁶", and this is true for the forming of the external image. Thus, the external image is fundamentally biased, which can be greatly improved if a mass of satisfied tourists leaves the settlement. The professional image is also distorted, in a positive direction, by the settlement for its own well-understood interest.

Therefore, the local government also needs a magic mirror, just like the evil stepmother of Snow White that shows the real face of the settlement without distortion. This is what we call a partner image. Local governments choose twin cities or twin settlements for themselves. Usually, the personal friends or acquaintances of the mayor become the partners. In this case, the twin town relationship includes mutual guest appearances from the dance group, the choir or the sports association, or the exchange trips of school children. This is not the most important, but rather the keeping of the magic mirror of Snow White in front of the local government. Since both the internal, external, and professional image show a necessary distortion, only the opinion of the twin town's local government will show us our true image. Depending on whether our twin town is also our competitor. Why? For example, if New York is one of the twin towns of Budapest, the New York partner image cannot hold a real mirror up to the capital's leadership saying: you are like this. New York moves in other dimensions and has other problems. Prague, Warsaw, or Vienna can show Budapest what it is truly like, or what it should be like, provided they are twin towns, and therefore provide advice as a favour to a friend, as unbiased, sibling rivals. It would be a basic expectation of the local government's self-awareness if it received a picture or an image of what it really was. It could achieve this by asking the municipal body of a settlement with similar dimensions (twin), working under the same environmental conditions, to hold up a distortion free mirror in front of it by completing a questionnaire.

¹⁰⁵ Like when they said to a man selling a horse on the market: "This horse almost walked into the wall, it is blind!" To which the seller replies: "It is not blind, only reckless." (In Hungarian reckless is said blind-daring in a word-to-word translation.)

¹⁰⁶ Anyone who has ever wondered how a beam can get into someone's eye may be interested to know the expressions "reflection of the eye" and "reflection of well water" are the same expression in the original Aramaic language of the Bible; the Greek and Latin direct translations result in the exchange and unconditional acceptance of the meaning of the mixed up, identically spelt words 'eyes' and 'wells', as well as its spread as a saying. The 'camel' passing through the eye of the needle instead of 'string' is also such an example.

3. THE GOOD

What kind of settlement marketing strategy should the local government follow who wants to portray the role of the Good in this situation? After auditing the settlement features and defining customer target groups, it needs to understand itself, with the help of the partner image. Subsequently, it sells the settlement to its own population, and makes sure to identify the level at which most of the population identify with the settlement.

In the Hungarian literature of urban marketing, the 'three Gets:' get to know, get to love, and get to protect, were introduced based on the criterium that the local population do purchase their settlement. The order is also important, the local population can only love its settlement if they know its history, geography, traditions, culture, abilities, and values, as well as its disadvantages and dangers, otherwise they do not know what to protect. People only protect what they love (be it an advantage or a disadvantage). All this corresponds to the cognitive (knowledge), emotive (emotional) and active (action) levels of site identification. The result of the settlement's acquisition by the local population is protection, which is manifested in a clean (crime-free, safe) social and physical (pollution-free, orderly) environment.

After that the "Good" sets its sights on the operators and managers advising the investment capital holders with its very favourable professional image, the internal image is transformed by the local government, and its external image that has been improved for tourists, to attract capital to the town after the operators convince the faceless heads of the decision-making investment companies and organisations. Realising the investment can attract a workforce to the settlement. Investing is not only important in the production and service sector, but also in higher education, which can attract students to the settlement of the future. It is important for the local government to fully support local tourism, but not to mix settlement marketing with tourism marketing. The latter is carried out by travel agencies. The responsibility of the local government, from a marketing point of view, is to ensure that tourists do not leave the settlement with a bitter taste in their mouth. Priority should be given to the support of investments and services that develop experience tourism. The result of such a settlement marketing strategy is a liveable settlement with tidy, clean, flowery public spaces, production plants, high-level services, perhaps a higher education institution, or a thermal spa, high local tax base and income, with an adequate number of jobs.

4. THE BAD

The biggest mistake the local government can make, among those who intend to deal with settlement marketing, is to neglect the partner's image and only use twin towns for cultural networking. An even bigger mistake, and doomed from the beginning, is when it doesn't even get to know its internal image, that is, it does not try to sell the settlement to its own population. Such marketing is useless, as a settlement that is visibly unwanted by the seller and its own population will not be bought with capital.¹⁰⁷

The bad practice fails at the beginning, after which it will try in vain to send the professional image to the advisors of the decision-makers according to the good screenplay. If there are no job-creating investments, then the workforce, perhaps even the students or the patients, will not arrive. Not to mention the fact that tourists do not like a settlement that is obviously not bought by the local population. Such settlement marketing results in the appearance and domination of rubbish, disorderly public space, violence and crime, high unemployment, segregation, lack of property security and public security, an uninhabitable settlement.

¹⁰⁷ When the Mercedes bought Kecskemét in Hungary as one of its production premises, they did not start the process by contacting the local government. The management employees of the Mercedes travelled to all nominated settlements, driving through the streets, and talking to the population; in other words, they verified that the physical and social environment of the towns were clean. That is, they wanted to find out whether the local population had 'bought' the towns or not? Only afterwards did they contact the mayors of the selected towns.

5. THE UGLY

It is a mistake in the settlement marketing strategy to omit the first target group. There is, however, another mistake which can be attributed to ignorance rather than forgetfulness. This is when the local government sees the most important target group in tourism. That fact that they then create a partner image and an internal image, i.e. keep the selling order of the settlement, or not, the diagnosis will change to ugly, because of its ignorance, only if the local government sells the settlement to its own population before offering it to tourists. However, if it does not try to sell to its own population before it offers the settlement to tourists, then its marketing practice will be both ugly and bad.

At the same time, this also means that a ugly practice (if the settlement is sold to its own population) may even work if the local government is lucky enough and many tourists or operators within their acquaintances are able to mobilise capital, and the tourists visit was rich in good experiences. In this case, the essential target group, which has the least direct capital-generating effect, is in a privileged position. In a professional sense, if this is done by the local government in the spirit of a conscious 'settlement marketing' strategy, this will lead to a blurring of the town marketing plan with the development of tourism, which again is ugly from both a marketing and tourism side. Tourism development is an extension of investments, businesses and services that continuously increase the number of visitors in the settlement. However, settlement marketing is not primarily about addressing tourists, but about the local population, and above all capital, and not just for developing tourism, but to boost the income generating capacity of the local population in all areas of the economy.

Therefore, in fortunate cases, ugly settlement marketing can also work in relation to capital attraction, but if it is also bad, it will only be able to put the Welcome and Goodbye signs along the road that mark the boundary of the settlement and will only be able to establish small business services in the settlement, which remain mostly unused.¹⁰⁸

From the outcome of the ugly role reversed settlement marketing municipal activity it can be observed that the local government is fixated on tourism. However, in most cases, like Corfu or the Italian Adriatic, which are heavily exposed to tourism (!) – it also seems that tourism marketing is not a good substitute for settlement marketing. Investments, jobs, and services based specifically on tourism are only successful in high season; while year-round, at least in Europe, where the impact of seasons is still felt, they do not meet the expectations of a liveable settlement.

6. SUMMARY

The study tries, in a didactic and visual manner, to distinguish three practices from the local government's point of view in the field of settlement marketing: the Good, the Bad and the Ugly – referencing the 1966 hugely successful film of Sergio Leone. The study introduces the factors of settlement marketing, the local government, and the target groups: the local population, managers, capital operators and developers, the reaching of whom is the ultimate goal of settlement marketing, as they are the ones who can create jobs and infrastructure that generate the additional target groups (migrant workers, university students, patients seeking treatment, and especially tourists). The basic knowledge regarding the selling aspect of settlement marketing comes from Feldman (1990), Tózsá (2011), Balencourt – Zafra, 2012). Before presenting the good practice shown in the four types of images (internal, external, partner and professional) and the brand appear. According to good practice, the successful sale to the first customer target group forms the basis for reaching out to developers through the managers. Without this, successful settlement marketing cannot be achieved. From the other target groups, that of tourists is of particular importance, as it strengthens the reach

¹⁰⁸ The author of these lines asked a waiter in Palaiokastritsa in the Greek island of Corfu, whether people lived well from tourism here? According to the answer, it is true that he works in the restaurant from May to September, but – like everyone else in Corfu – his family makes a living from olives. On the Italian coast of the Adriatic Sea in a resort similar to Rimini, Gatteo Mare, a 5-storey hotel owner told the author in relation to the same question, that if he had earned a good living in this place (which, like Corfu, God probably also created for tourism) with the income generated from the hotel during the main summer season, he would have opened more than just two levels from the five available. Compared to these, settlement marketing based on rural tourism in Eastern Hungary is not likely to have much of a chance.

of the manager's target group. The bad practice is when the local government neglects or does not care about selling to the local population – in this case, the settlement will become a loser in the competition between settlements. Finally, the ugly practice had several examples unfortunately: the local government confuses the marketing of the settlement with the marketing of tourism, targeting tourists as the main and primary customer target group. This practice may have limited results in the urban competition among settlements.

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389 Charging Forward: Unveiling Dynamics, Challenges, and Strategies in the Shift to Electric Vehicles

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Abstract

Electric vehicles (EVs) offer a sustainable alternative to conventional internal combustion engine vehicles, significantly reducing CO₂ emissions and supporting renewable energy integration. EVs emit substantially lower greenhouse gases during operation compared to fossil fuel vehicles. As renewable energy constitutes a larger portion of the grid, the environmental benefits of EVs will be further amplified. Despite these advantages, the transition to EVs faces multifaceted challenges, including resource allocation disparities, the urgent need for infrastructure development, and the complexities of reduced gasoline tax revenues. Additionally, the "value-action gap" in consumer behavior remains a significant obstacle, as consumers often hesitate to pay premiums for environmentally friendly options. Employing a mixed-methods approach, this paper integrates qualitative interviews and quantitative questionnaires. In-depth, semi-structured interviews with suburban residents of Xinzhou City, China, capture insights into EV adoption and infrastructure perspectives, while online questionnaires assess the impact of subsidy policies on residents' willingness to purchase EVs. This research aims to enhance understanding of the intricate dynamics between urban development, climate action, and the transition to sustainable mobility.

Keywords

Electric Vehicles, CO₂ Emissions, Value-Action Gap, Urban Development.

1. INTRODUCTION

According to the UN's statistics, it's encompasses shifts in Earth's climate, affecting temperature, precipitation, and weather patterns (UN, 2023). Impacts include rising sea levels, extreme weather events, and ecosystem changes (EU Commission, 2023). The transportation emissions is contribute significantly to global greenhouse gas emissions, accounting for 24% of total emissions. And urban transport management plays a crucial role in driving climate action and reducing carbon emission. Therefore, EVs comes out to be an really ideal mitigation to ease the tension of the climate changes (Williamson et al., 2018).

Electric vehicles (EVs) include pure EVs, hybrids, and fuel-cell EVs. They rely on battery power instead of internal combustion engines (Thomas & Azevedo, 2014). In contrast to conventional vehicles powered by internal combustion engines, EVs offer a cleaner and more sustainable option for reducing environmental emissions by reducing CO₂ emissions and supporting the integration of renewable energy sources. A study of OECD countries showed that decreasing the energy intensity of output and increasing the share of renewable energy can offset some of the increase in carbon emissions from energy consumption. Therefore, widespread adoption of EVs can significantly reduce CO₂ emissions from the transportation sector. For example, depending on the source of electricity used by the electric vehicle, at best, the EU's trams emit 80% (at worst, about 25%) less carbon than conventional gasoline and diesel vehicles (Devi et al., 2022).

Meanwhile, depending on the vehicle technology, EVs emit significantly lower amounts of greenhouse gases during operation than fossil fuel vehicles. For example, electric cars have zero

tailpipe emissions, emitting no carbon dioxide or other pollutants during operation (Knobloch et al., 2020; Nissan's website). Emissions associated with EV charging decrease further as the proportion of renewable energy in the grid increases. By transitioning the energy mix to renewable energy sources such as solar or wind, the environmental benefits of EVs will develop to the maximum.

The world faces an imperative shift towards sustainable transportation, therefore, one of the solutions to solve climate change underscores the multifaceted challenges associated with promoting EVs. These challenges encompass resource allocation disparities, the imperative need for infrastructure development, and the complexities arising from reduced gasoline taxes. Simultaneously, Consumer adoption of EVs is influenced by factors like cost savings and government incentives (McKinsey & Company, 2022). The "Value-action gap" in consumer behavior towards eco-friendly choices emerges as a formidable obstacle, with consumers displaying hesitancy to pay premiums for environmentally conscious options.

This paper seeks to analyse the differences in resource allocation that impede the equitable diffusion of electric vehicles and provides case study data for strategies to overcome infrastructure challenges. Through the exploration of this paper, it aims to help us understand the subtle dynamics between urban development, climate action and the need to transition to sustainable transport.

2. METHODOLOGY

2.1 Theoretical Basis

Undeniably, many people are deeply concerned about climate change, yet they often engage in environmentally harmful behaviors or fail to take corrective actions. This discrepancy between attitudes and behaviors is known as the "value-action gap." Generally speaking, environmental attitudes do not effectively predict pro-environmental behaviors. When considering demographics, internal environments, and external environments, different countries and regions, influenced by their own cultures, lack a standard model to measure the gap between people's behaviors and attitudes. However, this gap becomes an obstacle to the transition towards using EVs as a means of mitigating climate change.

Gifford and Chen (2011) categorized the psychological barriers to climate change mitigation and adaptation into seven types: limited cognition about the issue, ideological worldviews, social comparisons, sunk costs (including financial ones), distrust, perceived risks associated with environmental behavior changes, and symbolic actions (Gifford & Chen 2011). First, consumers, constrained by their limited cognitive abilities, often make irrational decisions, and pro-environmental behaviors are hindered by a lack of rational awareness (Gifford 1967). Second, when ideologies and worldviews conflict with environmental awareness, nations and individuals tend to defend their socio-economic status. Third, the herd effect causes consumers to subconsciously compare their behaviors with others. Fourth, sunk costs, in this context referring to the financial expenditures on fuel vehicles, conflict with environmental protection, yet consumers find it difficult to abandon their dependence on them. Fifth, there is a distrust of authorities. This relates to the sixth point, which is the perceived risks associated with EVs, including infrastructure and driving safety, that influence consumer purchases. Consistent with the herd effect, the seventh point is symbolic actions, where people talk about environmental protection without taking action.

Moreover, individuals inadvertently embrace eco-friendly actions without explicit environmental motivation. Consumers are more cost conscious than ecologically conscious. (Hitchings, Collins and Day, 2015).

2.2 Data Collection

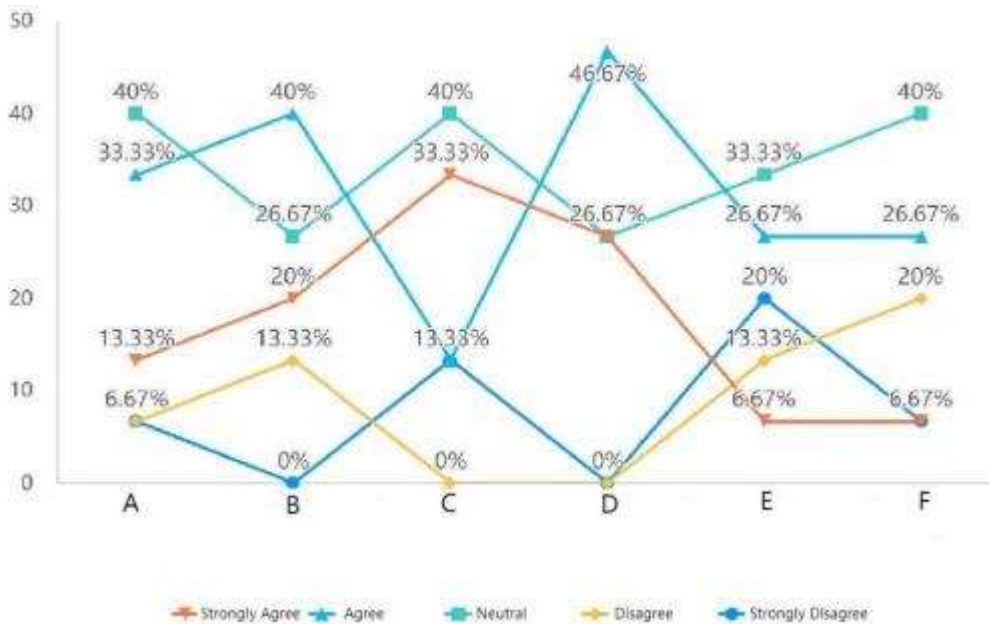
To conduct this pilot study, a mixed-methods approach was employed, combining qualitative interviews and questionnaires. The qualitative aspect involved in-depth, semi-structured interviews with suburban residents of Xinzhou City, China. These interviews aimed to capture insights into the challenges, opportunities, and perspectives of suburb residents attitudes to EVs and its supporting

infrastructures. Additionally, questionnaires were conducted to focus how the subsidy policy affect people's willingness to buy EVs.

The 12 participants (6 male and 6 female) come from suburb and urban area were accepted the semi-structured interview and finished the questionnaire. Most interviewees held a bachelor degree, and owned EVs (66.67%) or fuel-driven vehicles (91.6%). The average interview time last for 30 minutes.

3. DISCUSSION

3.1 Value-Action Gap Challenges



Source: Source: collected and photographed by author.

Figure 1. How people feel about the EVs' purchase behaviours? (First 5 question)¹⁰⁹

By answering the question "If the price of a new energy vehicle exceeds that of a fuel vehicle, I would prefer to purchase a fuel vehicle," all interviewees supported this statement. The degree of agreement varied, but economic considerations were consistently significant. The Chinese government's subsidies on both the supply and demand sides have played a crucial role in promoting the EV industry. Besides economic support, EV-friendly policies, such as exemptions from driving restrictions and parking fees, further encourage adoption.

EV, as an emerging industry, possess an undeniable advantage in low-cost competition, both in China and globally. If consumers can make purchases based solely on environmental concerns, price may not be a significant factor. However, the interview results indicate that the low cost of EVs, along with the perception that purchasing an EV garners more praise, may be the underlying reasons behind the industry's prosperity. Additionally, some EVs are now priced similarly to or higher than branded fuel vehicles, necessitating a deeper analysis of consumer behavior. Understanding these motivations is crucial for promoting the gradual replacement of fuel vehicles by EVs. By answering the question "If the price of a new energy vehicle exceeds that of a fuel vehicle, I would prefer to purchase a fuel vehicle.", all interviewees supported this statement. The only difference is how extend they agree with it.

¹⁰⁹ The code represents questions as below:

A: Purchasing a new energy vehicle can promote the mitigation of air pollution, which is valuable to me.

B: If the price of a new energy vehicle exceeds that of a fuel vehicle, I would prefer to purchase a fuel vehicle.

C: The lower operating costs of new energy vehicles are valuable to me.

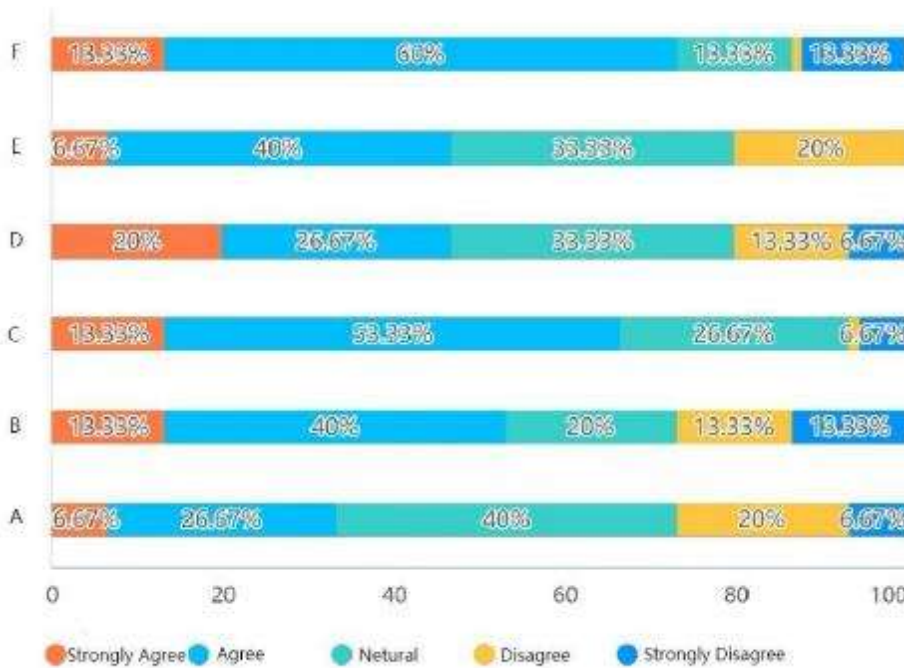
D: The unrestricted travel policy for new energy vehicles can make daily travel more convenient, which is valuable to me.

E: Purchasing a new energy vehicle can lead to positive evaluations from others towards me, which is valuable to me.

F: Driving a new energy vehicle is liberating and relaxing, which is valuable to me.

3.2 High-tech Products

One of the most distinctive features that sets EVs apart from traditional fuel vehicles is their product positioning. Interviewees indicated that they are more inclined to classify EVs as merely modes of transportation rather than high-tech products. Battery, motor, and electronic control - are crucial for new energy vehicles (EVs) and face supply chain challenges, particularly with core components like IGBT chips. Batteries account for 76% of EV costs and include modules and electrical systems. Electric drive components (13% of costs) cover motors and transmission, while electronic controls (11% of costs) involve sensors and controllers. EVs require more chips for functions like speed control and electronic systems, posing supply constraints due to global semiconductor shortages. Additionally, EV supply chains are impacted by resource constraints, especially for batteries, which face challenges like limited range and dependence on critical metals. Manufacturers like Tesla are optimizing battery supply, but risks to production capacity can affect the broader EV industry. 73% of the interviewees disagree with EVs as a high-tech products. This perception against to the development trends in China's EV industry supply chain, which diverges significantly from that of fuel vehicles.



Source: Source: collected and photographed by author.

Figure 2. How people feel about the EVs purchase behaviours? (Another 5 questions)¹¹⁰.

Upstream Supply Chain

In the supply chain of traditional fuel vehicles, upstream components mainly consist of parts like engine blocks, pistons, and transmission systems. However, the upstream supply chain for EVs is fundamentally different, focusing more on critical materials such as batteries and electric motors. Batteries, often lithium-ion types, are essential for storing and providing energy. The production of these batteries involves various critical materials, including lithium, cobalt, and nickel, which are not required in conventional fuel vehicles.

¹¹⁰ The code represents questions as below:

- A: When I decide to purchase a new energy vehicle, I am confident that I can overcome any difficulties and ultimately make the purchase.
- B: I have the knowledge, resources, and ability to purchase a new energy vehicle.
- C: When my family and friends express interest or take action to buy a new energy vehicle, I am more willing to purchase one.
- D: My family and friends would support my decision to buy a new energy vehicle.
- E: Buying a new energy vehicle is beneficial for me.
- F: New energy vehicles are a high-tech product for me.

Electric motors used in EVs also require rare earth elements, which are integral to the magnets that drive the motors. These materials enhance the efficiency and performance of the electric motors. As EVs rely on electric power and sophisticated chip technologies rather than internal combustion engines, the focus on electronic and material sciences becomes much more pronounced. This shift has led to a significant realignment in the sourcing and procurement strategies of automotive companies.

Midstream Supply Chain

In the midstream supply chain, EV manufacturers must tailor their products to a variety of use cases. Personal vehicles, such as private cars and company cars, constitute one segment. In contrast, commercial vehicles form another significant segment, requiring adaptations to meet different operational needs. For instance, electric buses and trucks are designed to handle the rigorous demands of public transport and goods delivery, respectively. These vehicles need to balance energy efficiency with the capability to carry heavy loads or operate for extended hours.

This differentiation necessitates a deeper segmentation within the industry, where manufacturers not only produce various models but also specialize in different market niches. The flexibility and scalability of EV production processes are therefore critical, requiring advanced manufacturing techniques and integrated supply chains.

Downstream Supply Chain

The downstream supply chain for EVs includes charging infrastructure, battery swap stations, and after-sales services. These elements are crucial for the operational viability and consumer acceptance of EVs. Unlike traditional fuel vehicles, which rely on an extensive network of gas stations, EVs depend on a robust and accessible network of charging stations. These stations need to be strategically placed to ensure convenience for users.

Moreover, battery swap stations are an innovative solution that can significantly reduce the time required for recharging. By allowing users to swap depleted batteries for fully charged ones, these stations can enhance the efficiency and attractiveness of EVs, especially for commercial operators with tight schedules. After-sales service for EVs also encompasses the maintenance and upgrading of in-car multimedia software. As EVs are embedded with advanced software systems for navigation, entertainment, and vehicle diagnostics, regular updates and improvements are essential to maintain performance and user satisfaction. These software updates can also include enhancements in vehicle efficiency, new features, and bug fixes, ensuring that the vehicle's technology remains up-to-date throughout its life-cycle.

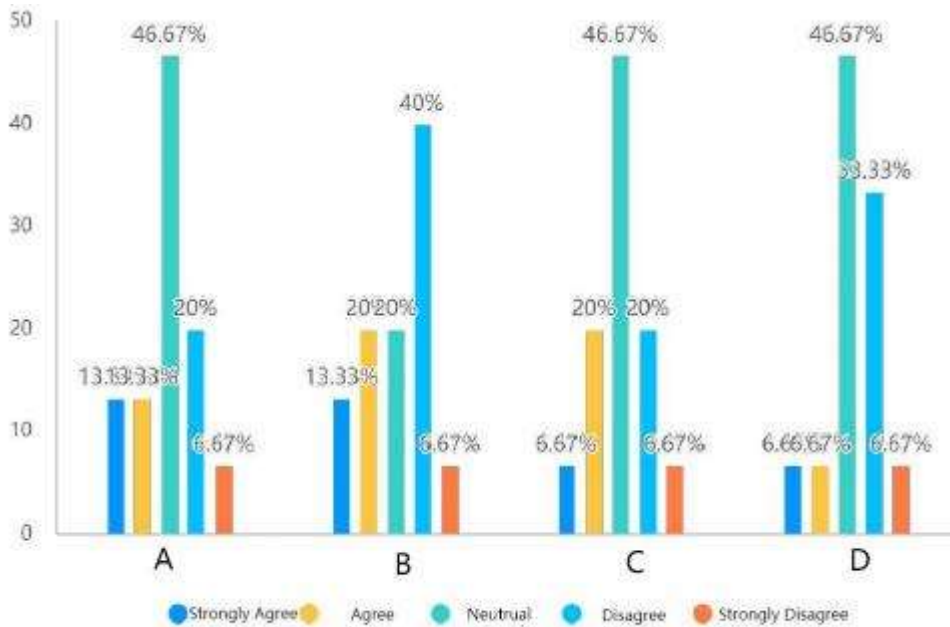
Upstream: Key raw materials and components	Midstream: Vehicle manufacturing	Downstream: Charging and after-market services
Battery: Cathode (Nickel ore, Aluminum ore, Manganese ore, Cobalt ore), Anode (Graphite), Electrolyte (Lithium hexafluorophosphate), Separator (Polyethylene, Polypropylene)	Passenger cars: Private cars, Government vehicles	Charging services: Charging equipment, Battery swapping stations, Battery recycling
Motor: Rare earth elements Silicon powder, Iron ore	Commercial vehicles: Buses, Trucks Special-purpose vehicles: Engineering vehicles, Sanitation vehicles, Food trucks, Coaches, Vending vehicles, Inspection vehicles	After-market services: Automotive finance, Insurance, Leasing, Used car trading

Source: Source: collected and photographed by author.

Figure 3. Supply Chain of EVs

The evolution of the EV supply chain from upstream to downstream highlights the transformative impact of technology on the automotive industry. Unlike traditional fuel vehicles, the EV supply chain emphasizes critical materials, specialized manufacturing processes, and advanced technological integration. The shift towards electric propulsion and high-tech positioning reflects broader trends in consumer expectations and industrial capabilities. As a result, consumers are not very aware of EVs. Compared to fuel vehicles, EVs do not have a very long life cycle and require frequent updates and maintenance.

3.3. Inadvertent Environmentalism Challenges



Source: Source: collected and photographed by author.

Figure 4. How people feel about the EVs purchase within environmental reasons?¹¹¹

The concept of inadvertent environmentalism is exemplified in the way consumers approach the purchase of electric vehicles (EVs). Although many respondents can quickly reference terms like "carbon neutrality" and "green traveling" when discussing environmental protection, their purchasing decisions often reflect a value-action gap. This phenomenon highlights the disconnect between consumers' environmental attitudes and their actual behaviors, suggesting that consumer environmentalism can be largely unconscious. While benefiting from national policies promoting EVs, consumers are passively contributing to a greener society without actively prioritizing environmental considerations in their decision-making processes.

To illustrate this point, Figure 4 depicts how respondents feel about purchasing EVs for environmental reasons. The data collected indicates that although respondents acknowledge the environmental benefits of EVs, this awareness does not strongly influence their purchasing behavior. For instance, 46% of respondents were neutral about recommending EVs to others, and a significant proportion outright refused to do so. This reluctance was often justified by practical considerations, as highlighted in one respondent's explanation:

"I need to drive to Beijing to visit my girlfriend every weekend. It's actually a bit inconvenient to drive an electric car to Beijing. However, since my girlfriend lives in Beijing, she bought an electric car.You

¹¹¹ The code represents questions as below:

A: I am very willing to purchase or continue purchasing new energy vehicles in the future, even if their prices are higher than gasoline vehicles.

B: For environmental reasons, when I purchase or replace a new car, I would first consider a new energy vehicle instead of a gasoline vehicle.

C: For environmental reasons, I am willing to recommend new energy vehicles to others.

D: I am willing to recommend new energy vehicles to others instead of gasoline vehicles.

mentioned the environmental factor; electric cars are definitely environmentally friendly, but we didn't consider this factor when buying the cars. ...If I had bought an electric car at the time, she would have definitely bought a gasoline car.

- Miao, Interviewee, Female (2024)”

This statement underscores the predominance of convenience and practicality over environmental concerns in the decision-making process for many consumers.

Further insights were gleaned from the ranking of factors influencing EV purchase behaviors, as shown in Figure 5. The study found that safety was the primary concern for consumers, while environmental awareness was ranked second to last. This finding is particularly revealing given the significant investments by the state in promoting environmental awareness and education. Despite these efforts, consumers tend to prioritize immediate economic and personal benefits over long-term environmental impacts when faced with financial pressures.

Addressing the psychological barriers mentioned in Section 2 requires a multifaceted approach that goes beyond traditional environmental education and awareness campaigns. Strategies should include improving the convenience and affordability of EVs, enhancing infrastructure to support widespread EV adoption, and fostering a cultural shift that normalizes environmentally responsible behaviors. By understanding and mitigating the factors contributing to the value-action gap, policymakers and industry stakeholders can more effectively promote the transition to sustainable transportation and achieve significant reductions in greenhouse gas emissions.

Options	Total Score	1 st Rank	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th
Safety performance	7.67	4(26.67%)	1(6.67%)	2(13.33%)	2(13.33%)	6(40%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)
Overall price (on road price)	7.67	7(46.67%)	2(13.33%)	0(0%)	1(6.67%)	1(6.67%)	2(13.33%)	0(0%)	0(0%)	2(13.33%)	0(0%)
Follow-up costs such as fuel prices, electricity prices, and charging equipment	7.4	2(13.33%)	5(33.33%)	0(0%)	2(13.33%)	4(26.67%)	1(6.67%)	0(0%)	1(6.67%)	0(0%)	0(0%)
Vehicle range and power	7.27	1(6.67%)	2(13.33%)	4(26.67%)	6(40%)	0(0%)	0(0%)	1(6.67%)	1(6.67%)	0(0%)	0(0%)
National policies such as purchase subsidies, parking fee exemptions, etc.	6.67	1(6.67%)	2(13.33%)	4(26.67%)	2(13.33%)	1(6.67%)	1(6.67%)	3(20%)	1(6.67%)	0(0%)	0(0%)
Brand factors	5.87	0(0%)	2(14.29%)	4(28.57%)	0(0%)	0(0%)	6(42.86%)	2(14.29%)	0(0%)	0(0%)	0(0%)
Market trends, such as pursuit of high technology, etc.	4.07	0(0%)	1(7.14%)	0(0%)	1(7.14%)	1(7.14%)	2(14.29%)	5(35.71%)	2(14.29%)	1(7.14%)	1(7.14%)
Environmental friendliness, such as low carbon emissions, environmental factors, etc.	3.4	0(0%)	0(0%)	1(7.14%)	1(7.14%)	1(7.14%)	0(0%)	2(14.29%)	4(28.57%)	5(35.71%)	0(0%)
Conformity (conformity to prevailing trends)	2.87	0(0%)	0(0%)	0(0%)	0(0%)	1(7.14%)	2(14.29%)	0(0%)	5(35.71%)	6(42.86%)	0(0%)
Other (please specify if applicable)	0.53	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	1(20%)	0(0%)	0(0%)	4(80%)

Source: collected and photographed by author.

Figure 5. Ranks of factors which influence people's purchase behaviours.

4. CONCLUSION

The transition to electric vehicles (EVs) is crucial for sustainable transportation and climate change mitigation, but it involves a range of economic, infrastructural, behavioral, and policy challenges.

Economic incentives, like subsidies and tax breaks, have helped lower initial costs, yet the value-action gap remains—where consumers' pro-environmental attitudes do not always lead to corresponding behaviors. Policies need to address practical concerns, ensuring EV ownership is both economically and logistically viable. A robust charging infrastructure is essential, including widespread availability of charging stations, integration of renewable energy sources, and advancements in battery technology. Current infrastructure deficiencies, especially in suburban and rural areas, need coordinated efforts from government, private stakeholders, and urban planners. Effective policies must support the EV transition through economic incentives and regulations that encourage EV-friendly infrastructure and renewable energy adoption. These policies should also ensure equitable access to EVs for all socio-economic groups through targeted subsidies, infrastructure investments, and community education programs.

EVs offer substantial environmental benefits, particularly in reducing greenhouse gas emissions and decreasing reliance on fossil fuels. When powered by renewable energy, EVs can significantly lower CO₂ emissions compared to conventional vehicles. However, lifecycle emissions from battery production and disposal must also be considered. Widespread EV adoption requires a cultural shift towards environmentally responsible behaviors. This involves changing societal attitudes towards transportation and highlighting the benefits of EVs beyond their environmental impact. Education and awareness campaigns can promote this shift, emphasizing practical benefits like cost savings, convenience, and technological advancements.

In conclusion, transitioning to electric vehicles is essential for sustainable transportation and climate change mitigation. It requires a multifaceted approach, including economic incentives, infrastructure development, and addressing the value-action gap in consumer behavior. Collaboration among policymakers, industry stakeholders, and consumers is crucial to overcome the challenges associated with EV adoption. By addressing these comprehensively, we can achieve a greener, more sustainable future with EVs playing a central role in reducing emissions and promoting environmental sustainability.

This study enhances understanding of the dynamics between urban development, climate action, and sustainable mobility, emphasizing the need for integrated economic, infrastructural, and policy approaches to foster equitable and widespread EV adoption. Ongoing advocacy for sustainable solutions is essential to ensure a cleaner, healthier planet for future generations.

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405 Examining the return of investment of freight vehicles with electric powertrain

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Abstract

In 2017, road transport accounted for 93% of total energy use in EU transport, 94% of which was fossil fuel-based. Freight transport is growing slower than passenger transport in all scenarios currently under consideration but could still be up to three times higher by 2050 than in 2010. Under the European Green Deal, Europe would have to reach zero greenhouse gas emissions by 2050 to become the first climate-neutral continent. A radical overhaul of the transport sector is inevitable to achieve this ambition. This research examines scenarios for the widespread uptake of electric transport vehicles, comparing them with conventional propulsion. By analysing the scenarios, we aim to propose a system of incentives for infrastructure development and the purchase and use of alternative propulsion vehicles in support of national economic interests. For this purpose, a 10-year time horizon is taken as a starting point, starting from today's perspective, by examining parameters such as purchase cost, running and consumption costs, and the inclusion of carbon dioxide emissions as an external cost over the whole life cycle of the vehicles. The scenarios highlighted that the current situation does not provide more favourable conditions for using electric vehicles than traditional vehicles, so drastic intervention in this area will be inevitable in the short term to achieve climate-neutral transport.

Keywords

Electric powertrain; sustainability; incentives; transport policy.

1. INTRODUCTION

International and EU policy efforts align with the view that using zero-emission freight vehicles is a self-evident and desirable solution to reduce greenhouse gas emissions (Pla Bernalte, 2023). However, analysis has shown that while the necessary subsidies and regulations to achieve these efforts are in place, the process is relatively slow and more substantial interventions may be needed to achieve the long-term goals. (Lee & Park, 2023) Including emission-related parameters in a distance-based tolling system is a potent tool for policymakers to encourage operators with low-emission fleets and operators with obsolete vehicles to renew their depreciation policies and fleets. (Bjerkkan & Babri, 2025) In the long run, it is not expected that owners of electric trucks will be able to benefit from the current level of discounts available. At the same time, to meet climate change targets, it is assumed that the charges for conventional vehicle transport will increase and that new challenges will make it increasingly difficult to price them appropriately (Vickerman, 2024). The "Fit for 55" package aims to achieve the EU's 2030 target of reducing emissions by 55% and reaching net zero emissions by 2050. On 2 June 2022, European transport ministers jointly agreed on the three main areas of action of the "Fit for 55" package, covering the use of alternative fuels through the

Adequate Fuel Infrastructure Network (AFIR) and the decarbonisation of maritime and aviation transport (European Commission, 2022):

- from 2025, fast-charging stations of at least 150 kW for cars and vans must be installed every 60 km along the TEN-T core network along the EU's main transport corridors;
- from 2025, a minimum 350 kW heavy-duty vehicle charging station with a minimum capacity of 350 kW shall be installed every 60 km on the core TEN-T core network and every 100 km on the wider TEN-T comprehensive network, with full network coverage by 2030;
- hydrogen refuelling stations serving both cars and trucks to be installed in all urban nodes on the comprehensive, and every 150 km along the TEN-T core network from 2030;
- seaports hosting a minimum number of large passenger ships or container ships (in TEN-T core and comprehensive maritime ports and also inland waterway ports of the TEN-T network) will have to provide sufficient shore-side clean electricity supply by 2030;
- airports must provide electricity for stationary aircraft at all gates by 2025 and at all remote stands by 2030;
- users of electric or hydrogen vehicles should be able to pay easily at filling or refuelling stations, without prepayment and with full price transparency, by credit card or contactless devices;

operators of filling or refuelling stations must provide consumers with full information electronically on the availability, waiting times or prices of the various stations. The following is an overview of the main options for action in this field from the perspective of an EU-recognised organisation. It also looks at the situation in the EU and the impact of recent policy measures.

2. ALICE'S PROPOSED PROGRAMME FOR SUSTAINABLE FREIGHT TRANSPORT SYSTEMS

In order to achieve the EU's ambitions, it is necessary not only to meet the common ambitions set by the Community decision-makers but also to have individual action points and programmes from each organisation and country to achieve success. A precise and effective action plan is needed, with freight transport and logistics as one of the focal areas. The following is an overview of the programme of ALICE¹¹² and of the programmes of those European countries that now have a concrete programme to achieve decarbonisation. A study published by ALICE in 2019 has fully explored the main areas where the main points of intervention and proposals for the future could be to achieve decarbonisation ambitions. Among other things, five main areas were identified to achieve the European targets committed to in the Paris Agreement¹¹³, for which the areas for action and the timeframe for action were defined, looking ahead to 2050. The five key areas and their corresponding proposals for action are set out in Table 1.

Table 1. ALICE's proposed programme for sustainable freight transport systems (ALICE, 2019)

I. Growth in demand for goods transport	II. Smart and combined use of transport modes	III. Sharing and maximising the use of fleets and assets	IV. Use of energy efficient fleets and equipment	V. Operating fleets and assets with the lowest possible energy consumption
Restructuring supply chains Localisation Decentralisation of production and stockholding 3D printing Dematerialisation Customer behaviour	Increased use of rail, water and low emission modes of transport Multimodal optimisation Synchromodality	Load optimisation Load consolidation and asset sharing Modular packaging and boxes Returns Open warehouses and transport networks	Cleaner and more efficient technologies Efficient vehicles and vessels Driving behaviour /Environmentally friendly driving Telematics Fleet management Logistics centres and warehouses	Optimisation of diesel systems CNG/LNG Biofuels Hydrogen Electric/ hybrid Logistics centres and warehouses

¹¹² Alliance for Logistics Innovation through Collaboration in Europe

¹¹³ Paris Agreement: The Paris Agreement entered into force on 4 November 2016, when the necessary condition was met: the 55 countries responsible for at least 55% of global greenhouse gas emissions ratified the agreement.

In the table, we have highlighted the relevant solutions for this research in bold. Of all the solutions under Pillar V, introducing electric/hybrid and hydrogen vehicles is considered to have the highest potential, which is also in line with international research (Majerova, 2022) The main limitation to realising the potential of these solutions is the required infrastructure investment, which may delay implementation. A combination for heavy-duty vehicles could include LNG and biofuels as interim fuels until 2035, with hydrogen fuel cell vehicles and battery electric vehicles as the leading longer-term solutions. Table 2 shows the time and GHG emission reduction matrix for the solutions proposed in Key Area V.

Table 2. Action points for lower energy fleets and assets (ALICE, 2019)

		Timeline		
		Short (2022-ig)	Central (2023-2030)	Long (2031-2050)
Impact on GHG emission reductions	More than 20%	Electric/hybrid in urban environments		Hydrogen
	Between 10-20%		Electric/hybrid long term	Ammonia (maritime)
	Less than 10%	Cleaner diesel CNG/bioLNG Biofuel (road vehicle) Solar energy (logistics facilities)	Biofuel (aircraft, ships)	

The table also shows that the timeframes include specific action points, which, if implemented, categorise the level of GHG reductions expected. Processing and translating the formulated action points to the home environment can be of maximum help in our research areas. In the following, the current situation is presented, as well as the currently known programs of each European country to achieve sustainable freight transport targets.

3. TAX INCENTIVES AND SUBSIDIES FOR THE PURCHASE AND OPERATION OF ELECTRIC COMMERCIAL VEHICLES IN THE EU

Many European countries offer fiscal support to encourage the market uptake of electric (commercial) vehicles, but these tax and purchase incentives vary widely. The common goal is to reduce the use of conventional LDVs and HDVs and increase alternative propulsion in road transport. The EU's share of alternative fuel vehicles was close to 5% by the first quarter of 2024 (EAF0, 2024). Figure 1 shows the change in the number of each alternative fuel vehicle over the last 15 years (passenger cars and light commercial vehicles).

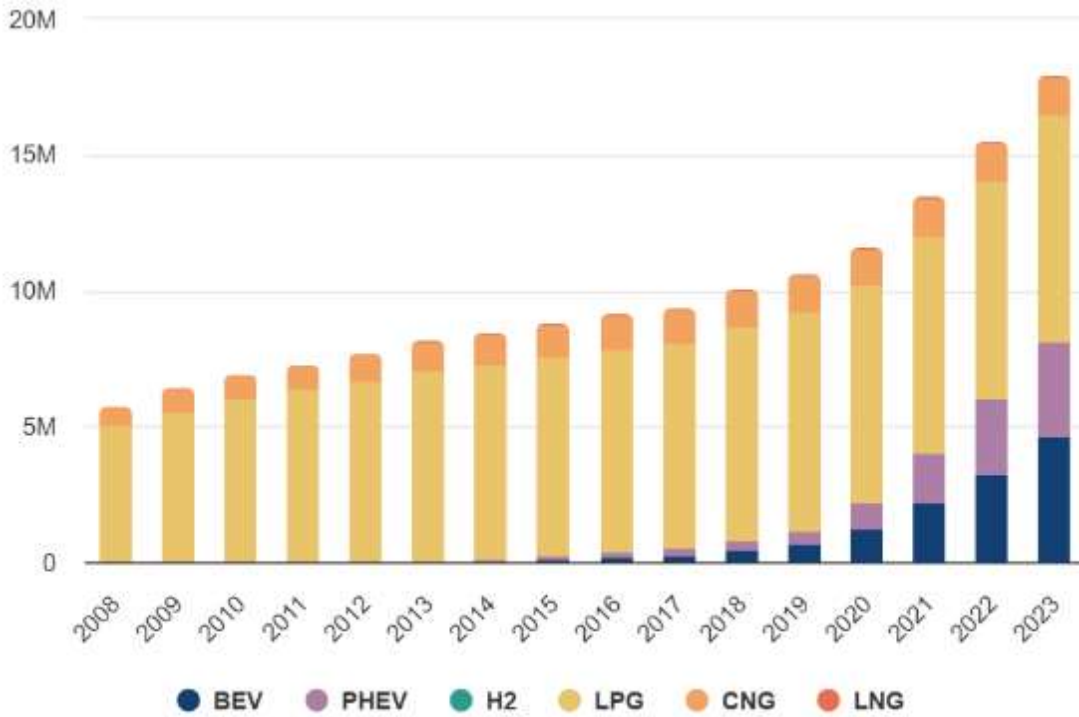


Figure 1. Total number of alternative fuelled passenger cars and vans (EAFO, 2024)

The graph shows that LPG has been the most popular alternative propulsion system in this time period, while after 2015, BEVs¹¹⁴ and PHEVs¹¹⁵ entered the market, and those became gradually more represented each year. From a freight transport perspective, a more interesting question is how the adoption rates of alternative powertrains in heavy-duty vehicles will evolve, as this is another primary polluting sector. Figure 2 shows the total number of alternative-fuelled HDVs in the EU-27 over the last 15 years. Hydrogen and LNG vehicles were, understandably, not represented in this category.

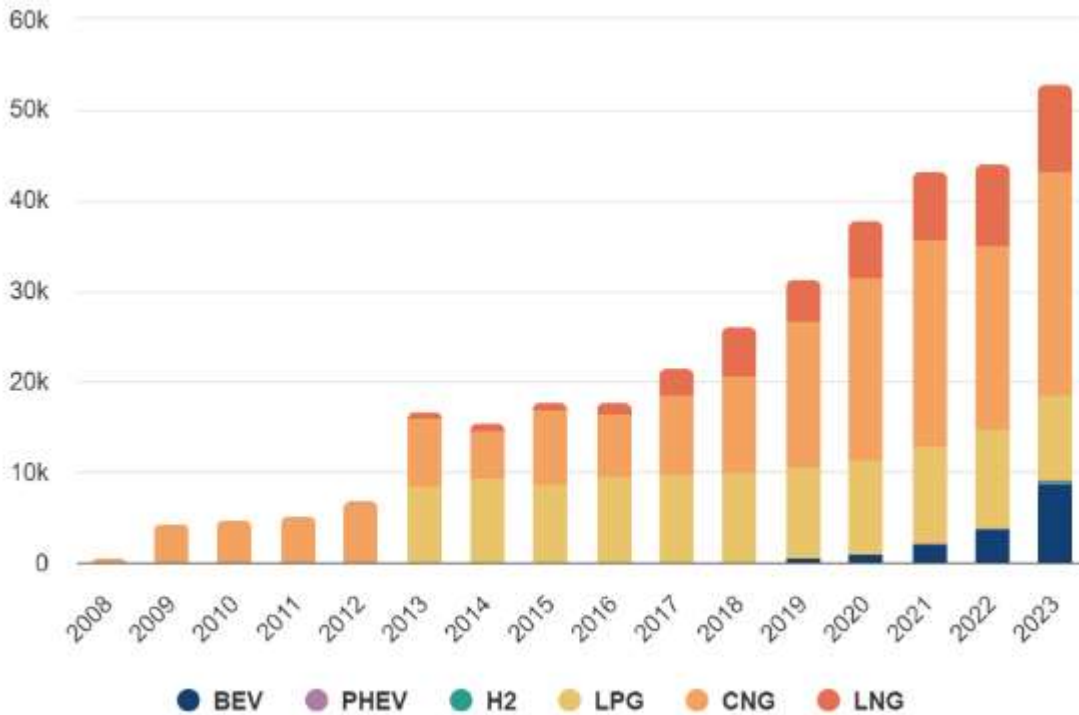


Figure 2. Total number of alternative fuelled heavy duty trucks (EAFO, 2024)

¹¹⁴ BEV = Battery Electric Vehicle

¹¹⁵ PHEV = Plug-in Hybrid Electric Vehicles

Similar to passenger cars and vans, LPG and LNG were the most popular fuel types in this category. Electric trucks entered the market much later, in 2019, but their numbers have been increasing vigorously since. A breakdown of the 2023 data by country is shown in Figure 3, with the addition of the UK, Norway, Iceland, Switzerland, Turkey and Liechtenstein, as those are also active contributors from a transport geographic point of view in the region, alongside the EU Member States.

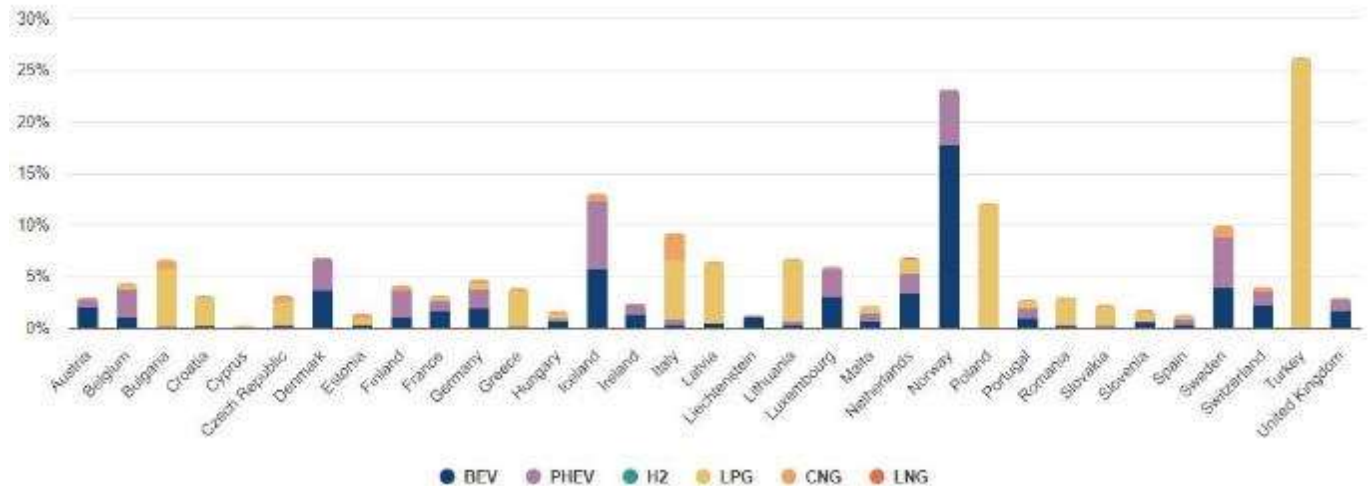


Figure 3. Fleet of alternative fuelled passenger cars and vans as a percentage of the total fleet (EAF0, 2024)

The chart shows a surprising result in that the top three countries are not from the EU27, but Turkey, Norway and Iceland, albeit using different alternative fuels. For trucks, the overall picture is different, with Poland, Spain and Italy leading the way with the most gas-based propulsion, as shown in Figure 4.

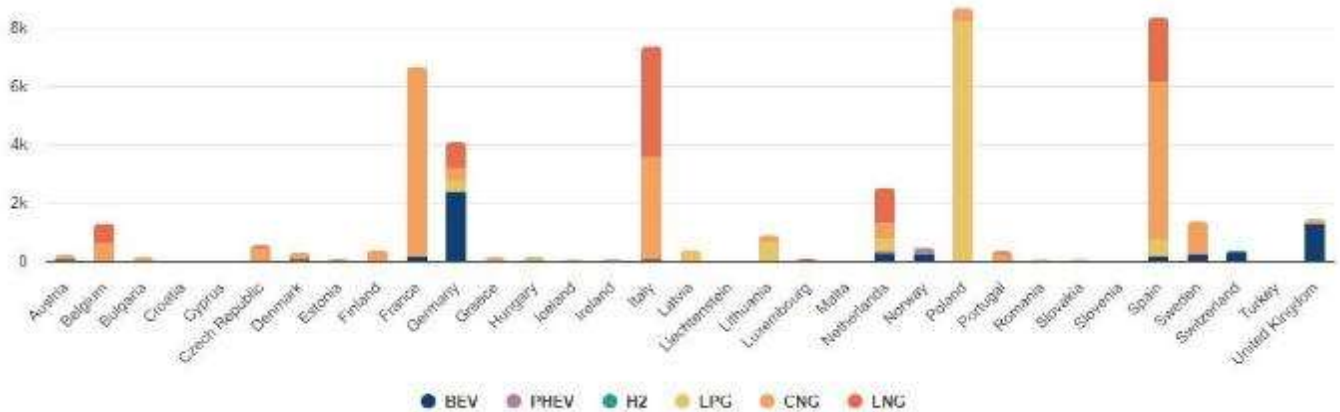


Figure 4. Total number of alternative fuelled trucks (EAF0, 2024)

ACEA has compiled an overview of commercial electric vehicles in use in the EU Member States, Iceland, Switzerland and the UK, including purchase incentives such as bonuses or customer premiums, as well as incentives for developing or installing charging infrastructure. Infrastructure improvements are an essential part of an efficient and incentivised overall system. Figure 5 shows the number of electric charging points in the countries surveyed.

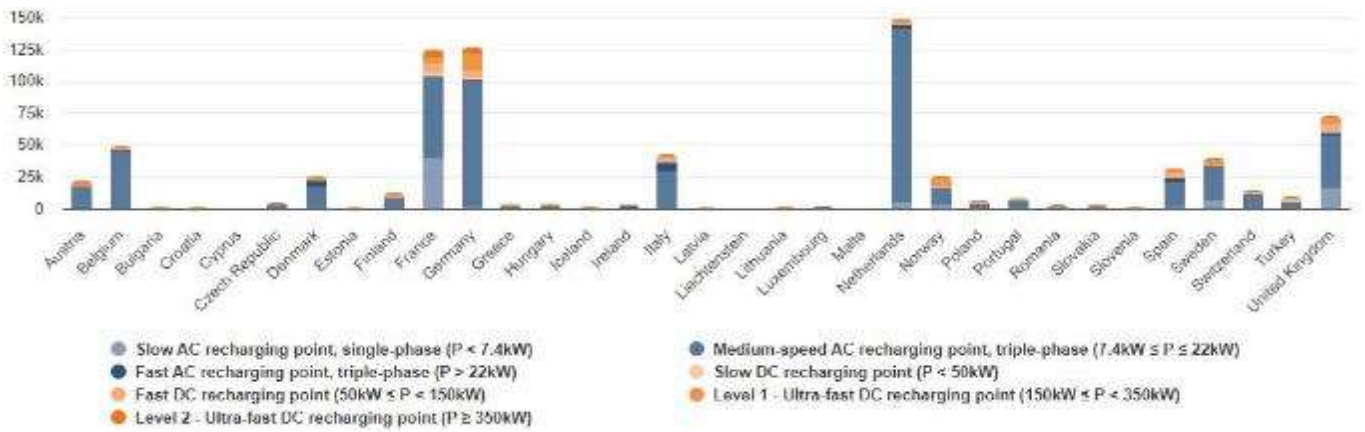


Figure 5. Total number of AC and DC recharging points, according to the AFIR categorization (EAF0, 2024)

It can be seen that, as with the use of alternative fuel vehicles, some countries are prominent in the region, but in many cases, the values are almost absent from the chart. The overall picture shows that 22 EU Member States (~80%) today do not offer infrastructure development or deployment incentives. Moreover, almost one-third do not offer incentives for purchasing electric commercial vehicles. Three Member States do not offer tax incentives: Estonia, Hungary, and the Netherlands. Hungary is the only member state not offering any tax or purchase incentives. EU Member States generally offer less tax relief and incentives for electric commercial vehicles than for electric passenger cars. Figure 6 shows the types of incentives offered by each Member State (ACEA, 2023b).

	TAX BENEFITS		INCENTIVES	
	Acquisition	Ownership	Purchase	Infrastructure
Austria	✓	✓	✓	✓
Belgium	✗	✓	✓	✗
Bulgaria	✗	✓	✗	✗
Croatia	✓	✓	✓	✗
Cyprus	✓	✓	✓	✗
Czechia	✓	✓	✓	✓
Denmark	✓	✓	✗	✗
Estonia	✗	✗	✓	✗
Finland	✓	✗	✓	✗
France	✓	✗	✓	✗
Germany	✗	✓	✗	✗
Greece	✓	✗	✓	✗
Hungary	✗	✗	✗	✗
Ireland	✓	✓	✓	✗
Italy	✗	✓	✓	✗
Latvia	✓	✓	✗	✗
Lithuania	✓	✗	✗	✗
Luxembourg	✓	✓	✗	✗
Malta	✓	✓	✓	✗
Netherlands	✗	✗	✓	✗
Poland	✓	✓	✓	✓
Portugal	✗	✓	✓	✗
Romania	✗	✓	✗	✗
Slovakia	✓	✓	✗	✗
Slovenia	✓	✗	✗	✗
Spain	✓	✓	✓	✓
Sweden	✗	✓	✓	✓

Figure 6. Fiscal advantages granted by EU member states (ACEA, 2023a)

The following is a country-by-country analysis of recent measures to encourage the purchase of alternative vehicles. For this purpose, the measures shown in Figure 6 were scored first, with the 'Tax benefits' category receiving 1 points if present in the Member State concerned (exists or not) and the 'Incentives' category receiving 2 points, as it was clear from the literature review and EU efforts that in the short term, purchasing and infrastructure development are the priority and were therefore given twice the weight. The scoring and the number of alternative fuel vehicles present in each Member State are shown in Table 3.

Table 3. Scoring of incentive instruments and number of alternative powertrain vehicles in each EU Member State by 2023 (Own ed.)

	Tax Benefits		Incentives		Sum	Passanger cars and vans	Truck numbers
	Acquisition	Ownership	Purchase	Infrastructure			
Austria	1	1	2	2	6	340	203
Belgium	0	1	2	0	3	483	1262
Bulgaria	0	1	0	0	1	722	106
Croatia	1	1	2	0	4	110	9
Cyprus	1	1	2	0	4	1	0
Czech Republic	1	1	2	2	6	2024	517
Denmark	1	1	0	0	2	923	278
Estonia	0	0	2	0	2	355	82
Finland	1	0	2	0	3	628	350
France	1	0	2	0	3	7542	6682
Germany	0	1	0	0	1	3273	4085
Greece	1	0	2	0	3	281	110
Hungary	0	0	0	0	0	414	119
Ireland	1	1	2	0	4	113	33
Italy	0	1	2	0	3	5693	7352
Latvia	1	1	0	0	2	77	380
Lithuania	1	0	0	0	1	867	850
Luxemburg	1	1	0	0	2	405	78
Malta	1	1	2	0	4	13	0
Netherlands	0	0	2	0	2	2105	2517
Poland	1	1	2	2	6	2218	8699
Portugal	0	1	2	0	3	722	331
Romania	0	1	0	0	1	400	21
Slovakia	1	1	0	0	2	276	26
Slovenia	1	0	0	0	1	93	19
Spain	1	1	2	2	6	4806	8359
Sweden	0	1	2	2	5	3646	1339

The correlation analysis was carried out using linear regression to see if there is a connection between the incentives applied (expressed by the scoring we have outlined above) and the share of electric vehicles in the fleet (in each country in 2023). In Table 3, the Member States were also categorised according to their overall score after being aggregated. Accordingly, the excellent category includes countries with a score between 6,5 and 4, with a total of 9 (green); the medium category includes countries with a score between 3 and 2, with 12 (yellow), while the less prepared for electrification of road transport category includes countries with a score below 1 (or 0), with 6 (red). The results of the linear regression analysis are visualised in Figures 7 and 8, with passenger cars categorised separately from light commercial vehicles and trucks.

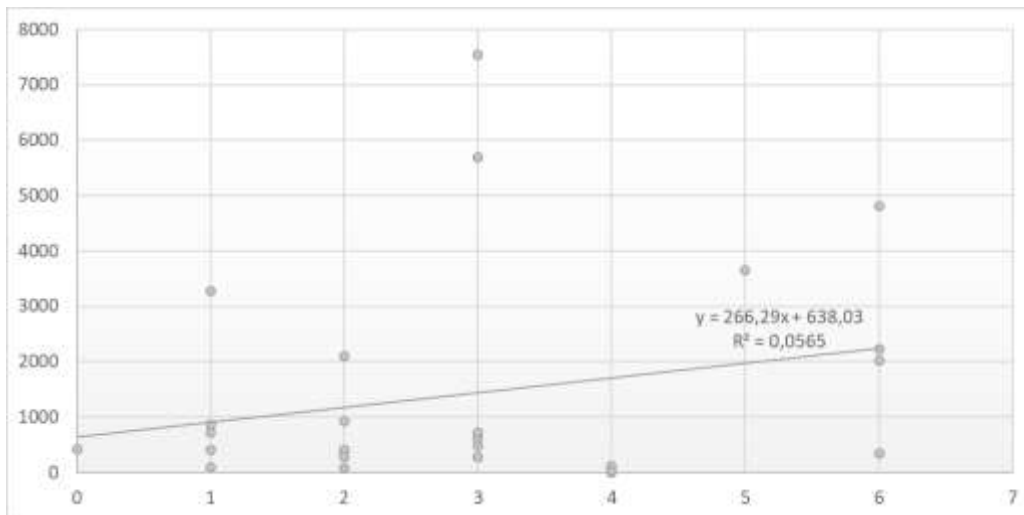


Figure 7. Linear regression relationship between incentive instruments scored and the number of passenger cars and vans (Own ed.)

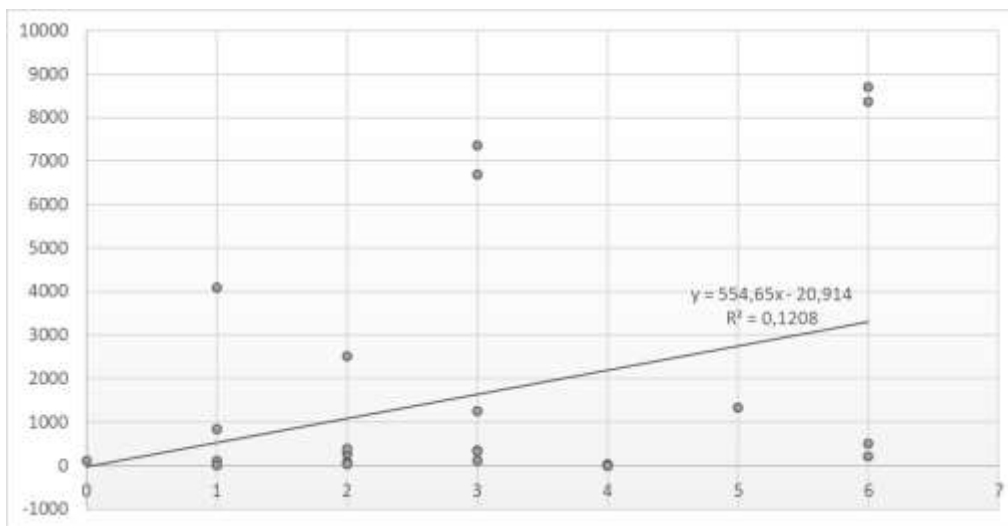


Figure 8. Linear regression relationship between incentive instruments scored and the number of trucks (Own ed.)

The R^2 values show no strong relationship between the dependent and independent variables, i.e., in this case, x, i.e., the scoring of the incentive schemes, which does not explain the actual vehicle numbers in this sense. It is noteworthy that within the literature review, instances exist where certain Member States may lack specific incentive instruments in 2023. This absence may be attributed to various factors, such as the expiration of the instrument's application period or its phase-out. Furthermore, it is plausible that new incentive types are slated for introduction in the future. Thus, the depiction presented herein serves as a snapshot of the situation as of 2023.

4. SUMMARY

In transport planning, decision-makers need reliable and informative analysis and data-based decision support to compare policy options. Both international and EU policy efforts are consistent in that zero-emission freight vehicles are a self-evident and supportable solution for reducing greenhouse gas emissions. At the same time, EU policy efforts do not differentiate between solutions (no preferred technology) but make ambitious, long-term proposals to reduce emissions, focusing on using zero-emission freight vehicles. The literature review shows that the number of alternative vehicles has increased in most of the countries surveyed, indicating steady growth in road freight transport and that using alternative powertrains is essential in the long term, although this area is also growing yearly. Joint action by road transport operators and effective professional dialogue with

decision-makers is essential and indispensable to ensure that an appropriate charging network is set up at the right speed and to the proper technical standard throughout the European Community. The present research suggests that, while support systems may have impacted some Member States in the short term, a significant breakthrough is still to come. It is stressed that the research represents a snapshot of the situation in 2023, and the long-term effects of individual incentive instruments could be realised as part of a more detailed analysis. To get the complete picture, an essential further line of research could be to examine, among other things, the temporality of whether and to what extent there has been an increase in the uptake of alternative fuel vehicles in those Member States where incentives have been applied. The comparative analysis of the different options and the development and implementation of strategic plans for businesses and enterprises based on these options will be crucial for developers, policymakers, economists and consumers in the coming period.

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ABSTRACTS

Ordered by ID number

3 Import Competition and Domestic Transport Costs

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Abstract

With China's 2001 WTO accession, trade costs between the US and China fell sharply, but the transport costs of Chinese imports within the US remained sizable. We argue that domestic transport costs shield local labour markets from globalization. Using a shift-share design for industry-level Chinese imports across 42 ports of entry, we show that US job losses from competing imports occurred near the ports where they arrived. Once accounting for domestic transport costs, import competition affects coastal areas more than inland areas; shows larger impacts in housing markets and indirectly affected jobs; and explains voting, mortality and family formation.

5 Autonomous Vehicles in Future Cities

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Abstract

An increasing number of scientific and practical scenarios explore the potential impacts of the widespread adoption of autonomous vehicles on urban transportation and, consequently, on the individual lives of urban residents. Many now acknowledge the logic that shared autonomous fleets, as an alternative to individual car ownership, have the potential to significantly reduce the number of vehicles on the road, with important implications for land use and urban landscapes. While our knowledge about these possibilities has been growing, our understanding of how urban residents will react to these changes remains limited.

Furthermore, most studies examining urban residents' preferences tend to make generalized statements that apply to the entire population, rather than focusing on specific demographic segments. This lack of segment-specific research has resulted in a dearth of information regarding the urban preferences of young people who are expected to play a crucial role in shaping the future of mobility.

Our study aims to investigate how young urban residents in Hungary would react to potential urban landscape changes induced by the widespread adoption of autonomous vehicles. We employed real-time eye-tracking measurements on a considerably large sample of 102 participants under laboratory conditions. During the experiments, participants viewed pairs of "before" and "after" urban landscape images, illustrating potential urban changes due to the mass adoption of autonomous vehicles. Our analysis of fixation durations, average fixation lengths, and average fixation counts indicates a consistent preference for the "after" images across all metrics, with a particularly strong preference among male participants.

9 How are Europe's Cities and Regions Contributing to Europe's Green Transition by Boosting the Circular Economy?

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Abstract

Circular economy is an economic model that aims to be more sustainable than the traditional, so-called "linear" model (manufacture, use, dispose). This model is based on maximizing the use of resources and minimizing waste (Geisendorf & Pietrulla, 2018). There are several ways to describe the principles of the circular economy, one of which is the concept of "9R" (Kirchherr et al. 2023). These are often represented in a hierarchy, from the most desirable practices to the least desirable. (1. Rethink, 2. Refuse, 3. Reduce, 4. Reuse, 5. Repair, 6. Remanufacture, 7. Recycle, 8. Recover, 9. Recreate).

Bourdin et al. (2022) explain that definitions of the circular economy systematically forget the local, territorial, regional dimension. However, it is the local and regional level that is most appropriate for deploying innovative circular economy solutions. First, each territory has specific resources. Therefore, considering the territorial dimension of the circular economy means identifying resources (material and immaterial) available locally and thinking about using them optimally (Geissdoerfer et al., 2017). Second, circular economy initiatives require close cooperation between local actors such as businesses, local authorities, and citizens (Bourdin et al., 2022). By integrating the territorial dimension, it is possible to facilitate collaboration and active participation of local actors in the implementation of these initiatives. Moreover, Jambou et al. (2022) have shown that geographic proximity between the stakeholders of a circular economy project facilitated their coordination and flow exchanges. Third, the environmental impacts of economic activities are often local (Korhonen et al., 2018). By taking into account the territorial dimension, it is possible to better identify environmental impacts and implement appropriate solutions to reduce them.

While there are many articles analysing public policies implemented to promote the circular economy (Hartley et al., 2023) at the national level, there are few studies focusing on regional and urban policies (Arauzo-Carod et al., 2022). However, Niang et al. (2023) recently showed that the circular economy could have local impacts in terms of job creation. Torre & Bourdin (2020) also suggested that the circular economy could be a way to reindustrialize Europe while taking into account the objectives of the green transition.

In this context, the aim of our article is to analyse what types of circular initiatives cities and regions in Europe are developing and how they contribute to the green transition. To do this, our analysis is based on the study of Circular Systemic Solutions across 37 European cities and regions. We will conduct a thorough documentary analysis of the strategies and initiatives implemented in these cities and regions, as well as semi-structured interviews with local authorities. We will thus highlight the impact of these local initiatives in the implementation of the European Green Deal.

11 The Rule of Law as the Barrier of Cohesion Resources

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Abstract

The measure of the European Union's cohesion policy is determined by the current multiannual financial framework (MFF), which finances the policy. In the 2021-2027 programming period, the European Union manages with 1,824.3 billion euros. This quantity is significant, because there was no precedent for such a large budget in previous periods.

However, last year a new phenomenon has emerged in parallel with the increase of the financial support, which can also represent a barrier to EU payments. This is none other than the policy of the rule of law.

Since 2021, the EU budget enjoys increased protection in the cases when the violation of the principles of the rule of law threatens the financial interests of the EU, due to a new legal framework. This new legal framework is the Regulation on the general conditions for the protection of the EU budget, (known as a "conditionality regulation"), which has been in force since January 2021.

This new set of conditions mentioned above enables the EU to take measures to protect the EU budget favourable for the member states, for example suspend payments or make financial corrections.

A fault line has been created between the member states along the condition of the rule of law. Nowadays it is highly debated whether a lack of the rule of law in a member state can result in the freezing of the disbursement of EU financial supports.

The presentation is based on the literature published on the subject, furthermore the previously processed relevant documents and legislation of the European Union.

The purpose of the presentation is to introduce the fault lines emerging alongside the suspension of EU financial supports and the conditions of the rule of law as well as to outline the possible future scenario. The presentation highlights that freezing the disbursement of EU subsidies appears as a genuine powerful weapon in the hands of the EU.

16 Perceptual Boundaries of Urban Areas and How to find them?

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Abstract

Cities, while as typically defined 'administrative divisions' in many countries worldwide, have an intrinsic dynamic nature that sets them apart from pure administrative division units. They often grow beyond their designated administrative boundaries, and conversely, a natural city may also be divided into multiple "administratively defined" cities. Therefore, when examining cities, it is imperative to expand our focus beyond the strict confines of administrative entities and consider the broader concept of urban areas or metropolitan regions--frequently colloquially also referred to as cities.

In contrast to cities, the term 'urban area' lacks a universally accepted definition. Scholars have proposed various interpretations, with many utilizing commute patterns or economic activities as criteria for internal coherence among spatial units. In our research, we introduce a 'perception-based' approach, with cognitive maps, to redefine the boundaries of urban areas within China. Using the case of Foshan as an example, we scrutinize the perceived urban boundaries and compare them to the official administrative borders of associated cities/towns. The objective of this study is to illuminate the nuanced distinctions between the two, thereby enhancing our comprehension of the intricate relationship between city administration and the 'perceived cities' shaped by cultural and historical linkages.

17 Empirical Study on the Current Situation of Japanese Agricultural Corporations: Perspectives from Creating Shared Value

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Abstract

Japanese agriculture, which traditional small-scale family farms dominate, faces sustainability issues such as a decrease in the number of farms, aging farmers, an increase in abandoned farmland, and stagnation in rural areas. Although agricultural corporations account for only a small percentage of the total number of farms, the ratio of employed farmers to new farmers is rising. Generally, agricultural corporations operate on a relatively large scale, have a wide range of business domains, and are highly motivated to realize efficient and stable agriculture. Furthermore, some agricultural corporations are actively working to solve problems in local communities, such as eliminating abandoned farmland, collaborating with welfare programs, and introducing environmentally friendly agriculture. Therefore, it is considered that agricultural corporations play a significant role in improving the sustainability of Japanese agriculture. CSV (Creating Shared Value) management, which realizes the economic and social value simultaneously, is being proposed as the sustainability of society is being called into question today. In agriculture as well, management that balances economic value and social value is considered to be able to contribute to the realization of a sustainable society. Therefore, this study aims to clarify the current situation of Japanese agricultural corporations on realizing CSV management and draw policy implications based on empirical analysis. First, we conducted a questionnaire survey of agricultural corporations and received 972 responses. Next, the situation of the economic and social outcomes of agricultural corporations (four aspects: solving social problems, social reputation, multifunctional function, and efficient resource utilization) was clarified from the survey results. Finally, we applied SEM (Structural Equation Modeling) to the survey results of agricultural corporations to analyse the relationships between management philosophy, management strategy (economic and social strategies), management performance (economic and social outcomes), and entrepreneurship, as well as to clarify the determining mechanisms of economic and social outcomes. The following main conclusions are obtained. First, it is clear that the clarity and penetration of management philosophy improve entrepreneurship. Secondly, management philosophy and entrepreneurship facilitate the implementation of competitive and social strategies. Thirdly, the implementation of competitive strategies improves economic and social outcomes. Fourthly, the implementation of social strategies improves social outcomes as well as economic outcomes under the conditions of high entrepreneurship. Therefore, the policy implication derived from this research is to foster entrepreneurship to succeed in CSV management in agricultural corporations.

Keywords

Creating shared value (CSV), Agricultural Corporation, Structural equation modeling (SEM), Entrepreneurship, Competitive strategy

JEL Classification

M14, M21, Q12

18 The Impact of COVID-19 on the German Real Estate Market: Evidence Based on Spatial Statistical Models

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Abstract

The COVID-19 pandemic had a significant impact on economic development, including the real estate market. Traditional stationary retail concepts in inner cities were disrupted by the pandemic shock, exacerbating an existing crisis. The impact on the residential real estate market is even more complex. As a result of the COVID-19 crisis, the attractiveness of the outer suburbs of large cities is increasing, due to factors such as remote working and behavioural adjustments that will be sustained in the future. In a spatial econometric model, it is shown for 401 German NUTS-3 regions using socio-economic data and a unique housing price dataset for the years 2012 to 2022 that districts in the immediate vicinity of independent cities have increased demand in the housing market. With regard to the post-pandemic, the spatial model results show that a high incidence of COVID-19 tends to have a negative impact on property prices. In addition, variables directly related to housing demand, such as interest rates and socio-economic factors such as childcare, have significantly positive impacts on property prices. However, it is important to note that the findings are not evenly distributed across Germany, highlighting regional inequalities. The changing landscape of the real estate market requires policy makers to recognize and address the growing interdependence between cities and their surrounding areas. This includes considering strategies to strengthen links and cooperation between urban and neighbouring regions.

20 QDC: Quick Density Clustering - New Algorithm for Spatial Point Data

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Abstract

This paper develops the Quick Density Clustering (QDC) method which fills the gap in the toolbox of density clustering of spatially geo-located points. It uses a K-means algorithm which is run on two normalized spatial variables: fixed-radius nearest neighbours (NN) and a sum of distances to k nearest neighbours (NN) to find diverse densities of points in 2D. Clusters detected by QDC classify all (x, y) geo-points to high/mid/low-density clusters. QDC uses a standard clustering method on transformed data, unlike many other sophisticated methods that are run on 2D geo-coordinates. It is a quick, efficient, semi-autonomous and big-data tool applicable to static and streaming data. A major parameter in QDC, the number of K clusters to detect, is interpretation-driven, while the other two: the radius for counting NN and the number of NN to sum the distances are of secondary importance and in a minor way impact the outcome. Classification for new points (prediction) is quicker than a typical kNN algorithm by using thresholds of spatial variables. The approach is suitable for tracking human activity as traffic or crowd detection from spatially geo-located mobile data – it finds the high-density points independently of phenomenon intensity and works well with streaming data. QDC is also an important tool for analysing socio-economic spatial point data. The paper shows the example of clustering business locations as well as population from census. Point data, which are unevenly located over space, are analysed to detect high and low-density areas.

21 Revitalizing Post-Earthquake Urban Landscapes: A Creative Economy Approach to Sustainable Regional Economic Growth in Eleven Turkish Provinces

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Abstract

The earthquake that occurred in Türkiye on February 6th, 2023, resulted in extensive destruction and loss of life, especially in eleven provinces: Kahramanmaraş, Gaziantep, Şanlıurfa, Diyarbakır, Adana, Adıyaman, Osmaniye, Hatay, Kilis, Malatya, and Elazığ. The earthquake had a substantial influence on the economy of the area, including its creative industry. This research focuses on the urgent need for sustainable regional economic development after the 6th February 2023 Earthquake, which substantially affected eleven provinces in Turkey. This research examines the potential for post-earthquake regeneration by harnessing the creative sectors of advertising, architecture, art, crafts, design, fashion, film, music, performing arts, publishing, research and development, software, toys and games, television and radio, and video games, recognizing their crucial role in the economy. The research focuses on the spatial distribution of creative enterprises and their accompanying labour force in these provinces, using data from the Social Security Institutions covering the period from 2009 to 2022. The objective is to identify prospective patterns without seismic occurrences by extrapolating the trajectory before the earthquake. This empirical study enables a thorough assessment of the creative economy's impact on regional resilience and sustainable development. The study consists of three primary phases: firstly, the identification and examination of the spatial dispersion of creative companies and employees across the eleven provinces; secondly, the evaluation of this data over the specified period; and thirdly, the prediction of potential future paths in the event of no significant disruptions. This study utilizes quantitative approaches to comprehensively examine the dynamic correlation between indices of the creative economy and regional growth.

Initial results highlight the robustness of the creative economy sectors, demonstrating development patterns that indicate a possible offset to the disruptive impacts of the earthquake. The temporal study offers valuable insights into the adaptive capacity of creative industries, emphasizing their capability to recover and contribute to the process of regeneration. Examining the situations before and after an earthquake allows for a detailed comprehension of how the creative economy might promote resilience and sustainable economic development in an area.

Ultimately, it is evident that the creative economy may have a crucial impact on the revitalization of the eleven provinces after the earthquake. It has the potential to provide employment opportunities, entice capital investment, and foster social unity. The industry has a high degree of resilience to unexpected events and has the potential to contribute to the development of a more environmentally friendly and economically stable regional economy. This report proposes the implementation of policies and methods to facilitate the rehabilitation and expansion of the creative industry in the eleven provinces.

23 Spatial Differentiation of Effects on Housing Price: Estimation with New Media Data

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Abstract

Traditional methods of housing price studies are both time-consuming and limited today. An entire sample of housing price studies allows for more detailed and basic inferences for planning and housing policies. New technologies, like social media, websites, mobile apps, and transit cards, can offer more precise data that can accurately represent the actual population. In addition, linear estimation models in housing price research are limited to considering the spatial difference of the house since they only consider the internal characteristics of the house. In this study, real estate website data, which provides a larger sample, and geographically weighted regression (GWR) were used to understand the effect of spatial differentiation on housing prices. Although the study consists of two stages, in the first stage, the districts with the highest price differences were identified with descriptive statistics on the scale of all districts in Istanbul. As a result of descriptive statistics across the thirty-nine districts, it is seen that the differences within the region can be read from the graphs and statistical results. This analysis, which also gives clues about the income levels of the districts, helps to understand whether there is spatial differentiation in the regions. In the second stage, the Beşiktaş district was selected, where differentiation and proximity to the city centre are high. Finally, the effect of environmental and spatial characteristics on housing price differentiation at the neighbourhood scale was examined with GWR. As a result of the selection made among the determined spatial variables, the number of plazas, the number of universities, the height of the top floor, the net population density, the distance to the main arteries, and the distance to public transportation explain the spatial housing price change in Beşiktaş district by 83%. When the GWR model was established with these variables, localR² values reached up to 87%, especially in the centre of Beşiktaş. Neighbourhoods in the north are the group with the lowest lodge, R². It can be said that the factors that affect the price of a house change spatially. Therefore, the generally accepted value is insufficient for every neighbourhood or region.

Keywords

Social Media Data, GWR, Spatial Differentiation, Housing Price, Istanbul.

24 The Effect of Location Package of Historic Cities' Survival

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Abstract

Many cities of antiquity, such as Rome, Alexandria, Athens, and Jerusalem, survived over the course of history and have become today's major urban areas. Yet other historic cities, such as Antioch, Ctesiphon, Seleucia, Capua and Babylon, disappeared from the map of living urban areas long ago. After wars or natural disasters, people did not return to these cities and they remain in ruins today. The distinction should thus be made between the causes of a city's destruction and the reasons for abandonment, which may not be identical. Although causes of a city's destruction might be multiple, the cause for abandonment is often singular, meaning that the place, in which the city had been built, had effectively lost its appeal, so people do not come back to the site to rebuild it. This assumption offers a way of verifying the "location package" concept, according to which a place's survival as an urban entity and its growth potential are due to the package of location attributes the place has. In this presentation, an attempt is made to verify this hypothesis by combining available data on location and population size of major cities of antiquity (CoAs) with several location attributes obtained from different sources – solar irradiation in the area, annual precipitation, proximity to the coast, quality of soil, and others. As the analysis shows, the proportional share of CoAs in the surviving group (i.e., CoAs located in today's urban areas) increases steadily in the line with the number of location advantages the city has, rising from 24% in places without counted advantages to 100% in the areas with the highest number of location advantages, that is, more than fourfold.

26 Housing Challenges for Ukrainian Refugees: A Comparative Analysis of Vienna and Lviv

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Abstract

Russia's armed aggression against Ukraine has launched a new series of global crises, including forced migration. More than fourteen million people in Ukraine have fled their homes to find refuge in other regions within the country or abroad. Every twelfth resident is an internally displaced person in Ukraine. At the same time, EU countries are witnessing the largest wave of mass influx since WWII. In 2022, more immigrants arrived in Austria than at the height of the European migrant crisis in 2015.

The purpose of the study is to conduct a comparative analysis of the housing challenges faced by Ukrainian refugees in two contrasting cities, Vienna (Austria) and Lviv (Ukraine). Today, more than 25 000 Ukrainian refugees are living in Austria's capital, Vienna. Lviv has to integrate more than 150 000 internally displaced persons. Research on refugees' housing access and long-term/mid-term housing integration paths is of particular relevance in both cities, which are characterized by a high inflow of Ukrainian refugees on the one hand and a significant shortage of affordable housing on the other. Housing provision for Ukrainian refugees in Vienna and Lviv differs significantly due to variations in their respective national and urban policies, the dissimilar legal status of the refugees in the two cities, and varying approaches to refugee integration.

Thus, this research answers the following questions: (1) How the integration or the pathways of housing integration in Vienna function, compared to the situation during the so-called "refugee crisis" in 2015, and (2) what the differences are between Lviv and Vienna, as the two cities have different housing-market systems. In Lviv, city authorities are faced with the task of integrating internal refugees, whereas Vienna must deal with international refugee integration. What effect does this have on housing integration paths and provision?

29 Difference-in-Differences with Endogenous Network Externalities

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Abstract

The Difference-in-Difference (DID) framework stands as a widely accepted method in quasi-experimental research, particularly in addressing economic problems characterized by interdependent relationships across various levels. Traditionally, these relationships are often modeled using complex general equilibrium models that derive from either individual choice models or aggregated relationships. In the pursuit of inferring causality, researchers have developed structural models grounded in sets of behavioural hypotheses about the agents involved.

Microeconometrists have critically examined structural models, pointing out challenges arising from a focus on a large set of parameters. While structural parameters are inherently linked to economic theory, the intricacies of these models can sometimes overshadow the pursuit of understanding average causal effects. Despite this, the overarching goal of theory-motivated structural estimation closely aligns with the broader causal agenda. Some experts advocate for the use of causal inference models, such as the conventional DID approach.

However, the classical DID framework has limitations, particularly in its failure to consider treatment-induced changes in the network linking treated and control units. To address this gap, we propose a novel approach employing a spatial DID model integrated with an instrumental variable. This innovative methodology aims to account for the endogeneity present in both the network and outcome variables. The instrumental variable network DID method takes a dual approach: firstly, it controls for the endogeneity of the network to the treatment, and secondly, it addresses the direct and indirect impact of the treatment on any network member.

To demonstrate the efficacy of our proposed model, we conducted Monte Carlo simulations and applied the methodology to estimate the impact of drought on global wheat trade and production. The results underscore the significance of considering the network and its changes in causal inference models. Notably, traditional DID models that overlook the network and its dynamics lead to substantial underestimates of overall treatment effects.

In conclusion, our research introduces an innovative spatial DID model with an instrumental variable, offering a nuanced approach to tackle endogeneity in both network structures and outcome variables. Through empirical applications, we showcase the model's superior performance, emphasizing the necessity of accounting for network dynamics in estimating treatment effects. This contribution not only advances the methodological landscape but also enhances the reliability of causal inference models in the realm of quasi-experimental research.

30 Occupation Portability and Regional Allocative Flexibility: Evidence from Brazil

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Abstract

The study assesses the allocative flexibility in the labour market of Brazilian regions based on the mix of turbulence and mismatch. We study the periods 2014-2017 (domestic crisis) and 2018-2021 (Covid-19) to illustrate the regions' ability to adjust to shocks. We define occupation portability as the probability that a particular occupation is demanded by different sectors and check how the adjustment to shocks varies across different portability levels. We observe a higher sensitivity to the economic crisis of 2015-2016 (turbulence) and a greater inability to adjust to the pandemic (mismatch). Poor regions showed higher flexibility indices, which can be explained by the lower density of firms in the same sector, a smaller number of complex occupations, a higher number of sectors capable of absorbing less specialized labour, and a higher concentration of portable occupations.

32 A Study on Development of a Dynamic Spatial Input-Output model and its Application to Japan's Regional Economy

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Abstract

Input-output (IO) analysis is an important method for policy evaluation, and many studies have been applied at various regional levels. This dynamic model has been understood as an effective analysis method for evaluating the effects of future policies. There are two types of IO tables with spatial dimensions. One type is the inter-regional IO (IRIO) table, which contains detailed transaction information between regions and is suitable for empirical analysis. The other type is the multi-regional IO (MRIO) table, which is suitable for analyzing changes in regional production technology and changes in transportation conditions between regions. The IO approach also includes backward linkage models that measure impacts on upstream industries and forward linkage models that measure impacts on downstream industries. In this study, we aim to develop a dynamic spatial IO model that integrates these features.

In Japan, national and regional IO tables have been created and published by the central and local governments. Many researchers have also attempted to estimate IO tables at the municipal level. In this study, we attempt to estimate an inter-regional IO table and a multi-regional IO table for municipalities across Japan. The base data is the 2015 national IO table. Estimating regional IO tables for over 1800 regions in Japan poses several computational challenges. The computational complexity depends on the number of production sectors in each region. In this study, we explore this estimation issue.

Additionally, we consider how to incorporate IRIO and MRIO tables at the municipal level into dynamic spatial IO models. To solve this problem, we design simulation models that enable the measurement of the effects of various policies and events. This task includes the development of computational procedures to solve the simulation model. In this study, we consider application examples using this model and data. We measure spatial ripple effects and spillover effects at the municipal level across the country, targeting impacts such as natural disasters. Methods for visualizing simulation results are also explored to support intuitive understanding.

Japan is a country that experiences many natural disasters, and how to evaluate disaster resilience, including economic damage and recovery, is an important policy issue. We examine the possibility of applying the dynamic spatial model developed in this research to those problems. Japan is susceptible to earthquakes and tsunamis. In 1995, the Great Hanshin-Awaji Earthquake occurred, and the magnitude of the economic damage caused by the earthquake and its long-term effects became clear, highlighting the importance of disaster prevention investment for disaster mitigation. In 2011, the Great East Japan Earthquake occurred, and the earthquake and tsunami caused significant economic damage. In 2016, the Kumamoto-Oita Earthquake occurred, and in 2018, the Hokkaido Eastern Iburi Earthquake occurred in 2018, which affected regional economic activities. This research investigates how regional production activities would recover from the tsunami caused by the Nankai Trough mega-earthquake that is expected to occur in the near future. Most of the evaluations of the economic impact of earthquakes and tsunamis in Japan using IO tables have been at the prefecture level. Few analyses have targeted the municipal level and there are few applications of dynamic models. A feature of this research is that by using inter-regional IO tables at the municipal level, analyzing the impact of economic damage from disasters is possible, taking into account more detailed inter-regional transactions.

This study investigates how production activities in more than 1800 municipalities of Japan recovered from a tsunami and then proposes a dynamic bottleneck model that uses the inter-regional IO tables of the municipalities. By applying the concept of the hypothetical extraction method, we clarify the recovery process of municipal economies after the stoppage and subsequent resumption of production activities in the coastal area of Japan. The direct economic damage caused by the tsunami is estimated from the tsunami hazard map published by the government and data on the number of employees by the production sector. In the simulation analysis, a base case, pessimistic case, and optimistic case are assumed. The impact of Japan's population decline is included in the evaluation. Because transportation infrastructure is also severely damaged by a tsunami, the impact of traffic disruption is analyzed. The tsunami disrupts supply chains between industries and regions and affects production activities.

From this simulation analysis, we evaluate the recovery process of the production value of each municipality and each production sector. Through these numerical experimental analyses, we consider the effective use of models and data, as well as future issues. This information is useful for disaster prevention activities and resilience policies at the local government level. We also show that this dynamic model can be applied to the analysis of other natural disasters, such as volcanic eruptions, wildfires, floods, and typhoons. Notably, we suggest analyzing complex disasters that involve time lags in the occurrence of the disasters is useful. This study also suggests that an extended version of this dynamic model may be applicable to the impact evaluation of industrial innovations.

Keywords

Dynamic Model, IRIO and MRIO tables, Spillovers, Resilience Evaluation.

35 A Mixed Methods Research on CSV Management in the Japanese Rice Flour-Related Business

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Abstract

Generally, it is thought to be important to increase the demand for rice in new applications such as rice export, rice for feed and rice for flour, etc. while the demand for table rice is declining year by year in Japan. Paddy rice agriculture can be expected to contribute to the conservation of ecological systems, landscape formation, disaster prevention and food security. On the other hand, there is a high potential demand for rice flour products (e.g., gluten-free products) to meet consumers' nutritional and health-conscious needs, and the market is expanding both domestically and internationally rice flour products. However, there are two problems with the domestic rice flour: the cost at the stage of producing rice and the cost at the stage of rice milling and commercialization. To overcome these problems related to the spread of domestic rice flour products, rice policies to promote the businesses conducted in partnership with consumers and local residents for "creating-shared value" (CSV) are thought to be effective.

Therefore, the purpose of this study was to clarify the mechanism of CSV management in the domestic rice flour related businesses applying mixed methods research (MMR) by combining latent class analysis (LCA) and qualitative comparative analysis (QCA). Specifically, we conducted a questionnaire survey targeting companies engaged in the rice flour business and analysed the conditions for their CSV managements. First, for classifying the management characteristics of rice flour related businesses, latent class analysis (LCA) was introduced to the survey results. Secondly, a qualitative comparative analysis (QCA) was conducted on the CSV management entities extracted from the LCA, and the necessary and sufficient conditions for realizing CSV management were clarified. Finally, we draw policy implication for the regional development through a sustainable rice flour market in Japan based on the results of empirical analyses in this study.

Keywords

Rice flour-related business, Creating shared value (CSV), Latent class analysis (LCA), Qualitative comparative analysis (QCA), mixed method research (MMR).

37 Regions in Development Trap and the Exploitation of Endogenous Resources

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Abstract

The issue of regions being in development trap is a concern for both academics and development policy-makers at EU and Member State level. Although this phenomenon was already addressed in the literature more than a decade ago (Eichengreen et al. 2012, Kharas and Kohli 2011), it was the 7th and 8th Cohesion Reports that drew particular attention to this issue in development policy. Various reports and policy documents (e.g. Falling into the Middle-Income Trap? A Study on the Risks for EU Regions to be Caught in a Middle-Income Trap", EU lagging regions: state of play and future challenges, The geography of EU discontent and the regional development trap, Place, Productivity, and Prosperity, Revisiting Spatially Targeted Policies for Regional Development, etc.) are characterised by the fact that they are based on macro-level indicators and draw conclusions mostly at regional level. However, these analyses and findings fail to identify the causes, which are typically local, originating from the most elementary actors of development policy, thus lacking a place-based approach and proposals that could contribute to solving the trap in a comprehensive and sustainable way.

The presentation will explore the development policy methods, institutional conditions, measurement basics and measurement options that - at least partially - fill these gaps. It will also present concrete interventions that have been put into practice and offer well-working solutions at local and regional level, especially for social groups living in peripheral areas studied by the 'geography of dissatisfaction'.

38 European Union Strategies and their Effects on the Adriatic-Ionian Region Ports

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Abstract

European Union macro-regional strategies bring together territories and stakeholders that are geographically close, but more importantly have common interests and goals to be addressed. In addition to serving as a guide for the territories involved, they are also a stimulus for growth and cooperation. Looking at the strategy of the Adriatic-Ionian region, it is possible to observe the involvement of non-EU countries, which share common goals and challenges. This area is focused on the Adriatic-Ionian basin, so ports and maritime transport play an important role in this region. The present work stems from the need to investigate the Adriatic-Ionian region in a relevant area such as the cooperation and cohesion of the maritime ports, reviewing what their main activities are and how they are influenced by macro-regional strategies in their management and participation in initiatives and projects. Starting with an overview of European macro-regional strategies, and the Adriatic-Ionian context in particular, the review was then conducted on the activities, governance, cooperation and participation in projects with other stakeholders in the macro-region. The research was conducted by consulting planning documents and information on port authorities, in order to assess the state of the art in the Adriatic-Ionian region on the topic of the ports. The conclusions of the research emphasize the importance of the European Union Strategy for the Adriatic-Ionian Region's role in the competitiveness and cohesion of Adriatic-Ionian region ports through the cooperation between them as they are complementary and therefore it could be a mean to improve performance in this regard. This paper aims to open up further perspectives in this field, laying a foundation for more research in this domain.

39 Navigating Change: Shaping the Future of EUSAIR - Trends, Priorities, and Policy Implications

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Abstract

This study focuses on the European Union Strategy for the Adriatic and Ionian Region (EUSAIR) as a pivotal framework. EUSAIR's four key pillars—Blue Growth, Connecting the Region, Environmental Quality, and Sustainable Tourism—form the bedrock for comprehensive regional development. Through synergistic efforts, EUSAIR aims to cultivate collaboration, innovation, and sustainable growth, thereby contributing to the broader goals of social, economic, and territorial cohesion in the European macro-regions. This paper investigates the shifting needs and trends within the European Union Strategy for the Adriatic and Ionian Region (EUSAIR) from 2014 to the present, aiming to formulate strategic policy recommendations for the upcoming programming period. In addition, this article endeavours to identify emerging priorities intricately linked to the concepts of neighbourhood and enlargement, emphasizing the integration of the region, bolstering the single market, and positioning it as a vibrant research and academic hub. Anchored in the identified potential new priorities, including research emphasis, stakeholder engagement, youth involvement, infrastructure connectivity, and data standardization, the study proposes leveraging the need of establishing a dedicated space for research, study, and the exchange of data and information. A well-structured space for data and information sharing, along with the definition of specific transversal priorities represent a cornerstone for addressing evolving regional priorities for fostering comprehensive development in the macro-region.

40 Application of Hybrid Gibbs Processes to Firm Location Forecasting

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Abstract

Importance of geo-location is obvious for businesses, since it is a key for success (Bhat, Paleti, and Singh 2014, p.462). Forecast of location for a new business plant is difficult, since a lot of things have to be taken into account. As a base of such forecast, one should estimate a model explaining firm locations. Already existing models use aggregated data, which do not seem to be appropriate for such problem, since they do not reflect spatial nature and distribution of data, do not account for spatial factors (such as localization patterns (Pablo-Martí, Muñoz-Yebra, and Santos 2014), issue of economic clusters and agglomeration economies (Buenstorf and Guenther 2007; Lasch, Robert, and Le Roy 2013; Walz and Wellisch 1996; Delgado, Porter, and Stern 2010; Jo and Lee 2014; Basile, Castellani, and Zanfei 2008; J.-M. Arauzo-Carod and Manjón-Antolín 2012; Rosenthal and Strange 2003; Jofre-Monseny, Marín-López, and Viladecans-Marsal 2014)) or existence of spatial dependence and heterogeneity. Aim of this paper is a development of method, which allows to predict location of a new point and takes into account individual characteristics of point, its neighbours and spatial covariates. Paper can be considered as a contribution to development of spatial micro-econometrics. Preliminary results show that consideration of spatial factors (such as distance to center or line pattern of roads) and interactions (captured with hybrid Gibbs process) allows to produce a model which passes goodness-of-fit tests and can be used in prediction of new locations.

41 Regional Differences in the 9th and 12th Grades of Hungarian Public Education. Equality of Opportunity, Output and Competences

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Abstract

Hungarian secondary school education has faced many new challenges since 1990. The number of children is constantly decreasing nationally. At the same time, the number of schools increased due to the appearance of church and private schools. The competition for students transformed institutions. The four-class gymnasiums became 6th and 8th classes. The former vocational training schools and vocational secondary schools have become institutional types providing higher education. Among school administrators, there were also significant reorganizations between local and county governments and current school districts. At the same time, the Hungarian school system must manage the 21st century. Challenges of the 20th century: the expansion of modern media and information technology, the development of foreign language competences, the explosive development of the natural sciences. On the other hand, the Hungarian school system should deal with the growing social and territorial inequalities, and the catching up of the children of the falling social strata. Meanwhile, the Hungarian labour market was transformed. The old big employers have disappeared. The demands placed on employees by newly emerging large foreign companies and domestic SMEs are already significantly different from the old situation. Social and spatial mobility creates new structural inequalities in the Hungarian labour market. The cooperation of the education system - the teaching materials, the school network and all stakeholders - is necessary.

42 Examining the Competitiveness and Sustainability of the Southern Great Plain Region

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Abstract

What is the Southern Great Plain? The land of the Hungaricums? The valley and countryside of the great rivers that cross Hungary - the Danube and the Tisza? The region of the strong market towns - Kecskemét, Szeged, Hódmezővásárhely, Békéscsaba, Baja? In addition to cities with a very strong Hungarian national consciousness, it is home to German, Serbian, Slovak and Jewish settlers and their descendants. Man and nature are constantly at war here. During the second conquest of the country in the 18th century, the aim was to bring the desertified, wild landscape into cultivation. In the 19th century, the regulation of rivers shaped the landscape, the current framework of water management, the transport infrastructure and the spaces of cities. In the 20th century, social transformations, the spread and fall of Soviet-style large-scale agriculture transformed the Great Plain. Economic transformations and large infrastructural constructions almost always led to a partial migration of the population of the Southern Great Plain. The sustainable development of the Southern Great Plain is only possible with a very significant increase in competitiveness. The aim of the research is to identify the competitiveness factors on which the long-term development of the region can be based. The task is how to move from the current FDI-driven development path to a knowledge-based, innovation-oriented and sustainable development path?

43 Diversity Management in Japanese Agriculture for Creating Shared Value

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Abstract

Diversity Management (DM) is a management initiative that generates innovation and leads to value creation by utilizing diverse human resources and providing opportunities to maximize their abilities. When the workers' psychological safety, creative thinking, social capital, and well-being are improved in workplace through the introduction of DM by firms, it is thought to contribute to the creation of both social and economic value and to realize shared value creation.

The purpose of this study was to clarify the awareness of workers toward DM in Japanese agriculture based on a large-scale web questionnaire survey. Specifically, it clarified the effects of introducing DM on workers' psychological safety, creative thinking, social capital, and well-being. First, we applied multivariate analysis to the survey results and clarified the characteristics of workers' awareness toward DM in agricultural sector. Secondly, we applied structural equation modeling (SEM) to the results for analysing the impact of DM initiatives in the workplace on the well-being of workers. The results clarified that the introduction of DM in the workplace has a positive impact on the psychological safety, creativity, and social capital (SC) of working people, and their satisfactions with work and life are increasing. Furthermore, the results revealed that creative thinking and the exhibiting ability in agricultural sector improve the well-being of workers which means that the increasing in the task type diversity is also important. Therefore, creating shared value (CSV) in agricultural firms for realizing a sustainable agricultural and rural development needs to improve psychological safety in the workplace and life satisfaction of workers through effective DM efforts.

Keywords

Diversity Management (DM), Creating Shared Value, Multivariate Analysis, Structural equation modeling (SEM), Japanese agriculture.

48 Problems Arising along the Urban Rural Fringe - A Case Study of Hungarian Cities

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Abstract

Urban sprawl has a wide-ranging impact on the urban-rural fringe of the post-socialist cities, which are the most dynamically changing areas of the countryside in the Central and Eastern European countries. Intensive construction activity and population growth can be seen in the outskirts. Due to the lack of local spatial planning and land-use management in these areas, the environment was severely damaged during sprawl. Housing conditions are quite different in the suburbs, so that we can find great variety and inequalities. There are considerable differences in the buildings and character of the residential environments, as well as in the social status. To better understand the phenomenon, we investigated two Hungarian cities: Győr and Kecskemét. Both regional centers have large outskirts, and Kecskemét's catchment area has many scattered farms, even in international comparison. During our research, we conducted systematic fieldwork and in-depth interviews (n=30) and implemented quantitative (GIS) and statistical analysis to gather critical features of the transformation of the urban-rural fringes. According to our results, a highly fragmented spatial structure has emerged due to the lack of local government resources and will. Urban sprawl causes complex environmental problems, such as landscape degradation and social segregation, and raises the question of the unsustainability of buildings and construction along the urban-rural fringe.

49 Luminosity and Local Economic Growth

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Abstract

The seminal study by Henderson et al. (AER, 2012) introducing night-time lights (NTL) data to a new audience greatly expanded the range of what can be feasibly evaluated in data-poor environments. Whenever and wherever traditional economic activity data, such as GDP, are either absent or not trusted, NTL data might be used instead as a local economic growth proxy when estimating treatment impacts from natural disasters, economic shocks, regional policies and so on. To provide a more familiar metric, some authors estimate effects of these treatments on local luminosity growth and then transfer GDP-luminosity elasticities from elsewhere to show economic growth effects. Dozens of studies in the literature that have used this elasticity-transfer approach.

The range of treatments studied in the literature has no restriction; some use very finely-grained spatial data, like individual beaches whose average area is just 0.02 km² or micro grids. In contrast, studies providing the GDP-luminosity elasticities are necessarily from more spatially aggregated units given the need for GDP data. So a general direction of elasticity transfers is from aggregated sources to less aggregated destinations. Also, studies providing GDP-luminosity elasticities are often for earlier periods because GDP data are only available with a lag, especially for developing countries. The insight that we present in this paper is that these GDP-luminosity elasticities vary by time period, are sensitive to the level of spatial aggregation, and to the remote sensing source of NTL data. The elasticities also differ between metropolitan and non-metropolitan settings and by country. Our findings differ from influential prior studies which suggest that aggregation levels have little effect on GDP-luminosity elasticities. This variability means that the reported effects on local economic growth of various treatments may be quite inaccurate.

We use data from the two most populous developing countries that report official sub-national GDP data at county and district level (China and Indonesia), and we supplement these findings with US county level data. We construct panels of annual sub-national GDP for the period from 2000 to 2019 for each country and relate these to three types of NTL data: the widely-used DMSP data, the next most popular VIIRS Night Lights (VNL) data, and the relatively unused NASA Black Marble data. We use the “within” panel data estimator, with fixed effects for each year and for each county or district to provide a measure of the GDP-luminosity elasticity based on changes, rather than on cross-sectional levels.

Results

We examine what happens when data are aggregated from county/district level to the state/province level, finding that elasticities become much larger when aggregated. Consequently, transferring GDP-luminosity elasticities from more aggregated settings to less aggregated study areas that lack GDP data will tend to exaggerate the effect of the studied treatment on local economic activity. We also examine sensitivity of this aggregation bias to variation across sub-periods and we also account for possible biases due to measurement errors.

Overall, our study suggests a need for more caution when interpreting studies based on NTL data.

51 Rural Development Challenges and Resilient Countermeasures in Northern and Central Europe: A Comparison of Sweden and Slovakia

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Abstract

In line with the emergence of the post-urban world, a general development trend is that rural areas are being divided in two opposite parts: the city-close countryside, that are being integrated in the growing city-regions, and a peripheral countryside outside the growth influences of the city-regions. (Between these areas, there might be intermediate zones, interacting with the city-regions, but not enough to turn over to integration). This means that “rural areas” cannot be treated as one unit, but as two units with very different development tendencies.

This chapter discusses the situation and tendencies for these two types of rural areas in Sweden and Slovakia, respectively. Both are members of the European Union and their rural policies are determined by the Union’s Common Agricultural Policy. However, the countries’ history and institutional legacy are very different. Postwar Sweden has been a welfare market economy, while Slovakia after World War II became a part of the socialist Czechoslovakia, and did not become an independent state until 1993. Furthermore, rural and agricultural policies were characterized by collectivization and a centrally planned economy with a strong emphasis on heavy industry in Slovakia. This significantly distorted the market and hindered the ability of rural communities to adapt to changes.

Against this background, this chapter presents and discusses current challenges for rural development in the two countries. Examples of reactions to these challenges and possible measures for building rural resilience are also provided.

53 Arguments for the Circular Economy Coming Along with Requirements of Bold Geopolitical Remodeling at the Global Scale

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Abstract

The pattern on a global scale, at the country level, is that "high quality" democracies use more natural resources due to their higher incomes, with a relatively stable level of domestic extraction and a descending share of domestic resources at the same time.

Meanwhile, poorer and often less democratic countries sell a higher share of natural resources as raw materials. As finished products, many of these countries already find themselves in the role of importers of these resources. Presumably, lower-quality democracy is essential to explain that country's global position at home and maintain it – while it benefits the few. There are historical reasons for much of this division, but not exclusively. For example, some countries with high fossil fuel reserves can achieve high incomes with a diverse historical record and democratic characteristics.

Closing the loops of materials and energy is what a circularity agenda calls for. The reason for the ecological crisis that has developed is precisely the abundance of natural resources at low cost - relative to the market pricing of value added. Therefore, global trade in natural resources is environmentally destructive and has impoverished and oppressed donor countries by skimming off much of the value added by developed countries and corrupting local regimes. A proper development path has to enable the developing economies to build their own organic economic structure, thus integrating total added value and reducing the globally increasing social inequalities that are one of the main drivers of environmental pressures in today's system. In a sense, this is the circular economy's global ecological and social meaning.

In our study, we take stock of evidence from the literature and present our original analyses that underpin the dual pressure put on societies and ecosystems by the current global resource allocation settings. We deliver the historical evolution of economic (value added, national income), social (democracy index, expected lifetime), and ecological characteristics (resource extraction, waste management) of distinct world regions, indicating that the vast majority of socio-economic benefits still support the core economic actors worldwide, resulting in overconsumption of natural resources and conserved historical roles of the periphery. Finally, we introduce a novel formulation of the circularity requirements at global and regional scales.

56 How Economic Rent-Seeking Constraints the Sustainability Transition Through Spatial Processes

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Abstract

Economists are impressed by the existence of economic rents for centuries, as it describes a suboptimal functioning of the markets. Despite the long tradition of the discussion on this topic, there is yet to be a generally accepted definition of the economic rent. Theoreticians do agree, though, that rents occur in case of natural or artificial barriers to entering the market on the one hand and that they deliver proceeds for the resource owner even without any additional modification or processing of the good on the other hand.

Economic rent manifests in operation surplus exceeding the normal profit, steaming from various forms of resources and markets from natural resources to platform economics towards some individuals. It is assumed that economic rents were present throughout the whole history of settled Humanity; however, its emergence required core legislative and organizational shells invented in the capitalist economy context, like private property rights, copyrights, and representative democracy. Some evidence implies that the share of the economic rents in national income has emerged in the last decades (Kaplinsky, 1998; Stemerding, 2023; Mazzucato et al., 2023). The share of rents has even surpassed ten percent of the GDP in the second decade of the 21st century in the US, albeit it is extremely challenging to estimate the amount of economic rents at a macro scale (Eggertsson et al., 2021).

The existence of economic rents at unprecedented levels explains a wide variety of the causes of the current ecological crisis. Artificially continued reliance on fossil fuels, urban sprawl as a megatrend, and housing market bubbles are severely driven by the economic and political power of few, transmitted by those decisions on infrastructures of roads and communication, land use, and spatial planning.

In this study, I will explore and present the critical linkages between the unsustainable development path after WWII and rent-seeking behaviour through the literature, case studies, and original research. I will also be advocating that there are ready-to-use policy solutions by hand, like cash-flow taxation, land use taxation, spatial planning reforms, and promotion of public transport.

58 Land and Deforestation Embodied in Trade: An Analysis for Brazilian Biomes

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Abstract

Given the social and ecological importance of Brazilian biomes, which, in addition to providing important environmental services on a global scale, also contribute to the country's income generation in activities linked to agribusiness trade, the objective of this paper is to evaluate agricultural land and agriculture-caused (AC) deforestation embodied in Brazilian trade, both at the intranational and international levels. To this end, we constructed an inter-regional input output matrix, named MIP-Biomas, which contains 47 regions, correspondent to the divisions of biomes within their respective federative units, cross-referenced to 36 activities. The MIP-Biomas was built based on the 2015 matrix of the Instituto Brasileiro de Geografia e Estatística (IBGE), considering product-based technology and the Interregional Input-Output Adjustment System (IIOAS) method. This matrix also has the opening of the vector of exports to some of the main Brazilian trading partners, namely, the European Union (EU), the United States (US), and China, as well as the rest of the world. Combining the monetary data from MIP-Biomas and physical data on direct agricultural land use and AC deforestation taken from satellite images of Mapbiomas, we constructed separate indicators to measure agricultural land content and AC deforestation content embodied in both intranational and international trade. Our results revealed the significant contributions of the Cerrado and Mata Atlântica biomes to agricultural land incorporated in trade at the intranational and international levels. Furthermore, the Caatinga biome has emerged as a prominent deforestation hotspot, second only to the Amazon in intranational trade and being the first in terms of international trade destined for the EU, US and China. Intraregionally, it was also possible to observe the pressure exerted by rich regions from the Mata Atlântica biome on land use and deforestation throughout Brazil. In sectorial terms, both at the intranational and international levels, it is observed that a large part of the content of agricultural land and of AC deforestation comes from the food sectors, especially bovines and their meats, as well as other proteins such as milk and dairy products, poultry and pork. It is emphasized that there are regional and sectorial variations in these results, as detailed in the paper. The results contribute to an evaluation of the sources and destinations of agricultural land use and AC deforestation in Brazilian trade and can serve as a basis for the formulation of national and international policies to fight against deforestation.

59 Sustainable Model of Corporate Embeddedness: Good Practices of Small and Medium-Sized Family Companies

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Abstract

The concept of embeddedness, originating in sociology and later evolving within economic geography and regional science with an explicit spatial dimension, has undergone a significant conceptual transformation in recent decades. Explored through various lenses in the academic discourse, this research introduces a novel perspective by integrating sustainability into the conceptualization of the phenomenon. While corporate embeddedness traditionally focuses on economic dimensions, this study contends that sustainability, limited to strategic integration in existing literature, must be an inherent part of the embedding process. As companies become locally embedded, their interaction with the environment extends beyond economic aspects, encompassing politics, science, society, and the environment. This commitment to the local space involves a consideration of social, cultural, and environmental impacts, necessitating the inclusion of corporate social responsibility and sustainability in the embedding concept. The research argues that the literature of embeddedness and sustainability shows similarities in many points, and their joint interpretation contributes to a deeper understanding of companies' local commitment. In the international literature, the connection between corporate embedding and sustainability as well as responsibility is a completely new recognition, thus creating the concept of sustainable embedding, the range of meanings of which goes beyond the traditional interpretation of sustainability and corporate responsibility, and the interpretation of sustainable embedding has not yet appeared in the domestic literature. The research explores the relationship between corporate embeddedness and corporate sustainability and responsibility. The aim of the research is to identify sustainable good practices of corporate embedding along the quintuple helix model of embedding with the purpose of pointing out how sustainability practices strengthen mutually beneficial relationships between businesses and actors in the local space. In order to collect sustainability practices related to corporate embedding extensively, family small and medium-sized enterprises are surveyed by in-depth interviews, as these types of enterprises show strong local commitment, thus assuming clearly identifiable good practices. The analysis of small and medium-sized enterprises is also relevant because their proportion influences the embedded sustainable values of a given local space. The interview guide contains targeted questions for each dimension of the quintuple helix model that is the economy, politics, academia, society and environment. The study argues that sustainable practices promoting embeddedness can be identified in all dimensions, despite the fact that small and medium-sized enterprises have limited opportunities compared to large enterprises. There is no doubt about the practical use formulated and disseminated along the theoretical model of the study: it serves as an incentive for small and medium-sized businesses, which helps to deepen the degree of their embeddedness, thereby generating additional local benefits for the local space and themselves. The significant weight and numerical ratio of small and medium-sized enterprises makes it important that, despite the disadvantages arising from lack of resources and size, the process of embedding helps their sustainable role in the local space.

62 Centralized Governance and Fuzzy Spaces - The Case of Hungary

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Abstract

In parallel with the comprehensive political and governance reforms, Hungarian regional development policy has also undergone crucial changes. The paper addresses the issue of the relationship of governance and the territorial units of regional development, based on policy and legal documents and on empirical research conducted in 2019-2023.

Since 2010 the Hungarian government has implemented several constitutional, administrative and public policy reforms, reshaping the territorial structure of power. Local self-governments have lost their former comprehensive empowerment and have gradually been excluded from many public services as well as the decision-making mechanism of regional development. The strong centralization redrew the administrative map, shifting the balance among levels and creating new spaces for developmental interventions. Our research conducted in a peripheric, declining county of Hungary, provided evidence of the disappearance of „official” public spaces and the emergence of alternative spaces following the new vital channels of territorial interest representation (to be visualized on a map).

The older territorial units and the new, mostly informal „functional” spaces have produced a jungle of institutions, actors and plans whose logic is diametrically opposed to the European cohesion policy principles. Political and public policy centralization has reinforced vertical ties at the expense of horizontal (social and territorial) cooperations. An interesting aspect of this paradigm shift is the activation of districts of individual parliamentary members emerging informally as the most important transmitting channels between the top and the bottom bypassing the counties, and other planning units of regional development. There are also several specially managed territories delineated by the government, leading to the hollowing-out of the „ordinary” development and planning mechanism. The network of larger cities is another special issue, since the legal, and planning frames hinder their necessary cooperation with each other and their surroundings. Cooperation is also limited by the political conflicts. It appears as if the central elite had occupied the territory, producing fuzzy spaces overwriting bottom-up processes and initiatives.

The new law on regional development is under preparation, at the time of RSAI conference we will know more about the new legal frames which legitimize the geographically and politically reshaped regional policy.

The Hungarian „story” is not unique, since many territorial reforms have been introduced in Europe and beyond with the same political ambition. The paper concludes by highlighting the difficult dilemma of harmonizing the predominantly economic and social logic of regional development with centralized governance models.

65 Smile-and-go. Regional performance through Global Value Chains in Europe

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Abstract

In the aftermath of the 2008 global financial crisis, questions have emerged regarding the actual benefits derived by territories from their active involvement in Global Value Chains (GVCs). Despite years of expansion and support for GVCs, both at the national and regional levels, there is a growing scepticism about the tangible positive impacts on local development and the mechanisms through which the produced value translates into regional prosperity. This paper seeks to shed light on this issue by introducing the concept of a dynamic regional smile curve, a framework designed to identify the predominant roles played by regions within GVCs and unravel the dynamics of value distribution across these regional roles and ascertain how it contributes to regional development.

The smile curve concept involves distinguishing between different types of regions within GVCs, specifically headquarters, factories, and primary resource regions by taking an aggregate macroeconomic perspective. The underlying hypothesis is that the advantages of increased participation in GVCs are not uniform across regions and depend significantly on the nature of their role within the chains.

The econometric analysis conducted in this study reveals that the benefits derived from GVCs participation are closely tied to the predominant role a region plays in the value chain. Regions acting as headquarters, with a strategic focus on scarce skills related to management, innovation, and decision-making, tend to enjoy large advantages. Similarly, primary resource regions, which supply scarce and pivotal natural materials, benefit from the participation in GVCs.

Therefore, a crucial determinant of a region's success in GVCs is its ability to leverage scarce resources effectively. This includes both natural resources and skilled human capital allowing regions to establish favourable terms of trade.

The findings emphasize the importance of regional strategies in maximizing the benefits of GVC participation, highlighting that the mere inclusion in global production networks does not guarantee equitable regional development.

Moreover, the study recognizes the dynamic nature of these results, emphasizing that the impacts of GVC participation vary across different economic scenarios. The regional smile curve is not static; its shape and the advantages associated with each role may change during periods of economic expansion or crisis. This underscores the need for adaptive regional policies that consider the broader economic context.

67 The Geography and Path-Dependency of Social Innovations across EU Regions

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Abstract

Regional economics and related fields often focused the investigation on the (territorial) determinants and the consequences of the technological transformations triggered by 4.0 innovations. In fact, they influence the ways firms produce, consumers perceive and buy goods, and they affect dynamics of local labour markets and skills required to work in this new economic paradigm. Although often underrated, the culturalization of the economic sphere is also having important socio-economic impacts, even related to innovation. The rise of the cultural (and creative) economy is strongly related with large transformations in the consumer's preferences and behaviours, more and more oriented towards experiences and semiotic goods capable to feed their statuses, also by the means of intangibles. This, in turn, can directly affect demand driven entrepreneurship and can also indirectly influence decisions of the supply driven one. At the crossroad of technological and cultural processes behind current transformations of societies, social innovation represents a key aspect to consider. It refers to the creation and implementation of new solutions to address social issues, improve human well-being, bring about positive social changes, and stimulate socio-economic regeneration of group of citizens. Importantly, social innovative initiatives aim at responding to social needs which are often place-specific. Drivers of social innovations are diverse and emerge from various sectors and actors. Pressing global issues, such as climate change, ageing society, and inequality, act as catalysts, prompting the search for impactful solutions. Successful social innovations often involve collaboration, creativity, and adaptability in addressing complex social problems. Despite their relevance for modern societies, some relevant sources behind the emergence of social innovation remains obscure. Especially, it is not clear whether it relates to extant technological domains. This work focuses on this linkage, addressing two main research goals. First, it aims at identifying the concept of social innovation explicitly adopting a place-based perspective, mapping the extent of this phenomenon across regions of selected EU countries. Second, it aims at discussing the prospective path-dependency of the emergence of social innovations in areas already rich of traditional – mainly technological - innovations. To address these goals, we build an original database merging two main sources:

1. the European Social Innovation Database (ESID) containing a large sample of social innovation projects developed across European regions,
2. the OECD REGPAT database with information on patenting in the long run.

Exploiting such information and integrating with other sources of data proxying for hypothesized regional confounding features, we collected data on NUTS3 regions of Austria, Belgium, France, Germany, Italy, Netherlands, Portugal, and Spain, and we elaborate an econometric design to test the linkage between traditional and social innovations.

Preliminary findings indicate that social innovation projects thrive where traditional innovation activities have gathered over time given other conducive-to-innovation features. Nevertheless, subsequent examinations in this study will expound upon the specific circumstances in which social innovations arise in non-innovative contexts and delineate the conditions under which innovative environments fail to catalyse the emergence of social innovations.

69 Platform-Attracted Urban Places - A Hungarian Case Study about the Spatial Dimensions

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Abstract

Peer-to-peer, internet-enabled platforms, such as Airbnb or OSZKÁR.com, can be seen as part of a phenomenon in which information and communication technologies and the sharing turn have transformed interactions between strangers and thus the space they experience (Lefebvre 2012, Soja 1998). In geography, studies related to platform- or the sharing economy mainly focus on local spaces, especially within cities, as critical mass plays an important role in interactions. Thus, so-called geographically-tethered platforms are connected to these spatial scales. In this context, I present a case study about the spatial patterns of a ridesharing company in five examined Hungarian cities. Based on the study, I introduce the concept of platform-attracted urban places. The definition of the concept and the characteristics of these urban places answer the following questions: Is the platform creating new places in the aspect of conceived space (Lefebvre 2012)? What pull factors make a local space a platform concentration? The study uses the database of the platform company to visualise the spatiality of the meeting points using QGIS software.

70 The Impact of the COVID-19 Pandemic on Global Production Networks Driven by EU MNEs

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Abstract

The COVID-19 pandemic has represented an unexpected shock that has deeply affected all countries, both from a health and economic point of view. It has raised uncertainty, in an already complex situation, bringing out doubts and new concerns on the international organization of the production process. COVID-19 has forced governments to lockdown, with interruption of production, closure of national borders, social distancing restrictions, and, consequently, profound implications on business decisions. Did production networks driven by MNEs shorten or enlarge because of the pandemic shock? Did they become more or less global? Was this reorganization homogenous across economic sectors?

This paper provided an answer to these questions by focusing on EU MNEs' behaviour. The assessment of the COVID-19 impact on firms' international exposure suffers from the fact the pandemic was a global shock and, therefore, there is no counterfactual, and consequently, it may be difficult to identify a reliable control group, i.e. a group of firms not affected by the shock with which to compare affected firms. However, the impact of the Covid-19 pandemic was geographically uneven, both in terms of health impact and in terms of restrictions imposed. We exploited this geographical heterogeneity to establish our identification strategy, and to construct a control group, thus estimating the impact of the pandemic with a difference-in-difference approach.

We found that COVID-19 induced MNEs to reorganize their networks of foreign subsidiaries. Besides these general effects, the study uncovered the presence of a great amount of heterogeneity among firms.

71 The “Dark Green” side of Economic Complexity: evidence from Italian NUTS-3 Regions

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Abstract

This paper investigates a possible dark side of economic complexity related to CO₂ emissions and energy consumption and fits an emerging literature stressing the costs and negative aspects of innovation. Merging different data sources on Italian NUTS-3 regions between 2015 and 2019, we investigate whether, and to what extent, the level of economic complexity of a region affects its energy efficiency and its overall CO₂ emissions. We analyse whether increases in the level of economic complexity are related to higher or lower CO₂ emissions produced in the same region, in other neighbouring regions, or imported from other countries. We distinguish countries into green and non-green, using alternative indicators such as the environmental performance index, the ecological footprint, and the environmental stringency index.

To compute the regional CO₂ emissions embedded in imports we use import weights for each NUTS-3 region using data on two-digit industries, while for the emissions produced within regions we combine gridmpas from the EDGAR database (v7.0) with the GISCO dataset provided by EUROSTAT. The economic complexity is computed using ISTAT data on exports, at the NUTS 3 region level. The level of economic complexity of each Italian NUTS-3 region, used as a proxy for the level of product sophistication, is computed using regional export data provided by ISTAT through the Coeweb database and following the methodology developed by Hidalgo and Hausmann (2009).

Our empirical analysis is based on a series of pooled and panel fixed effects estimates where the regional CO₂ emissions are regressed against the level of economic complexity of the same region and a series of regional characteristics including population, population density, human capital, weight of manufacturing industry, trade openness, and the average quality of institutions. To check for possible spillover effects across regions, we also use spatial econometric models such as the spatial lag, the spatial error, and the spatial Durbin model. We also analyse the possible causal effects of economic complexity on regional environmental performance using an instrumental variable approach. As an instrument, we use the regional endowment and distribution of skills and tasks before 2015, which should constitute the local set of capabilities through the combination of which the regional economic agents can generate a variety of new, and unique, products and services.

The effect of higher economic complexity on CO₂ emissions is difficult to predict. To the extent that higher product sophistication is combined with higher production efficiency and better input quality, we should expect regional CO₂ emissions to decrease as the level of economic complexity increases. However, this higher degree of sophistication could be achieved through higher energy consumption, both locally and by neighbouring regions. In addition, if more complex products require material and energy inputs produced and exported from countries with low environmental performance, then any domestic energy efficiency gain could be offset by a higher environmental cost for trading partner countries. These results can have relevant policy implications at the regional, national, and international level.

72 Using Crowdsourced Data to Estimate the Carbon Footprints of Global Cities

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Abstract

Cities are the core of global climate change mitigation. To facilitate progress on climate change mitigation in global cities, effective methods to measure the carbon footprints of cities are necessary. For global city carbon footprints, there have been a few attempts to establish a worldwide city carbon footprint database. However, due to the complexity and data intensity of the calculation procedures, these databases have a five to 13 years' time-lag and are difficult to update. A cost- and time-effective method to measure the carbon footprints of global cities has yet to be developed.

In this study, we propose a new hybrid method that integrates top-down EEIO analysis and bottom-up crowdsourced data to assess global city carbon footprints. Using the crowdsourcing platform, the Numbeo, to obtain income data at the city level, we estimate the carbon footprints of 465 global cities in 2020 by allocating national consumption-based carbon emissions to cities according to the cities' share of purchasing power. Basically, the estimation is conducted in three steps. Firstly, top-down accounting using MRIO tables is employed to calculate national carbon footprints. Secondly, by referring to the specific expenditure patterns and purchasing power of urban and rural residents, national carbon footprints are disaggregated into urban carbon footprints and rural carbon footprints. Thirdly, the urban carbon footprints at national level are further disaggregated into city carbon footprints by the bottom-up crowdsourced data to obtain city-specific income data.

Those cities comprise 10% of the global population but account for 18% of the global carbon emissions showing a significant concentration of carbon emissions. The Gini coefficients are applied to show that global carbon inequality is less than income inequality. In addition, the increased carbon emissions that come from high consumption lifestyles offset the carbon reduction by efficiency gains that could result from compact city design and large city scale. These results provide policy implications for city development planning and low-carbon consumption transitions. In addition, the method proposed in this study can calculate the most recent carbon footprints of global cities at a low cost. It thus has great potential to calculate the year-by-year carbon footprints of more cities and thus facilitate time-effective studies in this field. In our discussion section, we are able to report that our method produces results that are consistent with current research on city-level carbon footprints and that it provides support for the causal mechanisms elaborated in the literature. Therefore, the reliance and robustness of the method in this study is validated.

74 Explaining Economic Performances in the French Employment Zones: Industrial Relatedness and Spatial Externalities

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Abstract

Understanding the interactions between firms that constitute a local productive system and economic performance is particularly useful to elaborate appropriate policies. This understanding becomes especially relevant in the context of both national and supranational efforts aiming to reindustrialize and transition the productive system to meet ecological needs. The literature has established the importance of innovation diffusion as a driver of local economic performance, through its effect on employment dynamics. Jacob's externalities underline the positive effect of diversification. However, under the assumption that geographical proximity goes hand in hand with better cooperation between economic players, a distinction between two types of diversity has been made according to the level of cognitive proximity between sectors. Indeed, Frenken (2007) show that knowledge spillovers are more widespread between sectors sharing common characteristics such as know-how. However, no particular attention has been paid to related and unrelated varieties in the industrial sector in France. This paper makes two main contributions. First falling into the literature, we test the relationship between employment growth and related variety in France over the recent period distinguishing between a measure of the relatedness considering all the sector and an only relative measure of the industrial relatedness. Second, we investigate the specific features underlying this relationship, after highlighting the possible territorial heterogeneity of the results in the stylized facts. To do so, an ascendant hierarchical classification is conducted and we estimate spatial models. Including the weight of spatiality leads to the questioning of the independence between individuals. The existence of spillover effects, or decisions regarding territorial divisions may motive the consideration of spatial dependence in observations (Floch, 2018). Furthermore, control variables reflecting urbanisation economies and local specialisation, are included in the model. We test the empirical evidence of this ideas on the French employment zones (EZ) using firm's data and the employment growth rate over a six-year period (2016-2021). We find no evidence of a positive effect of the total related variety on local economic performances of the french employment zones. Indeed, between 2015 and 2021 employment appears to be more sensitive to changes in unrelated variety, in other words a strategy of portfolio diversification in the productive structure. Nonetheless, restricting our measure to the industrial sector shows different results. In this case, an increase in diversity in industrial-related sector leads to a higher employment growth rate. One possible analysis of these result would be that the expected positive relationship between related variety and employment are limited whenever we include the rest of economic sectors. In other terms, industrial relatedness' effect on economic performances is diluted when a larger number of sectors are included but become relevant again when isolated. Therefore, knowledge spillovers exert a more significant influence on employment within the industrial sector. Specificities in production might clarify why firms involved in industrial production processes share knowledge more easily among themselves compared to other parts of the sector. This could be attributed to innovations in industrial machinery and managerial practices that are more seamlessly implemented in industrial firms.

75 Navigating the Pinnacle: Exploring the Paramount Challenges of Urban Big Data in Tehran

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Abstract

Iran is actively addressing challenges and opportunities in regional and urban development through various policy initiatives. Key points include significant urbanization trends, national and local development plans to address regional disparities, the establishment of economic development zones, and a focus on rural development. Infrastructure development, transportation improvements, and environmental considerations are integral aspects of these policies. The Iranian government plays a central role, working through ministries and agencies, to shape and implement these policies, with local governments sharing responsibilities. In terms of smart city initiatives, Iran is leveraging Information and Communication Technology (ICT) for urban living enhancement, exploring smart transportation solutions, incorporating smart technologies into infrastructure projects, focusing on digital governance, and emphasizing environmental sustainability. Efforts are also being made to implement smart grids and energy management systems. Government initiatives specifically in urban development include urban planning and zoning regulations, the establishment of economic development zones with incentives for businesses, provision of social services, infrastructure development, commitment to sustainable development, periodic national development plans, technology and innovation policies, and the utilization of Public-Private Partnerships (PPPs) for funding and implementing major infrastructure projects. In this study, we aim to pinpoint challenges related to Urban Big Data in developing nations, with a specific focus on Iran. My objective is to understand and address the unique issues surrounding Urban Big Data in the context of a developing country. Through this research, we strive to contribute insights that can enhance the effective utilization of Big Data in urban settings within the Iranian context. This study involves two main stages. The first phase entails determining the key priorities for Urban Big Data utilization in Iran through in-depth interviews and expert-assessed questionnaires utilizing the Analytic Hierarchy Process (AHP). The second phase involves employing ArcGIS software for data analysis. Additionally, challenges related to big data application will be explored through a review of relevant literature.

Keywords

Urban big data, Urban planning, Challenges, AHP, Tehran.

77 U.S. Rural Farmers Market Vendor Persistence and Sales during 2019-2021

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Abstract

Farmers markets offer access to consumers for thousands of farmers across the U.S., but we have little data on sales and how differences among vendors, regions, and their selected farmers market affects sales or persistence at a market. In rural areas, these markets provide one of the only low-cost opportunities for weekly face-to-face interaction with customers. Little previous work examines farm entrepreneurship, customer discovery and interaction mechanisms quantitatively due to a lack of vendor level sales data.

This paper uses U.S. vendor-level sales data to understand (1) how different rural entrepreneurs are using farmers markets, (2) how sales varied between established and beginning vendors in a rural market, and (3) how market level COVID-19 restrictions impacted rural vendors. We intentionally identified beginning vendors separately from established vendors to understand if a vendor was demonstrating the ability to learn and grow their business through a farmers market. The findings are based on 8,892 sales observations from vendor businesses at five different rural Oregon farmers markets from 2019-2021.

We find high churn rates (business entry + business exit rates), of 70 percent or higher, among our sample of rural entrepreneurs that suggest farmers markets can be a low-cost business incubator in rural areas as business owners use face-to-face interactions for customer discovery and product refinement. We calculate a 3-year vendor retention rate of 38% across our sample discussing differences by market and vendor type. Farms and established vendors have lower churn rates and higher retention rates.

To understand how sales differ by vendor-level characteristics we used a panel fixed effect model and estimate that new and beginning vendors have on average 9% lower weekly sales than established vendors holding other factors constant. Vendors' weekly sales increase with market attendance, especially among beginning vendors with 4 years or less of prior farmer's market experience. Beginning vendors who attended at least 75 percent of available market days could earn at least 36 percent higher weekly sales than established vendors.

Our data confirmed previous work which found farm vendors have higher sales than value-added food and crafts and arts vendors, larger customer crowds encourage higher sales and rainfall decrease sales, all else held equal. Within our sample, we find no evidence that COVID-19 restrictions adversely affect the sales of vendors after accounting for other factors. While we note that the markets shrunk considerably; indeed, average sales for the vendors that persisted at the market were higher during weeks with a COVID restriction. These findings supported farmer's market managers' observations that vendor attendance is critical to building a customer following and during the pandemic their markets were stripped down to established farm businesses selling food to dedicated local food shoppers.

79 Social Innovation in the Development of Rural Areas

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Abstract

Innovation is a driver of economic growth. It has a positive impact on the competitiveness and output growth of companies, sectors and nations. This is why, since the 1980s, economic policies in developed countries have given priority to investment in innovation, particularly in high value-added activities, which has led to increased investment in knowledge-intensive industries and the creation of highly skilled, well-paid jobs.

Several empirical analyses show that in some cases innovation and moving up the value chain are not sufficient to ensure sustainable growth. Higher rates of technological innovation do not lead to higher welfare.

Researchers also point to the potential destructive effects of innovation in terms of job destruction and unequal distribution of wealth. There is a growing belief that other types of innovation are needed alongside new technologies, because of the diversity/complexity of problems in society, demographic trends, inequality, structural unemployment, knowledge intensification and globalisation.

The international literature is paying increasing attention to the study of social sustainability and social innovation, with the fundamental aim of achieving social justice, combating poverty, exclusion and discrimination. The focus of social innovation is on meeting community needs, emphasising the social benefits of innovative ideas in problem-solving that can be understood at the local community level. Social innovation can be used in synergy with technical and technological innovation to respond to challenges at the local community level and to find solutions to everyday problems. Social innovation can be of particular importance in areas where jobs and income are scarce.

Relevant economic and social problems such as unemployment, deprived areas and sustainability require long-term solutions that call for innovative cooperation between social actors.

80 Mitigate or Transfer? Impact of Inter-Regional Power Grid Infrastructure on Carbon Emissions in China

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Abstract

Background, Aims and Scope. As one of the biggest energy consumers in the world, China's carbon emission reduction capacity has greatly impacted the world's emission reduction process. China's power generation is shifting from energy-intensive eastern provinces to central and western regions. The development of inter-regional power grid infrastructure (IPGI) is an important factor influencing regional carbon emissions, which is of great significance for China to realize carbon neutrality by 2060. This paper investigates the effect of China's IPGI expansion on carbon emissions, aiming to understand its direct and indirect impact mechanisms on China's carbon emissions and the potential for carbon emission reduction.

Methods. Based on panel data from 30 provinces in mainland China from 1998 to 2018, this study integrates a two-way fixed effects model, a mediation effects model and a Spatial Durbin Model (SDM) to investigate the impact of IPGI on the regional carbon emission and its influence mechanisms and spillover effects.

Results and Discussion. The results implying that the IPGI significantly increase the carbon emission, but the impact varies across emission levels, suggesting an inverted U-shaped curve effect. The IPGI affects the regional carbon emission through energy security effect, technology effect and energy structure effect. For the energy security effect, the construction of IPGI can significantly increase energy consumption and improve the level of electrification, which would increase carbon emission. As for the technology effect, the IPGI can improve regional TFP and reduce the carbon emissions of per unit of GDP by improving energy efficiency. Although the IPGI significantly increase the amount of power generation, it improves energy structure by decreasing the proportion of coal power generation. The results of SDM model show that the region with high energy consumption has a significant positive impact on the carbon emissions of the regions closely related to it by power transmission through the IPGI, and thus IPGI promotes the spatial transfer of carbon emission.

Conclusion. The paper finds that while the expansion of IPGI in China would increase regional carbon emissions, it also offers opportunities for improving energy efficiency and energy structure. The government should balance the environmental impacts with the benefits of the construction of IPGI, and it is necessary to form cross-regional carbon emission compensation mechanisms.

81 Strategic Coupling to Global Production Networks in the Regional Development Agenda: Toward Conceptual Integration

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Abstract

In today's world characterized by relationality and connectivity, Global Production Networks (GPN) approach has gained importance. In particular, "strategic coupling" has recently attracted attention in regional planning and economic geography, and the number of studies is increasing rapidly. Central to the GPN perspective, strategic coupling represents the fundamental mechanism that links GPNs and economic development. Therefore, the GPN approach tries to understand and explain the process of regional and uneven development through the strategic coupling of regions to GPNs. Although 'strategic coupling' basically explains the economic development process of regions by focusing on trans-regional external connections and dynamics, this concept also provides a very useful approach to understanding the path creation/development and regional diversification, which are at the core of the EEG approach. This is also the reason for the recent effort to establish the link between EEG and GPN approaches through "strategic coupling" (MacKinnon, 2019; Yeung, 2021; Boschma, 2022). Despite this intense interest and theoretical attempts in the literature, the concept of strategic coupling has not been critically evaluated yet. In this respect, this research aims to explore the themes of 'strategic coupling', determine its limitations and gaps, and guide future research. Conducting the systematic literature review method, seventy-nine articles accessed with the keyword 'strategic coupling' from the Web of Science database were examined in terms of study years, research questions, conceptual frameworks, methodologies, and contexts. The results were evaluated under four sub-headings: an overview of empirical studies, the meaning of region-locality, actors and their roles during the process, and the regional development outcomes within the concept of 'value.' As a result of this research, it is seen that strategic coupling takes place through a different mechanism in different countries' contexts, and therefore, the concepts of 'actor' and 'value' in the framework need to be elaborated more comprehensively.

82 Internal State Borders in the Western Balkans Face New Opportunities and Challenges

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Abstract

After the historical lows of the 20th and early 21st centuries, these countries (Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, Serbia) have found themselves in a new position in the European process. They must simultaneously resolve their open and hidden territorial and border disputes with each other and meet the expectations of the EU (which all countries wish to join) and, in some cases, the direct demands of NATO. The Slovenian non-paper on the internal settlement of the 'encircled Western Balkans' raised fundamental questions, but the Russia-Ukraine war has presumably rendered it moot for a long time.

83 Local Development Prospects in CEECs after 2020: The Case for a Foundational Approach

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Abstract

The decade after the pandemic crisis has brought new economic development challenges for Central and Eastern European (CEE) countries and their sub-national territorial units. Against the backdrop of adverse demographic trends, including a shrinking and ageing population and the ensuing labour market tightness, CEE countries can no longer rely on extensive employment growth as a prerequisite for long-term economic growth, instead, productivity improvement should be a priority. Despite the fundamental role of foreign investments in the market and global value chain integration of the CEE macro-region and the associated economic growth and productivity gains, FDI by itself is insufficient to ensure sustained catching up. The CEE region is not homogeneous in this respect, since the Baltic States, Slovenia and Czechia have shown a solid convergence performance in terms of per capita GDP relative to the EU average and the Human Development Index. This heterogeneity is partly explained by the different institutional environment and the divergent growth models followed by the countries of the macro-region. As a result, the countries are not at the same stage of progress towards the 'high road' of competitiveness, while some of them may overcome the so-called middle-income trap.

Economic development in CEE countries is dominated by the performance of capital cities, although second-tier cities are also important drivers of development. However, peripheral regions struggle with problems of adaptation and response, often leading to brain drain and economic decline. Industrial strategies highlight those tradable sectors of the economy that favour leading edge KIBS firms and advanced manufacturing, while neglecting the residentiary economy that is more sheltered from competition and provides jobs in local production and services sectors. Our research is inspired by the burgeoning literature of the 'foundational economy' approach to economic development, focusing on mundane economic activities providing essential goods and services, and we investigate the differences of economic performance across the NUTS3 regions in selected CEE countries. We study regionally aggregated, firm-level financial and employment data including sectoral classification of the companies with 10+ employees. Our position is that a well-functioning foundational economy is necessary for the whole local economy to work efficiently in the long run. Sustainable economic growth relies on stronger internal markets, better quality of jobs and increasing human capital endowment, to which the local foundational sectors can make a key contribution. Moreover, increasing productivity in the foundational economy should lead to a regionally more balanced growth than an exclusive focus on the 'frontier firms' that are highly concentrated spatially. Therefore, our research contrasts the performance of different foundational and non-foundational sectors across the urban and rural areas in CEECs, and the results indicate that there are large inequalities across both the sectors and different types of urban and rural areas.

84 Spatio-Temporal Diffusion of COVID-19 Vaccines in Europe and their Role in Control of the Pandemic

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Abstract

Within a few months of its outbreak in Wuhan, China, the Coronavirus pandemic had appeared in almost every part of the world, highlighting one of the negative effects of globalisation: the rapid diffusion of harmful phenomena. However, within a year of the outbreak, the first vaccines against the Coronavirus were produced and vaccination campaigns were launched in the developed centres of the world. These processes have once again drawn attention to the centre-periphery inequalities in territorial resilience. In contrast, within the European Union, because of the EU's common vaccine procurement, countries followed broadly similar vaccination policies and had access to vaccines more or less uniformly and at the same time, regardless of their socio-economic status. However, the social acceptance of vaccines varied from country to country.

In my presentation I will show how the access and the acceptance of the vaccines evolved in different European countries and how this may have affected mortality in the waves of the pandemic during the winter of 2021-2022. To do this I gathered country-level and regional-level datasets related to the Covid-19 pandemic (mortality data) and vaccination process as well as socio-economic indicators from the European Centre for Disease Prevention and Control (ECDC), Eurostat and some selected national pandemic databases. After the data harmonisation process, I subjected these datasets to statistical data analysis: in addition to descriptive statistics, I used multivariate regression models. In the first model I used the vaccination rate as dependent variable and the socio-economic indicators as explanatory variables, while in the second model the excess mortality rate was used as dependent variable and the socio-economic indicators and vaccination rates were used as explanatory variables. In addition, I created static and interactive maps and graphs to visualise the spatial diffusion of the vaccines and the spatial inequalities of the vaccination and the excess mortality related to Covid-19 pandemic.

As a result, I got that on the one hand the acceptance of the vaccines mainly followed the European centre-periphery inequalities: while the societies of most European countries were almost fully vaccinated by November 2021, in some East-Central European countries less than half of the adult population was vaccinated. On the other hand, vaccination is thought to have had a significant impact on the mortality trends caused by the fourth wave of the pandemic but this effect is thought to have diminished later on. This highlights that not only the access but also the acceptance of new innovations could deepen existing centre-periphery inequalities in relation to social (and territorial) resilience and development.

85 The Dimension of Vulnerability in Hungarian Small Towns

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Abstract

Nowadays we are living in an age of recessions, and the Covid-19 period has given new meaning to many social and welfare issues. Rural areas and small towns, which were the centres of these areas, have been revalued, in many ways as an alternative to metropolitan life. The changed interpretative framework has refocused attention on small town society, on the inequalities that are usually hidden in comparison with big cities. In addition to the benefits that appear, the vulnerabilities of small town areas must also be taken into account; such as the availability or lack of access to health services and basic infrastructure, the lower number and quality of commercial and catering outlets, and the congestion that appears. The presentation examines two approaches: the concept of poverty in a functional sense in small towns and seeks to answer the question: what dynamics have been observed in recent years with regard to the quality of life in small towns. Second, the contributes to the field of analysis of rural development programmes by studying intervention characteristics and available financial resources in Hungary. The study compares the resource absorption data of two programmes (LEADER and the Hungarian Village Programme) by territorial unit. The Hungarian Village Programme is a national resource for settlements with fewer than 5.000 inhabitants (with 92 small towns), focusing on four main areas: economic development, social cohesion, settlement planning and cultural heritage, and the implementation of smart technologies. The research shows that all bottom-up programmes can be successful in deprived areas if the leaders of the municipalities are people with local embeddedness, who are known and trusted by the target group. Therefore, the results of the projects implemented have had a positive impact on the municipalities, significantly improving the quality of life of the inhabitants and making continuous work a part of their lives. The success of the programmes required local knowledge, personal contacts, flexibility, responsiveness, and the right competencies on the intervention side. A value-conscious and engaged local society is a cornerstone of bottom-up projects because a strong community means a robust settlement image. The key to the success of a bottom-up approach is the ability to engage, even down to the individual level, and to ensure participation in shaping the vision. The intensity of involvement is important both during the programming period and the development process. Our observations indicate that it is generally very strong during the planning period, while it is indirect (often representative) during the decision-making, implementation and monitoring phases, or in programme elements that are explicitly based on involvement (training, events, environmental programmes, etc.).

86 Regional Differences in Mental Health Promotion in Municipalities

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Abstract

We are witnesses to a tendency in the last decades that encourages states, companies, local communities, employers and employees to put more weight on the promotion of mental health, and the prevention of mental illnesses in workplaces. The World Health Organisation and the European Agency for Safety and Work released several directives and guidelines about the topic to support these groups in the efforts to create healthy workplaces. If employers and employees are able to recognize and handle these factors in the long run, they may cause less harm. Workplace health prevention programs can have positive effects not only in the workplace but in private and family life too. Studies have shown positive impacts economically too e.g. less absences, increased productivity. In one of my research connected to my PhD program, I set an aim to learn more about the existence of workplace health prevention programs in the Hungarian public administration, especially in the offices of local municipalities. As huge regional differences can be experienced in Hungary economically, we suppose that the accessibility to these programs shows a similar picture in the public sphere too. The leaders of the local municipalities were asked to answer some questions about the demand for programs (trainings and lectures about mental health), and whether they intend to organize or have already organized those. They were asked to forward the questionnaires to the employees of the offices. The employee questionnaire includes questions also about the demands and experiences of workplace health promotion programs.

Psychosocial risks can appear in any organization, but literature in this field shows that working in public administration means meeting special working conditions and burdens. Despite the large number of employees in this field, researches pay little attention to examine especially the efforts of the organisations to provide the employees with mental health support. Special working conditions, which have spread in the private sector e.g. home office and hybrid work, can not be implemented in most fields of public service, consequently, organizations in the public sphere have to provide appropriate conditions and support to counterbalance the work-related psychosocial harms.

The ongoing research will highlight the accessibility and the need for programs that support mental health in the public sector. The accessibility can depend on financial and personnel factors too. Less frequented settlements far away from bigger cities, or settlements in underdeveloped rural areas can have less opportunity to invite experts in this field. The results of the survey can emphasize the demands linked to mental health prevention and regional differences to help stakeholders provide employers in public administration with more support.

87 Examining the Results of the Developments of Hungarian National Palace and Castle Program in the Light of Sustainability

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Abstract

Heritage is connected to the community in many ways. A built heritage in dilapidated condition that cannot be visited can also be a subject of local pride and identity, but by making it accessible and interpretable, we create an opportunity to strengthen the ties between local community and cultural heritage. Hungary launched a major heritage tourism development programme during the 2014-2020 programming period, using mainly EU funds, with the aim of creating economic opportunities and social benefits for lagging regions, while seeking for sustainable operation of its built heritage on the long run. Both the developer and the funder had many expectations, from the amelioration of regional employment rate to the improvement of the quality of life and well-being of local residents, to the increase of the social acceptance of cultural heritage. Among the anticipated benefits of a similar development scheme, the engagement of young citizens has the most extended impact, therefore the establishment of the infrastructure, toolkit and human resources of heritage education was regarded as cornerstones of the project.

Between 2021-2023 all the projects were executed and closed, and the developed sites are now open to the visitors. The first years of operation can provide important lessons as to the achievement of goals, the causes of eventual failure and make place for improvement proposals. The quantity criterion of the present evaluation examines the countable results achieved, among them the number of cultural events, meeting places, selling points of local products created, but also strives at looking into the accessibility of these services to locals in terms of quality, affordability, availability and convenience. Regarding the fulfilment of educational goals, the analysis digs into the quantity and geographical distribution of the sites where families with children and student groups can obtain heritage educational programmes, the diversity of these, as well as the proportion of school subjects they cover.

In order to be able to evaluate the results as authentically as possible, the study compares them not exclusively to the planned outcomes of the development, but also to international and domestic benchmarks and best practices. The quality criterion of the investigation is provided by the in-depth interviews conducted with the on-site specialists, which investigate the causes of falling short from the expected results. According to the reason for the failure to meet the standards, the study provides development proposals in the areas of operation, communication and product development.

88 Cross-Border Activity along the EU External Borders of Hungary

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Abstract

The success and future of the European integration requires a multilevel approach where cross-border cooperation has an indisputably important role. The intensive spread of joint cross-border activities officially dates back to the introduction of the Interreg A programme focusing on the promotion of cross-border cooperation along not only the internal but also the external borders of the European Union. Ever since the mid-nineties Hungary has been in a special geostrategic situation providing cases for all types of EU borders (internal, external and temporary external). The aim of the paper is to explore the impacts of border location on the intensity of cross-border cooperation activities along the external borders of the European Union through the example of Hungary. The external borders of the European Union between Hungary and Serbia and Hungary and Ukraine are studied focusing on three areas: twin town relationships, EGTC memberships and Interreg partnerships. The participation in these three types of cross-border co-operations reveals the cooperation willingness specifically at the local level. Based on these components a formula called Cross-Border Activity Index (CBAI) is created to measure co-operation activity. The settlements were analysed along the three components, then comparisons were performed to find links between the different co-operation forms (proximity matrix, correlations). The highest the value, the stronger the co-operation activity. The CBAI was also tested for the Herfindahl-Hirschman index (HHI) to measure the concentration ratio. The CBAI was found to offer an endogenous dimension to cross-border activities, and thus adding a local/regional character to the existing cross-border co-operation models focusing on the proactive voluntary bottom-up processes in these types of activities. All three components were analysed and mapped individually to see their relevance for the differentiation between the border regions along the EU internal and EU external borders, and then their synthesis and depiction are used to reveal the multidimensional relationship pattern of border regions. The CBA Index as an indicator of the intensity of cross-border activity performed by the settlements, and thus can be used for measuring/weighing co-operation along the different border sections to show the intensity of cooperation between neighboring countries. It provides relevant information for the regional policy of the European Union in many respects: (a) helps to find the most active partners in the Interreg/Interreg NEXT/IPA programming, EGTCs and twinnings, (b) justifies the eligibility or non-eligibility of settlements/counties in the Interreg/Interreg NEXT/IPA programming; (c) highlights differences between border regions located along different border types (EU internal borders and EU (temporarily) external borders); and (d) indicates the concentration of cross-border issues. Calculating the values for several years or periods shows how the activity participation of certain settlements (and relevant border region types) changed – for example, the existence of Interreg projects by programming periods is a mirror of the effectiveness of the Interreg programme in general. Besides, understanding which geographical areas or border regions are the most active, contributes to a more precise and efficient allocation of EU cross-border funds.

89 A Spatial Justice-Based Perspective on Territorial Inequalities. Scenarios for the Future of the EU's Cohesion Policy

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Abstract

Economic growth, energy-related issues, digital transformations, connectivity, urbanisation, climate change are considered emerging mega trends that shape the context for policy responses to social, economic and spatial inequalities within the European Union (ESSPIN, 2022). In accordance with the corresponding challenges, territorial cohesion aims to enable equal opportunities for citizens and enterprises, so as to make the most of their territorial potentials, and brings into the spotlight the territories and their people, offering a solid background for the idea of 'spatial justice'. It creates a fertile seedbed for those territorial policies and plans open to holistic constructions, which combine place-based with people-based prosperity. Based on this vision, the IMAJINE project funded under the EU's Horizon 2020 programme has sought to examine the patterns and dynamics of territorial inequalities in Europe in order to formulate new mechanisms for addressing more effectively these inequalities and for promoting cohesion and spatial justice at European, national and regional scale. One of the most challenging messages resulted from this project's findings is that "the continuation of the European Social Model and current territorial cohesion principles is only one possibility, with alternatives including greater national and regional autonomy and policy divergence, an increased emphasis on broader social and environmental wellbeing beyond economic growth, or fragmentation under pressure from cultural and political polarization" (IMAJINE, 2022, p. 14). This paper explores the key features of the four envisaged scenarios, with a spotlight on transport and mobility sector and proposes as case study one of the EU member states from Eastern Europe, Romania. It is based on an in-depth analysis combined with the synthesis and interpretation of the findings of the workshop organised by the Bucharest University of Economic Studies team of this project (coordinated by the paper's author), which examined the developments of the four scenarios in the specific case of transport and mobility with experts from governmental agencies and local authorities, city managers, researchers. They were invited to express their views with regards to the specific aspects gravitating around three main questions: 1. Can scenarios help envisage challenges for future planning? 2. How can spatial justice and the discussed scenarios be incorporated into work on local transport plans? 3. What model of spatial justice would be the most beneficial to your local area? The results indicate a convergence towards the scenario which places the emphasis on economic growth and solidarity, spatial justice being viewed as the equitable distribution of wealth between regions, including transport and mobility purposes. However, some divergent views have been expressed as well, pointing to, for example, another scenario, which emphasizes the economic growth and territorial autonomy, with spatial justice being interpreted as regions being able to hold on the wealth they have created. From local transport viewpoint, this opinion is associated with an increasing power expected to be gained by the growth poles in Romania that will imply more resources invested in improving transport infrastructure, with real concerns for the green component as well, but at local scale, which might increase territorial inequalities.

90 Unveiling Region-Specific Effects of EU Cohesion Policy

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Abstract

This paper delves into the effectiveness of the EU Cohesion policy and its role in reducing regional disparities across EU Member States at the NUTS 2 level. The Cohesion policy, a pivotal investment policy in the EU, seeks to foster convergence through economic growth, sustainable development, and the alleviation of inequalities. Convergence, in this context, refers to the tendency of diverse economies or regions to gravitate towards a shared level of economic development over time. The study employs an augmented Solow model proposed by Mankiw, Romer, and Weil in 1992. It applies panel data analysis with fixed and random effects to assess whether less developed NUTS 2 regions catch up with their more developed counterparts and whether Cohesion funding is a significant variable for regional development. The analysis covers two sets of regions: one covering all regions from EU 27 and another covering only those from New Member States. Data sourced from Eurostat and ARDECO, Cambridge Econometrics' European regional database, along with Cohesion funding from the Cohesion Open Data Platform, spans the period from 2000 to 2019. A total of 207 NUTS 2 EU regions are included in the analysis, excluding certain regions due to data limitations and geographical considerations. The results highlight the significant, but negative, impact of Cohesion funding on the convergence process, with confirmed convergence observed in both EU 27 and NMS. The comprehensive panel data analysis provides valuable insights into the complex dynamics of regional convergence.

91 Measuring creativity: Lessons of the Cultural and Creative Cities Monitor

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Abstract

Nowadays creative cities and regions are often in the focus of research programmes concerning regional science. In the last two decades cities are often using culture and creativity as a tool of urban development. In a vivid city cultural institutions, organisations, creative centres are flourishing, there are many tourists and visitors because of international cultural festivals and expos, and cities benefit from the positive effects of culture-based urban development. It is always an interesting question, how to measure creativity within urban places? Is there any method, which is able to show the performance of the cities regarding cultural and creative activity?

The target of the presentation is to show the positions of big cities in Central and Eastern Europe at European level, based on the results of the Cultural and Creative Cities Monitor. The Cultural and Creative Cities Monitor is an important tool of the European Commission, which is using both quantitative and qualitative data and shows local strengths and opportunities of European cities monitoring their cultural and creative activity.

92 Beyond the Numbers: Analysing the Complexities of the Western Transdanubian Region's Labour Market

Patrícia Horváth

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Abstract

The study of regional labour market structures is of vital importance in today's constantly and rapidly changing economic and social environment, as while the labour force is one of the key actors in these spheres, it also appears to play an important role in the dynamic relationship between them. There is interdependency between the local social and economic space and the local human resources: the labour force is fundamentally economic and socially dependent, while the labour dependency of these two areas also occurs. The labour market does not exist in isolation, but functions as a complex, multidimensional phenomenon embedded in the functioning of local economic and social systems and not independent of them.

Based on these, the aim of this research is to examine the local labour market structure, highlighting its strengths, weaknesses and potential opportunities for improvement. Labour market processes are determined by both external and internal factors, but this presentation will focus only on the external dimensions: the economic and social determinants. Analysing labour market data is key to achieving a sustainable economy and society, and in this research the focus will be on the main factors of this relationship, such as the social embeddedness of the labour market, which provides insights into the current and future labour market, and the relevant economic indicators that provides a situation report on the labour market environment in the region examined. In this research, aggregated relative indicators and specific data of the area will be used to perform a macroeconomic analysis of the labour market. The methodology is based on the Key Indicators of Labour-Market of the ILO Department of Statistics and the labour force survey methodology of the Hungarian Central Statistical Office.

The research area of the study is the Western Transdanubian region, which is one of the most dynamically developing regions of Hungary, bordering four countries. The provisional results and conclusions of the analyzation of the regional labour market can be seen in several dimensions. It is presupposed that the local labour market and the local economic and social environment form a mutual and complex system of interdependencies, and making it tangible is one of the objectives of the research. It is also assumed that the dynamism of this relationship can be quantified using various economic and social indicators. The economic and social aspects of sustainability have been in the focus of literature in the past decades, but less attention has been paid to the sustainability of the labour market, therefore my research aims to identify indicators that can be used in sustainable labour market studies. Another aim of this presentation is to contribute to understanding and promoting of labour market sustainability in the Western Transdanubian region through an interdisciplinary approach. In addition, the presentation of the research results will provide a situational report of the local labour market, that will have practical relevance for the design and implementation of regional policies, economic development plans and employment strategies.

93 Location Signalling: Unravelling Causal CBD Impact on Technological Startup Survival

Maria Kubara

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Abstract

This study investigates the causal relationship between Central Business District (CBD) location and the survival and growth of technological startups. It inspects whether situating an innovative business in a highly competitive, densely populated area affects its survival – in a positive or a negative way. The research examines if CBD location itself influences startup survival due to intangible factors like prestige or signalling effects connected to that area within the city, or whether the CBD effect is solely due to spatial neighbourhood-specific factors like improved public transport accessibility and increased population density.

Various model structures will be employed to investigate if the CBD effect diminishes after controlling for space-specific or centre-specific factors, as well as interactions between companies – a proxy for agglomeration externalities. Model specifications will include variables indicating interaction dynamics among companies and neighbourhood specific controls, shedding light on how much these factors contribute to the overall CBD effect.

Examining prestige CBD location as a potential signal for startup growth potential, the study assesses whether this signal impacts startup survival and growth. By disentangling spatial factors linked to CBD effects, the aim is to isolate the genuine signalling effect of CBD.

This research adopts novel causal machine learning methods, including causal forest and spatial t-learner, which are still relatively new to regional science literature. The goal is to popularize these techniques and showcase their usefulness in unravelling the complex dynamics between CBD effects and startup survival. Non-parametric machine learning techniques, particularly models based on random forest, are chosen for their ability to capture the expected intricate non-linear influences in these effects.

The dataset contains point locations of technological startups founded in Warsaw, Poland, in 2016, tracked over a five-year period - the critical phase in the startup lifecycle. Accompanying variables are calculated at fine spatial scales (e.g., 500m or 1km radius) to unveil local characteristics of each business location. Additionally, investor data for each company, tracking firm's connections within a broader investor network, will be used to control for potential agglomeration externalities. The results aim to contribute to the literature on business location within the urban context. Insights will assess how CBD influences the survival and growth of technological startups, revealing the extent to which this effect is driven by spatial-specific factors or company interactions. These findings offer practical insights into navigating the effects and complexities of CBD locations for young technological companies.

95 Entropic Generalized Q Analysis

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Abstract

Q analysis a multivariate exploratory technique in the social sciences which seeks to identify and analyse commonalities and differences in the respondents' rankings of a set of relevant individual qualitative statements. Generalized Q analysis, is able to handle an enlargement of the number of ranked combined statements based on a structured and additive re-combination of the rankings of simple statements. The Entropic Generalized Q analysis combine the entropy of the rankings providing an implicit value function with complement and substitute factors. We find that the latter technique is able on the one hand and like the Generalized Q Analysis, to take account many simple questionnaires with trustful responses, allowing the expansion of the number of respondent, facilitating the naming and interpretation of the extracted multivariate components, and, on the other hand, to test the consistency of the responses and to perceive their value function and their relation with people and places

96 “Fighting Fires with H2O”: Understanding Feature Contribution to Forest Fires in the Carpathians

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Abstract

Climate change poses a significant threat to forests, including the ones in the Carpathians by increasing the risk of fires. This study employs supervised machine learning algorithms, namely Multiple Logistic Regression (MLR), Distributed Random Forest (DRF), Gradient Boosting Machine (GBM), and XGBoost (XGB) in the H2O.ai framework to provide a nuanced understanding of the strengths and weaknesses of each model. To enhance interpretability, various feature selection methods are used in conjunction with these algorithms to better understand the underlying factors and to further improve the accuracy of forest fire predictions. Recognizing the inherent opacity of these popular algorithms, this study employs a multi-faceted approach to increase interpretability by discarding the least important features during model building with the use of explicit feature selection methods, and by carrying out a comparative analysis of feature importance across the different models. Moreover, the utilization of SHapley Additive exPlanations (SHAP) summary plots elucidates negative or positive predictor associations with fires. The used supervised machine learning models are aimed at predicting forest fires in 39 administrative regions that span across the seven countries of the Carpathians, i.e., Czech Republic, Slovakia, Poland, Hungary, Ukraine, Romania, and Serbia. The binary dependent variable, the occurrence of forest fires was derived from NASA's Moderate Resolution Imaging Spectroradiometer (MODIS) dataset, while the negative control points, i.e., areas with no forest fires were selected by using a stratified random sampling method. 26 input features – climatic, vegetation, topographic, and socio-economic factors - were chosen based on their potential relevance to forest fire occurrence, supported by literature review. The result of the study is in alignment with international research, it confirms that tree-based algorithms outperform MLR. The best model's (GBM) performance was 0.946 AUC, indicating superior performance. This was achieved with feature selection using LASSO regression. Other noteworthy insights of the research are that the DRF model exhibits higher accuracy in correctly identifying actual fires, albeit it comes with an increased number of false alarms; secondly, the feature importance results from the GBM model are more balanced than the one from DRF. The research results, derived from the feature importance analysis suggest that the overall vegetation health and forest cover are crucial factors to forest fire occurrence. Additionally, socio-economic factors, such as cropland and pasture densities, along with climatic stressors like mean annual temperature contribute significantly to the susceptibility to forest fires in the Carpathian region. The use of SHAP plots helps with the interpretation of features, adding a visual dimension to it, shedding light on the intricate associations between predictors and fire occurrence. To conclude, this study aims to advance the understanding of climate change's impact on our forests and to offer a methodological blueprint for enhancing the interpretability of machine learning models in similar contexts. The nuanced insights from feature importance and the identification of key features could provide valuable guidance for policymakers and forest management practitioners, aiding the development of effective strategies to mitigate climate-induced fires.

Keywords

Carpathians, forest fires, geospatial analysis, machine learning, interpretability, feature selection, SHAP.

98 Control on Nonpoint Source Pollution under Uncertain Welfare

Akio Matsumoto

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Abstract

The optimal environmental policy is determined for Cournot duopolies with product differentiation. In the case of non-point source pollutants, the standard policies cannot be applied since the regulator is unable to observe individual emission levels of the firms, however, obtains only the total size of the pollution. The firms' decisions are concerned with their outputs and abatement technology, while the regulator chooses the uniform pollution tax rate. The optimal decisions are determined in a two-stage process. In the second stage, the firms determine their outputs and the technologies, taking the tax rate as given. In the first stage, the regulator selects the optimal tax rate with the given choices of the firms. Under asymmetric information, the regulator constructs the welfare function with uncertainty on the firms' outputs and determines the optimal tax rate by maximizing the welfare expectation and minimizing the welfare variance. Since the best reply of the government has a complicated form, the Nash equilibrium is numerically and graphically solved. It is shown that the optimal ambient charge tax effectively controls the total concentration of NPS pollution.

101 Do Capital Flows Ride the High-speed Railway? Evidence from China's Mergers and Acquisitions

Shuai Shi

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Abstract

While the impact of High-Speed Rail (HSR) on human mobility has been considered, its secondary effect on firms' corporate strategies such as Mergers and Acquisitions has been overlooked. This article addresses this gap by designing a quasi-natural experiment to reveal the treatment effects of HSR construction on variegated M&As for 264 Chinese cities. We discover that HSR attracts horizontal M&As that consolidate homogeneous assets, while it encourages local firms to acquire related or diversified assets through vertical and conglomerate M&As. The findings deepen understanding of the relationship between untraded infrastructure endowments and traded capital flows, with implications for regional disparity.

102 The Effect of High-Speed Railway Connection on Economic Development in China's Peripheral Cities: A Perspective of Innovation Capacity

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Abstract

A growing body of literature has explored the impact of high-speed rail (HSR) connection on urban economic development, while previous research has tended to focus on metropolitan areas. With unique datasets, this paper investigates the heterogeneous impact of high-speed rail on peripheral cities and its causes from the perspective of innovation by using China's HSR construction dataset from 2003 to 2019. Applying the DID method, we find that HSR construction does not have a significant average treatment effect on the economic development of peripheral cities. Existing studies suggest that the reason for the mixed findings on the impact of HSR is the heterogeneity of HSR on peripheral cities, and that this heterogeneity is mainly due to the characteristics of the peripheral cities themselves. Based on the idea of endogenous dynamics of regional development arising from innovation in the sense of Evolutionary Economic Geography theory, we adopt an innovation capacity perspective. And after taking into account the differences in innovation capacity of cities, peripheral cities with higher innovation capacity are able to enjoy more of the positive effects of HSR connections. Based on the city-pair level data, we find two channels through which innovation capacity influences the HSR effect. The innovation capacity of peripheral cities promotes the spillover effect of HSR connection on economic development by improving investment inflow and inhibits the siphoning effect by reducing labour outflow. Overall, these findings indicate that HSR connection has a two-way effect on peripheral cities, and only cities with higher innovation capacity can withstand negative shocks. The contribution of this paper lies in several aspects. First, we contribute to the literature on the economic impacts of HSR on peripheral cities, and shed light on the underlying reason for the heterogeneity of the economic impacts in the perspective of innovation capacity. Second, we quantify the spillover and siphoning effects between core and peripheral cities using investment flows and labour flows, respectively, using a city-pair level panel data. Third, we construct a time-varying instrumental variable using the least cost method, which avoids the problem of using historical transportation infrastructure data as instrumental variables that cannot be matched with panel data. Our findings add to the literature on the impact of HSR connections on the economic development of peripheral cities, and are useful in helping local governments rationally consider HSR construction and to focus on cultivating local innovation capacity.

104 Regional Income Distributional Effects of GVC Participation

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Abstract

While the literature on the distributional effects of GVC participation is quite abundant, the nexus between the regional income distributional effects generated by GVC participation remains instead largely unexplored, despite its paramount importance in Europe, where much of the GVC trade occurs among European countries, all affected by profound and increasing intra-country disparities. With an approach at the cross-yard of international and regional economics, the paper aims to fill such a gap, by presenting a theoretical model able to apportion the effects predicted by the Grossman and Rossi-Hansberg model at the regional level, and by proving the obtained expectations for intra-country regional income inequalities in Europe. Results show that a heterogeneous functional specialization of regions within a country amplifies the effect of GVCs on inequalities.

105 Technological Transformations, Market Power and Regional Inequalities in Europe

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Abstract

This paper studies the effects of automation technologies adoption on income inequalities in European regions by highlighting its dual impact on the distribution of wealth between profits and wages.

On the one hand, the rapid automation of tasks does raise concerns about the displacement effect and the compression of the labour wage share, particularly damaging the welfare of workers at bottom of the wage distribution.

On the other, automation-led improvements in productivity can create new jobs and increase average wages, and thus the labour share.

This desirable productivity effect, however, can be partially mitigated in those regions strongly specialised in sectors characterized by high market power, and in which income distribution favours the profit rather than the labour share.

Importantly, while in non-metropolitan areas the increase of the labour share is conducive to a rebalancing of the profit vs labour income distribution favouring especially low- and mid-skilled workers and, thus, contributing to a reduction of inequalities across workers groups, the same mechanism does not hold in metropolitan areas where the rebalancing of the profit vs labour income distribution favours especially high-skilled workers, thus amplifying inequalities across workers groups.

The paper proves these statements in an analysis of the manufacturing sector in European NUTS2 regions for the period 2008-2017.

106 Development Opportunities for Danube Freight Transport and the Evaluation of the Results of the Strategy for the Danube Region

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Abstract

The utilisation of the Danube as a waterway has always fallen short of its potential. This is mainly attributable to the geographical characteristics of the river. The Danube's water flow is uneven, with frequent low water levels in late summer and autumn. Another disadvantage is that it has few navigable tributaries, of which the Rivers Drava, Sava and the Tisza are of such size and flow that navigation is theoretically possible. The development of navigation on the Danube has always been hampered by the fact that it reaches the sea via a delta estuary, and the navigability of the individual branches could only be ensured by regular maintenance. And finally, it is a disadvantage that the river enters the Black Sea, which is a landlocked inland sea far from the main maritime transport routes. The presentation would answer the following questions: 1.) What is the situation of freight transport on the Danube, what are the opportunities and constraints of its development? 2.) In the context of the EUSDR, what investments are the countries undertaking to improve Danube navigation? 3.) To what extent are Danube organisations active in international projects and what are the impacts of cooperation? 4.) Whether it is possible to draw conclusions from the analysis of national and international projects on the commitment of the Danube countries to inland navigation?

107 Planning and Accompanying Industry in its Transformation: Towards a Renewal of Regional Industrial Policies?

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Abstract

Since the beginning of the decentralization policies initiated in 1980, French regions have endorsed increasing responsibility for economic policy (Le Lidec, 2020). Most recently, the 2015 NOTRe law strengthens their competencies, by granting them a legal leading role in economic development, and a responsibility for economic strategy and aid management. This transfer opens a field of possibilities for policies (Desjardins, Béhar, 2017). Industrial policies have been the subject of many scientific developments in Europe, fueled by the development of smart specialization strategies (S3). Launched in 2007, the S3 invites regions to adopt a program for transforming and diversifying their economies through an “entrepreneurial discovery process” (Hausmann, Rodrik, 2006) consisting in the identification, selection, and prioritization of a limited number of industrial domains (Foray, 2009). This policy has given rise to a vast literature review pointing to differentiated implementation trajectories (Kroll et al, 2014 ; Trippi et al, 2020), themselves dependent on economic and technological backgrounds (Camagni, Capello, 2013), administrative performance and capacities of governance (Sotarauta, 2018 ; Estensorro, Larrea, 2019; Gianelle et al, 2023). The literature points the difficulty of operationalizing both entrepreneurial discovery process (Grillitsch, 2016; Hassink, Gong, 2019) and strategic prioritization (Iacobucci, 2014). These issues are an interesting framework for analysing the rise of French regional industrial policies. How is this movement to consolidate regional industrial policies being built? On which actors, instruments and practices is it based? Our research is based on a comparative study of the regional plans for economic development, innovation, and internationalization (SRDEII) of the 17 French regions, drawn up in 2017 and 2023. This material is used to objectivize the issues, priorities and methods of regional intervention and their evolution. The research is also based on 20 interviews of regional or local industrial policy managers. This material is used to understand the specific functioning of the regions, their governance mode, their visions and tools of development. The analysis of strategies highlights a renewal of regional industrial policies, which are aimed less at specializing regional economy than supporting them in their transformations in an integrated manner. The aim is to provide integrated support to as many companies as possible to face some major challenges: digitalization, decarbonization, skills management... Our interviews show that the implementation of regional industrial strategies, as for smart specialization strategies, requires the creation of services and governance structures that enable economic contact to be made, needs to be understood... The cluster paradigm is an extension of ambitions to support business transformation with more technical support. These paradigms are implemented through various documents which show a tension between a strategic industrial policy that anticipates the technological, economic, social changes, and the desire to operationalize these documents. These tensions call into question the role of regional economic strategy, between adapting to reality and framing it. Despite these advances, obstacles remain: regional financial and technical resources are limited, the construction of economic governance and leadership covering the entire territory remains complex. In this sense, a multilevel governance system including municipalities, regions and the State is essential.

109 A Successor Model to FDI-driven Regional Development in Central and Eastern Europe? Challenges, Concepts, and Exploratory Scenarios

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Abstract

The present paper is concerned with outlining a potential future alternative to the dominant FDI-driven regional development model in Central and Eastern Europe (CEE), and extending the argument to three exploratory scenarios for regional development policy. The research is based on a review of academic literature, employing the framework of regional development policy and industrial policy, as well as the Dependent Market Economy variety of capitalism.

Foreign Direct Investment has played a dominant role in the transformation of CEE regions, whereby they were swiftly integrated into Global Production Networks, leading to considerable productivity increases. However, there is increasing evidence to suggest that this development model has reached its limits, and its original focus on low-cost productivity has become a development trap. Deep and persistent centre-periphery relationships, constrained spillover effects from FDI units, weak territorial networks, and insufficient capital accumulation for high-road development show the hidden costs and trade-offs of FDI dependency, while recent exogenous shocks have not so much caused, but highlighted the systemic vulnerabilities of the dependent economies. These weaknesses ultimately impact the resilience and upgrading potential of these regions, particularly in light of the turbulence characterising regional development in the 2020s. An exploration of alternative sources of growth in the form of future-oriented, challenge-driven industrial policies is thus warranted.

The paper thus outlines a potential successor model to mitigate the weaknesses of the FDI-driven growth model, while acknowledging FDI's continued significance in the macro-region. Three exploratory scenarios are discussed to reduce external dependency and promote place-based regional development: a deeper embedding of FDI units in domestic production networks; increasing the role of national capital in industrial policies to foster the rise of domestic multinationals; and an increased emphasis on domestic SMEs and their networks. These scenarios rely on opportunities which already exist in a formative stage within CEE economies, and offer an opportunity to exploit virtuous path-dependencies.

The main goals of this policy mix point at high-road growth by increasing the prominence of high value-added, knowledge-intensive activities; the diversification of territorial networks through deeper FDI embeddedness and stronger horizontal linkages; improved resilience with an element of improved strategic autonomy; and a greater number of growth centres capable of reintegrating peripheral regions. It is suggested that for these goals, industrial policies should put increased emphasis on fostering endogenous capital accumulation, embeddedness, a more sectorally and geographically selective approach to investment policies, and an emphasis on encouraging regional re-specialisation to generate and exploit competitive advantages.

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111 Museums in Times of Crisis: Analysis of the Impact of Covid-19 on the Italian Museum Sector

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Abstract

The Covid-19 pandemic significantly impacted museums in Italy, prompting a notable display of resilience as these institutions adapted to new circumstances and engaged the public innovatively during the health crisis.

This research focuses on the effects of the pandemic on Italian museums, utilizing data from annual surveys conducted by the Italian National Institute of Statistics on museums and similar institutions spanning from 2018 to 2021. Distinctions are drawn between private and public museums, as well as between museums and other cultural institutions, such as archaeological sites. Furthermore, the study examines institutions that received public support in 2021 and those that did not. Our dataset also includes the geolocalization of all the considered museums, enabling us to explore the role played by spatial variables in shaping the responsiveness of these institutions to unexpected shocks, such as the Covid-19 one.

To assess the pre- and post-Covid-19 gap in visitors' numbers, an interrupted panel data model is employed. This model allows for the quantification and comprehension of challenges and opportunities that the museum system should consider in the post-pandemic era. By incorporating a spatial effect, the model takes into account the proximity of other museums, capturing potential agglomeration and spatial competition effects.

Findings from the study reveal differential responses between public and private institutions to the pandemic shock. Private museums displayed more pronounced reactions and exhibited quicker recovery, indicative of distinct economic sustainability. Additionally, the research identifies post-Covid advantages associated with open-air settings, particularly benefiting archaeological sites and cultural institutions beyond traditional museums. The spatial dimension emerges as statistically relevant across various specifications, suggesting that the impacts are contingent on the type of grouping under consideration. This implies that possible positive effects of agglomeration, such as a higher supply of cultural heritage in a defined area, may sometimes be offset by negative effects, such as increased competition due to time constraints of tourists and visitors.

The results deepen the analysis of disparities between private and public institutions, reflecting distinctions often mirrored in the policies governing them. It is noteworthy that these interventions frequently overlook agglomeration effects, primarily due to their predominantly national scope. The study suggests that differentiating policies for dispersed and agglomerated institutions could be worthwhile, considering that more concentrated museums are more profoundly affected—either positively or negatively—by spatial effects. Such considerations have the potential to enhance the efficacy of policy design in the evolving post-pandemic museum landscape.

112 High Tides, High Stakes: the Dual Role of MoSe Barriers in Safeguarding Venice

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Abstract

Climate change and the increased frequency of extreme weather events pose significant challenges for economies reliant on tourism. Among various natural disasters, our focus is on *Acqua Alta*, the high tide phenomenon that characterizes Venice and its lagoon. The primary goal of our study is to assess the protective role of the MoSE system—an arrangement of mobile barriers designed to shield the city from rising tides exceeding 110cm. Implemented in October 2020, this system acts as a crucial defence, preventing city flooding and mitigating the adverse effects on the local population, and on tourists as well.

Recent studies indicate that *Acqua Alta* adversely affects tourism prices. During weather alerts (issued 48 hours before expected events), all else being equal, the hotels tend to reduce room prices. Leveraging the introduction of the protection policy in a quasi-experimental setting, our study aims to evaluate its effectiveness in safeguarding the tourism sector of the city economy. We work on a comprehensive dataset of daily room prices of Venetian hotels listed on Booking.com platform, covering the period between 2019 and 2023. Our focus is on the supply side of the tourism sector, where hotels may adjust their prices based on expectations of potential damages in the absence of protection, or they may maintain current prices knowing that protection exists. By analysing both pre-MoSe and post-MoSe periods, we employ causal inference methods to evaluate the effect of MoSE protection in ensuring price stability. Furthermore, our empirical setting takes into account different degree of exposures to high tide occurrences. Differentiating between low-lying and high-lying hotels using a continuous exposure metric, we uncover heterogeneity in price fluctuations, which reflect different risk exposure and, hence, different importance of the protection.

The findings of this study carry substantial implications for local governance by showing the dual functionality of MoSE barriers. These structures not only act as shields for physical protection but also play a relevant role in safeguarding the local economy. Our evaluation of the policy's effectiveness in averting price drops contributes significantly to conducting essential cost-benefit analyses for climate change adaptation measures. While the Venice case is unique, similar barriers exist in other countries where flooding and submersion pose actual risks, such as the Thames Barriers in London and the Maeslantkering in the Rotterdam harbor. Additionally, discussions about constructing similar barriers, along with other preventive measures, are ongoing in places like Mauritius. Our approach and results can provide insights for these situations, but further analyses, considering the specificities of each case, are needed.

113 How does Green Innovation Network Affect the Green Total Factor Productivity? New Evidence from China's Yangtze River Delta Region

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Abstract

Improving green total factor productivity (GTFP) is an important way to balance environmental protection and economic development in China's Yangtze River Delta region. In recent years, as the integration process of the Yangtze River Delta region continues to advance, the number of patents of green cooperation between cities has gradually increased and the green innovation network has become more and more abundant, but the effect of the green innovation network on GTFP has yet to be further studied. Therefore, we construct an analytical framework for the impact of green innovation network on GTFP in the Yangtze River Delta region, taking 41 cities in the Yangtze River Delta region from 2011 to 2020 as the study area. Through collating the data of green cooperative patent inventions in the Yangtze River Delta region, we have constructed the green innovation network by utilizing the social network analysis method. In this study, we use panel econometric models to empirically study the impact of green innovation networks on GTFP in 41 cities of China's Yangtze River Delta region from 2011 to 2020. We construct intermediary effect models from the intermediary paths of green technological innovation and industrial structural upgrading. In addition, considering the constraint mechanism of green finance to start with, we use a panel threshold model to explore the threshold effect of green finance. Furthermore, we use spatial econometric model to analyse the local-neighborhood impacts of green innovation networks on GTFP in China's Yangtze River Delta region, taking into account the spatial spillover effects of GTFP. The results of the study show that: (1) the green innovation network in the Yangtze River Delta region has a significant promotion effect on GTFP. The effect of green innovation network on GTFP promotion is more significant in cities with high level of economic development, cities with high emphasis on science and education, non-resource cities and large cities. (2) Green innovation network can enhance urban GTFP through two paths: promoting green technological innovation and promoting industrial structure upgrading. (3) The results of the threshold model show that with the improvement of green finance levels, the promotion effect of green innovation network on green total factor productivity will be increasingly enhanced. (4) Local integration into the green innovation network will be able to influence the GTFP of local cities, and at the same time, local GTFP enhancement will also promote the GTFP of neighboring cities. This study has important theoretical and practical significance for further scientific promotion of China's Yangtze River Delta integration, optimization of China's Yangtze River Delta's green innovation network, and realization of China's Yangtze River Delta's green and sustainable development.

Keywords

Green innovation network, Green total factor productivity, Green finance, Threshold model, SAR model.

114 China's Foregone Urbanization Dividend: Declining Agglomeration Elasticities and Misplaced Construction

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Abstract

China's rapid economic growth over the last four decades has been underpinned by several 'dividends'. A reform dividend started in 1979 as agriculture began to de-collectivize; the rise in rural productivity saw per capita calorie availability grow by one-sixth even as population increased rapidly, and also saw poorer rural provinces partially close income gaps with more urbanized areas (Gibson, 2020). A subsequent demographic dividend, from a growing share of the population in working age groups, provided a tailwind to growth through until 2010 (Cai, 2020). An urbanization dividend was expected to provide at least two types of benefits – transferring workers out of low productivity rural activities into higher productivity urban activities and agglomeration effects from producers, consumers, firms and workers locating closer to each other in highly productive big cities. In forecasts made 15 years ago, a concentrated form of urbanization where the biggest cities had the fastest population growth rates, was expected to increase per capita GDP by up to 20% over what was expected from more dispersed urban growth strategies (MGI, 2009).

Contrary to those forecasts, and contrary to the previous pattern of urban population growth, the most recent decade between the 2010 and 2020 Population Censuses saw China's pattern of urban growth shift sharply. The population growth rate for the biggest cities, which are those having more than six million urban residents, halved from what it had been the decade before. It was only the smallest cities, with less than one million urban residents, who kept the same pace of population growth from the decade before. This shift reflects recent policy changes to favor the growth of smaller cities, which include size-differentiated rules for *hukou* conversions and for land conversion that affects housing prices.

In this study we examine the changing nature and location of agglomeration economies in China, using resident-based measures of urban scale from China's 2000, 2010 and 2020 censuses. We find agglomeration economies occur only for the urban cores of large cities, not for the smaller and less dense county-level cities and smaller towns. The agglomeration elasticities, based on the relationship between log GDP per capita and log urban scale, are falling over time, from 0.24 in 2000 to 0.08 in 2020. For the non-core urban areas we can never rule out that elasticities equal zero. One explanation for these patterns is that the gains from greater urban density are being foregone due to China's urbanization strategy favoring growth of smaller cities. One novel indicator of bias against bigger cities comes from long-form census data on occupations: in the 2000 census most construction workers lived in the urban core cities, which is where most building activity was occurring yet by 2020 most construction workers lived in counties, reflecting a dispersal of building activity. The rapid fall in China's working age population raises the question of who in future will be living in these buildings in counties and whether these additions to the built environment are in the most productive places.

115 Policy and Governance of Functional Urban Areas - The Case of Poland

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Abstract

The need to delimitation, and develop mechanisms for strategic planning and partnership in functional urban areas (FUAs) for the implementation of new EU cohesion policy territorial tools in 2014-20 posed a major challenge for countries and regions. This was particularly relevant to the development of new policies and institutional frameworks for the introduction of the Integrated Territorial Investments (ITIs) in countries that had never implemented such solutions. Poland was one of them. The aim of this article is to present the challenges faced by regions and communes in Poland in the context of building partnerships, developing strategies for Sustainable Urban Development (SUD) and implementing territorial governance in practice. The experience of 2014-20 will be the background for demonstrating the changes that occurred in 2021-27 as a result of a significant increase in the use of ITIs by extending coverage to smaller cities and marginalized areas. In particular, the analysis deals with the implementation of new and modification of old approaches and solutions to delimitation, strategic planning and building governance structures in FUAs. The contribution of the study is twofold - on the one hand, it shows the transformation of FUAs policies under the influence of changes in the rules for the ITIs implementation and, on the other hand, it presents the evolution of the mechanism for building inter-municipal partnerships.

117 An Analysis of China's Aluminium Ores and Concentrates Import Dependence Risk and Optimization of Layout

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Abstract

Aluminum, as an important strategic metal mineral resource, plays a significant role in both the development of the national economy and national defense security. China is one of the few countries that possess a complete aluminum industry chain. Aluminum, with its properties of being lightweight, corrosion-resistant, and recyclable, is widely used in various industries, including construction, transportation, electronics, etc. With the development of the new energy market, the demand for aluminum continues to increase. However, the grade of aluminum in China is relatively low, and domestically produced aluminum continuously falls short of demand, leading to a yearly increase in China's dependence on foreign aluminum. This paper starts from the perspective of mutual dependence of market supply and demand subjects, considering both China's dependence (R_{ij}) on the countries from which it imports aluminum and the dependence (O_{ij}) of these exporting countries on the Chinese aluminum import demand market, and incorporates them into the calculation system to examine China's risk level of dependence on aluminum resource imports (R_{ij}/O_{ij}). Based on this, the paper adopts a dynamic ECM-AIDS model that differentiates import sources to study the market relationships between countries from which aluminum is imported, and uses the endowment of aluminum resources in various countries as an indicator to evaluate the attainability of imports, to determine the geographical areas for diversified layout. Finally, using nonlinear programming methods, it minimizes the risk of aluminum import by considering factors such as import dependence risk, supply risk, political risk, etc., and calculates the optimal import volume from exporting countries, aiming to explore specific implementation plans for diversified layout. Through the analysis of aluminium ores and concentrates (AOC)(HS code: 2606) import and export trade data from 2012 to 2021, it is concluded that there are significant differences in the dependence risk index values of China on the main countries from which it imports AOC. The risk of dependence on AOC imports mainly comes from Guinea and Australia, whose import dependence risk values are far greater than 1, and the share of exports from Guinea and Australia to China has always been high, reaching a total market share of 83.01% in 2021. In contrast, there is no import dependence risk for China's AOC imports from India and Indonesia. Moreover, there is a clear substitution relationship between different import source countries. To safeguard the security of AOC imports and effectively prevent import dependence risks, taking into account the results of the diversified layout calculation, international situation, transportation channels, and geopolitical factors, the following suggestions are made: China should control the quantity of AOC imported from Guinea and Indonesia, and consider countries like India and Jamaica as potential areas for China's diversified layout, while also paying attention to the development of AOC resources in Asian countries that have transportation distance advantages, to disperse the current risk of dependence on AOC imports.

Keywords

AOC Import; Dependence Risk; Market Layout.

120 Changes in Ethnic Structure and Political Representation in Upper Silesia

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Abstract

Upper Silesia is one of the few regions in Poland where communities with national, ethnic and/or regional identities other than Polish live in a relatively compact way and where ethnoregional organisations were established after the transition. Upper Silesia is administratively divided into two regions (voivodships). In the western part (Opole Voivodeship) there is a German community, recognised as a national minority but with a steadily declining population, which, in addition to local and regional bodies, also had permanent parliamentary representation. The eastern part (Silesian Voivodeship) is home to a newly awakening community with a distinct Silesian identity, which by the 2011 census had swelled to over 800 000 people, and which has a distinct identity from both Poles and Germans but is not officially recognised by the respective governments.

The paper uses the results of Polish censuses to describe the current structure of Upper Silesia and the changes that have taken place over the last two decades (nationality was asked first in 2002 census after the transition), including the 2021 census. Using relevant demographic data from previous censuses, the presentation will attempt to answer the question of the different dynamics of the development of German and Silesian identity, and to explain why the German minority has lost its stable parliamentary representation in the 2023 elections.

Keywords

Ethnic structure, representation, Germans, Silesians, Upper Silesia.

121 Characteristics of Ethnoregional Communities in Central and Eastern Europe

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Abstract

In the 20th century, the break-up of the great empires and peace treaties led to many ethnic groups becoming minorities in the newly created small states. After forty years of state socialism, the last years of the era saw the emergence of political and social movements that opened a new era of self-organisation in Central and Eastern Europe. Political movements based on national identities emerged, seeking independence and redrawing borders within the region (some succeeded in creating new nation states and an increasing number of communities became minorities), while others sought personal and/or territorial autonomy in the countries where they lived. Some of these minority groups are spatially concentrated in a particular region or along a border. Although these so-called ethnoregional communities may differ significantly in terms of their population and regional proportions, they constitute a distinct group of ethnic minorities.

Related to the above, the presentation will attempt to characterize the ethnoregional communities in Central and Eastern Europe based on available census data. The presentation will cover the following issues and topics: (1) the distinction between ethnic and ethnoregional communities (2) the evolution of the population of ethnoregional communities (3) the types of ethnoregional communities (size, spatial location, status) (4) the political organisation and representation of ethnoregional communities.

Keywords

Ethnoregional communities, Central and Eastern Europe, characteristics, types, political representation.

122 Relationship between Periphery and Core Countries/Path-Dependence in Regional and Local Development in Eastern and Central Europe/Spatial Economic Geographic Projection of Economic Policy of the Transitional Economies

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Abstract

1989 and 1990 were years of rapid change in Central and Eastern Europe. The intensity of the change varied in each country; they ranged from elite bargaining (in Hungary), through strikes and states of emergency (in Poland), civil war (in Yugoslavia) to armed revolution (in Romania). In the countries of the Eastern Bloc, the former socialist political, economic and social systems were replaced by plural political systems. From the worlds dominated by monolithic state parties, parliamentary democracies emerged with their multi-party systems. Local governments were created in the spatial structure of power and NGOs also appeared in the societies. This rapid change of the political course took actually place only within a few months; in Hungary the public law framework was rapidly established by the Parliament in the very last months of the State Party (including Constitution, Electoral Act and others).

Economic transitioning took significantly longer; such could only be deemed complete at the end of the nineties. Changes to the economic systems in the Central and Eastern European states took place according to the spirit of the Washington Consensus that is along the principles of deregulation, liberalisation, and privatisation. The section seeks answers to the following questions:

To what extent has the economic transformation been locally influenced by historical heritage and impacts of policies which shaped the spatial structure before 1990 (latter including development of industry, linear infrastructure, human sector and urban and regional planning efforts etc)?

Was the previously developed spatial structure (zone-based development ranking) a result of a process of global influence, or was their new internal spatial structure more determined by earlier decisions?

Was it determined by path-dependence and global (new or rather local, old) forces? Did the internal structure hinder or, instead, prepare the 'development' thus the movement between the centre and the periphery? Are there any models in this area?

How were economic and social processes formed in space and how were the spatial structures of the countries transformed? What were the chances of economic transformation? Can the differences between countries be emanated in this transformation, or did everyone choose the "the only model for capitalism" because there was no other?

What are the knock-on impacts and present after-effects of the drastic decline in economical performance, high unemployment, masses dependent of social care (impoverishment)? Have the spatial differences been rearranged, deepened or eased?

Ultimately, what was the price of the political system change and the economic transitioning? Was a new society born? Can its traces be detected in geographical space?

123 Suburbanization within the City: An Apparent Paradox and its Environmental Consequences in the Case of Hungarian Rural Centers

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Abstract

The transition to market economies in post-socialist Central and Eastern European countries (CEE) has led to a surge in urban sprawl. Rapid urban changes pose challenges to spatial planning and urban development in these regions, exacerbated by resource constraints and frequent changes in the legal framework. The lack of consolidated municipal planning methodologies and management routines intensifies the impacts of sprawl in CEE countries. Most research in the CEE region has primarily focused on the suburban zones of capital cities, with slightly less attention given to the processes in rural centers and their suburbs. The sprawl is further complicated by the fact that numerous villages and rural scattered habitats with a farm or allotment-like character have been annexed to rural centers during planned urbanization. These areas function as rural enclaves within the administrative boundaries of cities and currently serve as action zones for sprawl. However, statistical data on them is only limitedly available in most CEE countries. Often characterized by small buildings and a significant permanent population, these areas possess unique features compared to traditional suburbs. This study aims to examine the impact of urban sprawl on the rural-urban periphery of rural centers in Hungary, specifically in the cities of Győr, Kecskemét, and Szeged. The analysis employs both qualitative and quantitative methods, including a stratified systematic survey of households, interviews with local government representatives and officials, and GIS data analysis based on the Corine Land Cover database and the aggregation of grid population density data. Results indicate significant land use conversions in the selected cities between 1990 and 2018, with notable increases in built-up areas. Greenfield commercial, industrial, and residential projects have transformed spaces, leading to spatial differentiation and environmental impacts. The study also reveals complex spatial structures in peripheral areas, characterized by chaotic and fragmented land use patterns, degradation of habitats and plant communities, and the appearance of alien taxa. Issues such as waste incineration, air pollution, urban heat islands, and conflicts in water management are prominent concerns for residents. The study emphasizes the long-term destructive impact of ad-hoc and semi-legal investment development techniques on the urban environment and local social development, exacerbating territorial injustices and chaos. Overall, the micro-scale problems associated with urban sprawl make it challenging for local communities to function, perpetuating conflicts in already segregated and socially unequal areas. One of the key findings of the research is that, due to the nature of the 'complex cultivation patterns' CLC category, a significant portion of the changes is completely masked in the case of these mid-sized cities. Furthermore, the afforestation of abandoned plots appears to increase the forest area, although they can be better interpreted as brownfields. Finally, the "turning a blind eye" practice of local governments further aggravates the presented issues.

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124 Development of Electric Vehicle Battery Industry and Sustainable Economic Growth of Hungary

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Abstract

The increasing awareness of energy security and environmental protection has promoted the continuous development of the electric vehicle (EV) industry. As one of its core components, the battery industry is considered a key driver of sustainable economic development. Hungary, which has a relatively small population and economic scale in the world, has attracted a batch of greenfield investments in the EV battery industry in recent years. The purpose of this study is to explore whether the development of the EV battery industry has an impact on promoting the sustainable growth of the Hungarian economy, and to employ path analysis methods to conduct an in-depth study of its potential role in fields such as economic benefits, environmental protection, and social sustainability.

Path Analysis is a statistical method used to explore the direct and indirect influence relationships between multiple variables, as well as the paths and mechanisms between them. When studying the impact of the EV battery industry on the sustainable growth of the Hungarian economy, impact path analysis can help reveal the correlation and impact paths between different factors. Key variables involved in the study, such as battery industry investment, economic growth rate, technological innovation indicators, employment data, etc., will be obtained from the Hungarian National Bureau of Statistics, the Hungarian Investment Promotion Agency, the European Automobile Manufacturers' Association, and the EUSTAT database.

Preliminary research results show that the development of the EV battery industry has a significant impact on the sustainable growth of the Hungarian economy. Direct path analysis suggests that investment and technological innovation in the EV battery industry have a positive direct effect on economic growth. Increased investment and technological innovation have brought more employment opportunities and industrial development, directly promoting economic growth. In addition, indirect path analysis shows that the development of the EV battery industry has a positive impact on environmentally friendly production and socioeconomic benefits through intervening variables such as technological innovation and environmental protection. These indirect effects play a supporting and strengthening role in sustainable economic growth. However, preliminary research results also revealed some challenges. Although the development of the EV battery industry has brought many benefits to economic growth and sustainable development, its development may also be restricted by resource utilization, environmental protection, and sustainability issues. Therefore, it is necessary to further explore and balance the impact of the development of the EV battery industry on resource consumption and environmental pressure to achieve a balance between economic growth and sustainability.

125 Exploring the Association between the Marketing of Properties and Neighborhood Change

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Abstract

In this article, we study how the marketing of single-family homes are associated with changes in the racial and income makeup of mortgage applicants in a neighborhood. Real estate listings are curated by agents to attract a target market as realtors arguably have intimate knowledge of the local housing market and of the current tastes and preferences of different groups of homebuyers (Nowak & Smith, 2017). The language of advertisements is therefore chosen with intentionality (Goodwin et al., 2014), and perceptions of this language have been shown to vary by the race, education, and income of the individual reading it (Goodwin et al., 2018). Consequently, advertisements have a distinct vernacular that varies depending on the racial makeup of the neighborhood (Besbris et al., 2021; Delmelle & Nilsson, 2021).

Following this logic, we propose that listings can serve as an early indicator of change if properties are advertised to homebuyers in a manner that targets buyers who differ in race and income from the existing neighborhood composition. Our analysis therefore centers on the association between the marketing of properties and the characteristics of those responding to the advertisements, measured by home mortgage applicants. Given that investing in housing involves some amount of financial risk, in addition to satisfying the tastes and preferences of home seekers, we expect the overall composition of how homes are being marketed in a neighborhood to serve as a signal of risk, and therefore a potential trigger of threshold indicator.

We use a case study of the housing market of Charlotte, North Carolina, and annual, longitudinal real estate listing advertisements alongside mortgage application data, to demonstrate how the share of properties advertised a certain way in a neighborhood in one time period is associated with shares of mortgage applicants by race and income the following year. We do this by classifying property advertisement text using a semi-supervised learning algorithm into five categories following a housing investment, disinvestment to renewal continuum. We find that neighborhoods at the 50-70th percentile of properties advertised as 'opportunities' for reinvestment see a significant share of White mortgage applicants, but this significantly drops if the share rises above the 90th percentile, suggesting that there must be a critical mass, but not too many advertised opportunities for significant changes to appear. Black mortgage applicants significantly increase with rising shares of property advertisements indicating disinvestment. Our results show that the language alone used in real estate advertisements significantly explains the racial and income makeup of neighborhood mortgage applicants and reveals strong income and racial segregating forces.

126 Investigating Overtourism and its Economic Effects: Evidence from Italy

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Abstract

The last decades have seen a constant increase in tourism demand. The literature about the economics of tourism traditionally puts forward the link between tourism and growth. Scholars almost find a confirmation of this mechanism, but there are also mixed results (Comerio and Strozzi, 2019). This heterogeneity, however, has not been much explored by the economic literature, especially in an empirical way. Recently, the term “Overtourism” has emerged in this context. Many scholars, however, have stressed that the term overtourism is not well defined, lacks clarity and is very difficult to make operational (Capocchi et al, 2019; Walmsley et al, 2022; Koens et al, 2018). What the term seems to suggest, however, relates to the fact that cities’ carrying capacity can be (and is) overshoot, causing different negative outcomes. The aim of this paper is twofold: first, it will help to contextualize the overtourism phenomenon in economic terms. Secondly, it will fill the gap in the literature by evaluating the negative tourism impact on different economic outputs. Indeed, we suggest that market inefficiency could arise when the public administrations do not internalize the tourism social cost. To understand the complex relationship between excessive touristic flows and sustainable development in cultural cities and other attractive areas, we develop an indicator of overtourism following the method proposed by Buitrago and Yñiguez (2019), based on the combination of traditional tourist indicators (such as the number of beds and accommodation available) and data extracted from social media and other platforms (such as TripAdvisor and Airbnb data). The aim of this indicator will be to cover all the relevant aspects of the tourism phenomenon, such as the absolute and relative touristic pressure, the tourism growth rate, the spatial and temporal distribution of tourism, the quality of life of residents and the tourist satisfaction. This index will be used to understand the relationship between tourism and local development on a panel dataset of all the Italian municipalities for 10 years, from 2009 to 2019. The econometric model would take into account possible spatial spillovers between municipalities. Studying the Italian context is extremely relevant to this research question, given the large availability of cultural sites, where tourism facilities are provided at the expense of the local population.

128 The Relationship between Győr and the Benedictine Community in the Light of Creativity. Exploring New Regional Relationships Using the Theory of Territorial Capital.

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Abstract

Closely related to the research topic of the thesis, it is important to state that the economic growth of a given settlement or area is determined not only by economic factors, but also by sociological, anthropological, sociocultural, and religious factors. Of course, this system of relations is also true in reverse, so the religious, cultural and social structure is determined by the economic processes, which therefore also affect each other in this way, while shaping each other and themselves. Nowadays, it is becoming more and more obvious that the structure and processes of the regional economy can be measured more accurately and more substantively, if non-economic variables (intangible capital elements) are also included in our analysis. In recent times, a number of elements have been included in the territorial capital models, which can give a more complex picture of the economy of an area or settlement, since intangible assets are also taken into account when describing the values of an area, so the concept of territorial capital is suitable for combining all these factors (cultural, social, religious, sociological) comprehensively conceptualizes and operationalizes. Individual areas develop when they are able to utilize their own potential or capital more and more effectively, however, the most commonly used indicator, GDP, cannot exclusively show this current economic and social situation. Territorial capital is therefore "the intersection of the available and accumulated economic, social and cultural capitals in the territorial system, the common surface, the sum of the values that are characteristic of a given place and can only be interpreted there". Territorial capital - theory describes a situation, a state, it examines what kind of relationships characterize the elements of the territorial system, how we can characterize the functioning of their factors (also immaterial!) at a given time.

The Benedictines – like the city of Győr – serve as a model of successful development and a high degree of innovativeness, which in their case manifests itself in the field of regional embeddedness and social services. Their regional embeddedness resulting from their long history enables them to influence the social and economic life of their settlement and region in a complex way.

Thus, the presentation examines the relationship between Győr as a successful city and the Benedictine Order as a successful community and institution, and the embeddedness of the latter with the help of territorial capital theory as a possible regional analysis method. We are trying to explore the functions of the Benedictines in the spatial network of Győr, which networks are based on regional (city) collaborations, their shaping, and the recognition of relationships with other regional partners (social and economic institutions). The territorial capital theory proves to be suitable for exploring the relations between Győr and the Benedictine order, with the help of capital goods originating from the past and still active in the present, to examine the processes, which thus dissolves the limitations of temporality and makes it, as it were, continuous.

129 SNAI and Polish FUA: In Search of a Tailored Geographical Scale of Functional Areas

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Abstract

The study fills a research gap for multidimensional analysis on the context of the geographical scale conducted in various spatial layouts, for different institutional structures and implemented policies. The purpose of the article is to understand the administrative point of view in terms of creation and management of functional areas and their subsequent policies. We consider the functional area as a geographical tailor-made scale with a subsequent policy under an administrative perspective. The novelty is to compare the determinants of transformation of the geographic scale representing both the policy and territory and the social approaches. At the policy and territory level, the purpose is to identify territorial aspect, and solutions and instruments proposed by legislation and implemented strategies and policies, as well as the capacity of the functional areas to trigger place-based approaches and collaborative mechanisms, following the most recent recommendations in terms of policy planning. At the social level, the aim is to identify the determinants of partner involvement and answer the question of how functional areas are perceived by the institutions and partnerships that are pursuing the policy related to this new scale. To achieve our goal, we analysed two case studies (Lublin Functional Area, Poland and SNAI Alto Lario, Italy) that do not based on pre-existing divisions and institutions (such as regions or provinces), and the extent of the territory (the inclusion or not of the municipality in the policy) is a key topic for the management of these areas, using desk research (territory and policy context) and a in-depth interviews with decision-makers (social approach). It has been proven that despite different origins, spatial layouts, institutional structures and implemented policies, it is the experience and years earned by the involved institution, that play a dominant role in determining the tailor-made geographical scale of functional areas. In cognitive terms, combining these two perspectives allows for a comprehensive analysis of the determinants of geographic scale at the supra-local level and motivates further research.

130 Methodological Problems of Measuring Territorial Happiness

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Abstract

The happiness and well-being of urban inhabitants have played a central role in urban thinking and politics since ancient times. Initially happiness was research subject of philosophy, then the subject of psychology, sociology and political science (Diener et al 1999, Lane 2000), in economics happiness research started at the end of the 20th century, connected to Easterlin's research (1974). Although the empirical literature examining the most important economic elements of well-being and happiness is based on observations in spatial locations, the determination of spatial aspects and dimensions of happiness is rarely researched only with some exceptions (Clark et al. 2005, Aslam, Corrado 2007, Brereton et al. 2008, Ballas 2007). Recent years many happiness surveys and indexes had been elaborated. The United Nation World Happiness Report examines the happiness of nations, attempting to quantify happiness globally using the "gross national happiness" index (Sachs et al 2012). The OECD also elaborated its own recommendation on subjective well-being assessment. (OECD 2013). Parallel with national happiness indexes the first attempts to evaluate the happiness of settlements have also appeared. In the United States, Gallup-Healthways prepares a report on the well-being of US cities, states, and electoral districts every year, based on ongoing questionnaire surveys (Gallup-Healthways 2012). The European Union has also produced a quality of life survey covering 79 cities (Európai Bizottság 2013). In the course of research so far, no scientific consensus has emerged in defining the concepts of welfare, well-being, life-satisfaction, quality of life and happiness. So the first problem we face is the problem connected to the conceptualization of happiness, well-being. The next problem is whether it is possible to measure happiness. If we agree that happiness is possible to measure still remain some methodological problems:

The weighing and aggregation of indicators; The used indicators and the results are very similar to that measuring „development”; The approach basically follows and is based on Western European values. There are issues with the extreme ends of the scale, both of which are difficult to interpret in a way that would allow the results to be normalized, combined, and averaged.

With territorial dimension new methodological problems are coming:

The problems of data collection; We use the same indicators and weighing for all regions or settlements. But is it true that all indicators have same importance in all regions? Is the source of happiness or unhappiness purely personal or do spatial/contextual factors matter? (and if they do, to what extent?) How to differentiate personal and spatial elements? If social comparisons are important, what is the spatial scale at which people make their social comparisons? Do levels of happiness among individuals reflect different characteristics of residents in different districts and regions and areas (compositional effects) or whether there are environmental, geographical or other factors?

And finally, policy based on happiness raises a number of ethical and political conundrums...

In my presentation I would like to discuss these widespread methodological problems connected to measurement of spatial happiness.

131 Environmental, Social and Economic Dimensions of Community Supported Agriculture

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Abstract

Community Supported Agriculture (CSA) has emerged as an alternative agricultural model, fostering direct connections between farmers and consumers. This study aims to qualitatively explore the environmental, social, and economic dimensions of CSA, relying on verbal reports from farmers and community members, as well as a thorough literature review. In the face of increasing scrutiny of global food systems, understanding the holistic impact of CSA is crucial. The relevance lies in its potential to address environmental concerns, enhance social cohesion, and contribute to economic sustainability. As conventional agriculture faces challenges, exploring alternative models like CSA becomes imperative for building resilient and sustainable food systems. The primary objective is to provide a nuanced understanding of CSA's impacts, utilizing qualitative insights. By delving into farmers' verbal reports and existing literature, the study seeks to uncover the environmental practices, social dynamics, and economic implications associated with CSA. The research adopts a qualitative approach, relying on the narratives shared by CSA participants through in-depth interviews. Farmers, consumers, and community organizers contribute their experiences and perspectives, forming the basis of the qualitative data. Complementing these first-hand accounts, an extensive review of the literature on CSA practices provides additional context and depth to the analysis. The qualitative findings illuminate the multifaceted impacts of CSA. Participants' verbal reports underscore a notable reduction in the carbon footprint associated with food production attributed to localized distribution networks within CSA. Additionally, the study highlights adopting organic farming practices and decreasing pesticide and synthetic fertilizer use, aligning with sustainability goals. Regarding social dynamics, CSA emerges as a catalyst for community engagement, as verbal reports emphasize its role in fostering connections, educational initiatives, and shared values within communities. On the economic front, challenges such as initial investments and labour-intensive practices are acknowledged. However, participants report fairer compensation for producers within the direct-to-consumer model, suggesting economic viability. The conclusion is that the qualitative exploration provides valuable insights into the promise of CSA as a sustainable agricultural model. As global food systems evolve, CSA stands out as a viable alternative, offering a potential pathway to address environmental, social, and economic challenges. The study concludes by underscoring the need for continued community involvement and policy support to overcome hurdles and unlock the full potential of CSA in reshaping local food systems.

135 Driving Eastward: An Analysis of Chinese Automotive Foreign Direct Investment in Central Asian and South-East Asian Economies

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Abstract

This article delves into the dynamic landscape of the Chinese automotive industry's foreign direct investment (FDI) in Central Asian and South-East Asian countries, offering a comprehensive examination of the economic implications and strategic motivations behind these ventures. As China continues to solidify its position as a global economic powerhouse, its automotive sector has emerged as a key player in international investment. Focusing on the amount of invested capital, the nuances of Chinese automotive companies' foray into select nations within Central Asia and South-East Asia will be explored through their market presence. The study scrutinizes the strategic considerations guiding investment decisions including geopolitical factors.

In Central Asia, where infrastructural development and economic integration are on the rise, Chinese automotive companies have strategically allocated substantial capital to capitalize on emerging markets. Simultaneously, in South-East Asia, characterized by diverse consumer preferences and competitive markets, Chinese firms have navigated complex landscapes to establish a significant presence. Chinese automotive companies have notably directed their foreign direct investment (FDI) towards key countries in both Central Asia and South-East Asia. In Central Asia, countries such as Kazakhstan and Uzbekistan have attracted substantial investments. The strategic location of these nations, coupled with their growing economies and infrastructure development initiatives, makes them attractive hubs for Chinese automotive expansion.

In South-East Asia, Chinese automotive FDI has been prominent in countries such as Indonesia, Thailand, and Malaysia. These nations, with their burgeoning automotive markets and strategic positions within regional trade networks, have become focal points for Chinese companies seeking to tap into the dynamic consumer base and establish manufacturing and distribution networks.

Through an interdisciplinary approach, encompassing economic and regional policy dimensions, this research contributes to the broader discourse on China's global economic outreach. The findings presented herein offer insights for policymakers and industry stakeholders, shedding light on the multifaceted nature of China's economic engagement in the automotive sector across these strategically important regions.

137 Mines, Fields, or Classrooms: Effects of Primary Activities Agglomeration on Local Human Capital Accumulation

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Abstract

This study analyses the impact of spatial concentration of mining and non-mining primary activities on human capital accumulation at the municipality level. The expected channels involved in this interplay are related to the attraction of low-education labour and the 'brain drain' phenomenon, which displaces highly educated workers away. We focus in the case of Chile, where mining sector plays a key role in sub-national economic growth of mineral-rich municipalities. In addition, the Chilean mining sector is also characterized by its high wages, associated to copper price booms. This makes the opportunity cost of getting higher education against entering the labour market to increase during price rising periods. In this line, our scope is to assess whether the impact of mining concentration differs from that stemming from other primary sector activities. Non-mining primary activities are represented by diffuse resource sectors, such as agriculture, fishing, and forestry.

We assess the relationship between primary sector concentration and the stock of human capital accumulation from two approaches. First, we estimate the impact of the agglomeration of these types of activities at the municipality level on the individual likelihood of holding tertiary education. Second, we explore for spatial spillovers between municipalities, assessing the impact of agglomeration of mining and non-mining activities on the share of highly educated working-age population.

Preliminary results from individual-level estimations suggest that higher mining activity concentration leads to lower probabilities of working-age population to hold college degree in periods in which the copper price records the highest quotes. Conversely, diffuse resources would exert persistent negative effects on educational outcomes. This difference between estimations hold after focusing on different segments of the population. Results from exploratory spatial autoregressive combined (SAC) models estimations account for negative spillover effects from the concentration of non-mining primary activities in neighboring municipalities. Nevertheless, no conclusive results for the case of mining activities are found. These results suggest that the effects stemming from mining and non-mining primary activities on the distribution of human capital differ both in time and space. While mining resource-based activities are associated to one-shot negative effects on the local stock of human capital during price shocks, diffuse resource-based activities are associated to negative, permanent, and relatively more extensive effects on human capital. These results shed some light on the intra-national divergence in long-run regional development factors, derived from natural resource-based productive structures. At the same time, results contribute to the ongoing discussion on the different effects of point- and diffuse-resource based activities, focusing on mining. Based on these outcomes, policymakers should implement placed-based, tailored regional development strategies, aiming to productive diversification. Also, the development of knowledge-intensive activities linked to mining processes might allow to leverage price booms and attract highly educated workforce into mining zones.

138 Emerging Centres of Smart City Research. Lessons from Science Mapping and Spatial Collabouration Patterns

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Abstract

Cities have always been the centres of knowledge. More and more people live in urban areas and the creative class (e.g.: scientists, engineers, legal experts, designers) is concentrated in urban and metropolitan areas. The smart city concept is quite new as the first related publication in the Web of Science is only 30 years old and only after 2010 we see the rapid increase in the number of 'smart city' publications.

The content of smart city research is greatly varied. On the one hand a technological research focus is typical while on the other, the topic has penetrated to social science fields as demonstrated by policy, smart living, smart governance, smart businesses or sustainability related articles that rely on the smart city concept.

The strong technological focus of smart city research elevates cities where smart city research is concentrated also as places where knowledge and innovation is focused. By studying the thematic content, we can gain understanding on where cities are heading as they foster a smart city agenda.

In our research we reveal the thematic space of smart city research using science mapping tools and also identify the geographical hubs of smart city research and the inter-city collabouration networks. Two periods are distinguished: a take-off or emerging period (2010-2017) and a maturing or consolidated period (2018-2022). Comparison is focused on three main research questions:

What are the frequent research topics in the two periods and was there a shift during consolidation? How do thematic clusters develop in the geographical space?

Are there differences in publication and collabouration patterns at the city level?

Our explorative research is based on the Web of Science metadata of on more than 20 thousand articles in academic journals and proceedings. To capture thematic clusters we use co-word analysis based on keywords. A co-occurrence matrix is set up to detect common keywords between each pair of papers. Then we calculate cosine similarity and the resulting matrix is used to set up a weighted, non directed network of the articles. For the identification of thematic clusters the Louvain method is used.

To map city-level dynamics, we use the affiliation data of the articles. We aggregate author and co-authorship data to city level and set up a collabouration network, where relations are between cities based on articles jointly written by authors from different cities.

In the synthesis, the thematic and geographical results are analysed jointly. Besides uncovering the places where smart city research is conducted and the inter-city collabourations, we also structure thematic content of smart-city research.

Our work-in progress results demonstrate that smart city research is concentrated not only in traditional city centres but also in urban areas, where the population has been growing sharply for instance India and the Middle East region. For the whole period 6 thematic clusters were identified and the collabourations patterns were also mapped. Cities with diverse research profiles and more specialized cities have also been distinguished. Overall, results point to a changing landscape of focal urban areas at a global scale.

139 Spatio-Temporal Evolution of Patent Clusters: A Comprehensive Analysis from 1980 to 2010 in the UK

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Abstract

This research investigates the spatio-temporal changes of patent data clustering, examining shifts in their spatial distributions over time. The study explores the dynamic nature of patent clusters and their changes across different periods. Furthermore, the research explores coexistence among different patent types, unveiling relationships within and between patent clusters. By employing unsupervised learning methods, this study contributes to a comprehensive understanding of the changing structure of patent clusters, offering insights into the changing dynamics and interconnections within patent clusters across different time periods. The study will verify that present-day clusters are displaying greater diversity compared to those in the past. This hypothesis will be verified on the basis of very uncommon data on exact locations of patents which will be a significant improvement compared to the previous studies which are using regional data instead of point data.

The research utilizes patent citation data from the UK spanning the years 1980 to 2010 including critical details like the locations of cited and citing patents, patent types, and associated dates. The analysis specifically focuses on cited patent information. The findings of this study aim to offer insights for policymakers and industry stakeholders, enabling informed decision-making, and fostering innovation within patent landscapes. The diversification or specialization of a region can be assessed by examining the distribution of patents in specific areas. This information can be connected to regional resilience. The primary motivation for considering patent citations as valuable indicators of the economy lies in the understanding that innovation is a collaborative and cumulative endeavor. Inventors engage in the exchange of knowledge with fellow scientists and technologists, including other inventors. This knowledge often involves aspects not documented in bibliographic sources or personal experiments because it eludes complete codification.

This study, with its emphasis on exploring the spatio-temporal changes and coexistence patterns within patent clusters, may carry significant policy implications. Investigating whether a place focuses on different things or specializes in one area, seen through where patents are, is connected to how well a region can handle challenges. Understanding the delicate balance between economies of scale and expertise becomes crucial for regions aiming to avoid over-reliance on a particular industry. This helps regions not to depend too much on just one industry, making them more adaptable and resilient. The study's inquiry into regional resilience, not only in terms of the capacity of a region to withstand shocks but also in its adaptability to create new opportunities for growth, provides valuable perspectives for policymakers seeking sustainable economic development. Additionally, the exploration of similarities between technological and scientific regions, contingent upon the degree of overlap between these domains, opens avenues for nuanced policy interventions. Recognizing that innovation is a collaborative and cumulative endeavor, this study reinforces the importance of cross-disciplinary and cross-industry collaboration in regional economic planning and policy formulation. As such, the findings of this research offer a nuanced understanding of the intricate interconnections within patent clusters, contributing to the broader discourse on informed decision-making for regional development and innovation strategies.

141 Problem or Potential? – Native Ethnic Minority Communities in Development and Spatial Policies

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Abstract

Identity plays a key role in regionalism, as a driver of the cohesion or the devotion of different territories. In the EU, and especially in In-Between-Europe there are many geographical areas that do not form a territorial administrative unit, yet have a strong character and identity. This is often due to the fact that these areas are inhabited by national or ethnic communities which are in a minority position in the encompassing region or the country. These native ethnic communities can also be a source of regional development, as they have their own special external and internal economic networks, traditional cultural values, and represent a social diversity that is a breeding ground for innovation. Our research examined regional development documents all across the EU at different levels (regional, member state level, EU level) in order to answer the question of whether native ethnic minority communities are reflected as development resources in development concepts. This extensive research revealed this approach in only a few exceptional cases, and even in the case of plans for ethnic minority-rich areas.

146 Assessing and Comparing the Circular Economy Performance of Small Island Developing States

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Abstract

The Small Island Developing States (SIDS) are engaged in the process of transitioning from the linear economy to the circular economy. These territories expressed their expectations linked to this new paradigm: making material use regenerative, reducing carbon footprint and the amount of waste sent to landfill, combine economic, social, cultural and environmental dimensions of sustainability. To reach these goals, some have implemented projects, initiatives and developed collaborations or dedicated funds. However, a common missing link remains the measurement of their progress, which, as expressed in the literature, is a critical aspect to reach one's goal.

Over the years, many indicators of the circular economy have been proposed. They vary according to the scale of analysis (micro, meso, macro), the actors concerned (company, associations, governments) the country of application and the priority set in terms of circular economy (plastic pollution, resources optimization,...). These indicators are often applied to European or Asian regions, but almost never to the SIDS. As territories characterised by great vulnerabilities - such as a vulnerability to external shocks, environmental hazards and limited land and resources - the SIDS need to know exactly the amount of resources they possess and their current use, their dependence to external economies and the pressure they put on their environment. This is possible through the analysis of their territorial metabolism. Most importantly, from this assessment, it is then possible to measure their performances in terms of circular economy.

In this contribution, we want to measure the current performance of the SIDS in terms of circular economy. To achieve this objective, we adopt a comparative research approach by applying two set of indicators, the National Circularity Index, developed by the Circle Institute, and the Circularity Material Use Rate, developed by Eurostat, to a sample of SIDS. These two indicators, grounded in the concept of the territorial metabolism, provide a deep understanding of the territory - an essential aspect for designing effective circular economy strategies.

This study addresses a gap in the literature as it looks at the intersection between circular economy and the SIDS, where an assessment of their performances in terms of circular economy has never been applied, nor a comparison of these performances. By comparing their results, we can determine a common frame of analysis while also understanding if a difference of variables impact or not the performance score. Finally, studying the SIDS at the macro level allows the implementation and monitoring of regulatory instruments which, while too often lacking, is one the key factor of success of circular economy. Through this work we thus hope to provide a baseline of analysis, from where the SIDS will be able to set quantitative goals and track the efficiency of their strategies for a circular economy.

150 **Types of the Creative City**

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Abstract

The creative city concept is based on two things: culture and creativity. On these two important social values, the creative city builds a strategy that can launch city and regional development processes. We know many examples around the world, where city decision-makers and urban planners relied on culture to try to implement structural changes in settlements that were facing economic difficulties. In these places, culture proved to be a resource on which they were able to improve the often seemingly hopeless situation of the region. At the same time, the creative and cultural economy has also started to grow in the last few decades. A new social class appeared, which Richard Florida calls the creative class. And Florida believes that the members of this social class, the creative professionals, as a highly qualified workforce have a huge impact on the growth of the urban economy. The possibilities inherent in culture and creativity were eventually recognized all over the world, and a series of initiatives and good examples enriched the toolbox with which we can activate the beneficial use of our most valuable resources for the development of our cities. There are many types of creative cities. This also means that each city can find its own special character in the perspective system of the creative city, which can be the starting point for creating a strategy. What are these types? During the research, we will provide the answer to this question.

151 The Economic Situation of Regions in Europe After the Pandemic, with a Special Focus on Hungary

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Abstract

The outbreak of the coronavirus pandemic in 2020 has had an impact on many factors of the economy and thus on the economic situation of regions. The eighth Cohesion Report (EC, 2021) emphasized the depth of the economic recession during the pandemic was affected by some main factors. The first was that the places with stricter lockdown measures tended to experience a deeper recession, and in Hungary there were relatively strict measures in the first wave and the decline in GDP was also large compared to other countries. Another one was that some types of economic activities were much more affected than others, so Member States and regions that were more dependent on the problematic sectors saw a bigger drop in their economic activity. In Hungary the Central region was hit by the decline in tourism, but the number of people usually working from home increased and it was the highest in the country. The travel restrictions affected border areas where people could no longer cross a national border to go to work or to access services, and in Western Hungary (neighboring Austria) was most affected by it.

In the topic of regional resilience are different forms of regional development pathways (resistant, resilience, recovering, chronic dysfunction). In this research, we used European regional statistics, the GDP (2019-2022), to show how the pandemic has changed the economic situations of the regions (NUTS2), with a particular focus on the relative position of Hungarian regions. In 6 percent of the regions, the value of GDP in 2020 was less than 90% of data in 2019; these are mainly interested in tourism. In 2021-2022, some of them regenerated quickly, but in the case of a few regions, the GDP value just reached or slightly exceeded the data in 2019. In Hungary the GDP of all of the regions declined from 2019 to 2020, but all regions' economy shows the resilience in 2021 and 2022. The GDP growth of most developed rural region (Western Hungary) was slowest after the pandemic because of serious industrial base and connections with Austria, and Pest region (agglomeration zone of Budapest) had the biggest increase, because of rapidly regenerating economic branches (air transport, logistics etc.).

152 The Role of Public-Private Partnerships for a Sustainable Development through EU Cohesion Policy after Post War Reconstruction

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Abstract

The role of public-private partnerships (PPP) in increasing sustainable development is becoming more important at the local, regional and international levels. The article considers public-private partnership (PPP) as an effective mechanism of socio-economic development of the Ukraine and cross-border region. The article is focused on the peculiarities of using the mechanisms of public-private partnership, between governments, the private sector, and civil society, in the creation of objects of regional infrastructure of post war reconstruction in cross-border area. The current body of research based on the ILCA project with an important objective related to sustainable development as regards systems thinking needed to accelerate innovation in climate change. This provides evidence for the significance of higher education institutions in the process of fostering sustainable development through the development of curricula, research, and interaction with the local community. Moreover, the analysis demonstrates that the effectiveness of public-private partnership (PPP) is based on the fair exchange of ideas between public and private stakeholders, the pooling of resources and the sharing of risks and financial expenses in order to achieve the proposed objectives. A deeper understanding of the interdependencies inherent in the regional business ecosystem is crucial for enabling systemic change and transformation. In this paper we will also analyse other aspects related to corporate responsibility, the taxonomy and investments of sustainable financing, behavioural changes and the taxonomy of sustainable financing. The regional business ecosystem allows for a series of changes and transformations, including systemic ones. Therefore, in this paper, we focus our analysis on the study of the interconnections centered on behavioural change, sustainable financial investment and corporate responsibility. The main result is to create and disseminate the importance of public and private partnership, with invaluable knowledge and innovation capacity to build the necessary infrastructure for post war reconstruction. The result of the paper demonstrates that the university’s role to sustain, build and foster deep cooperation and close links with the public and private partners, local businesses and communities by focusing on mentoring and training programs for students, academic and non-academic staff. In addition, we consider that the results of this work can be used in real economic life by implementing public-private partnership projects in different fields in cross-border regions.

156 European SMEs towards a Green Economy

María P. García-Alcober, Ana Isabel Mateos-Ansótegui, María Teresa Pastor Gosálbez

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Abstract

Climate change, lack of resources and rising energy prices are leading economic agents to become increasingly concerned about economic efficiency and sustainability. In particular, the business world is trying in this direction, both to reduce its costs and as a matter of awareness of environmental sustainability. However, it is necessary to know in what situation companies are currently in, what obstacles they find when producing in a sustainable way or what kind of initiatives they are carrying out. In this study, we will focus on small and medium-sized companies in Europe (EU-27), with a special attention to Spain. Knowledge of business behaviour, in this sense, is fundamental when it comes to carrying out the appropriate policy measures, providing incentives to avoid these negative externalities. In this paper, we want to find out what factors drive European companies to develop a sustainable economy, what initiatives they carry out, and to make a classification, grouping these companies according to common characteristics. Finally, we analyse whether there is a positive relationship between more environmentally committed companies and business performance.

Using data from the Eurobarometer survey "SMEs, resource efficiency and green markets (2020)", we will construct a variable that indicates the level of environmental commitment of European companies, similar to the analysis carried out by Sáez-Martínez et al (2016). After making a comparison between the different countries, we will classify the companies depending on different characteristics, as Gkotsis et al (2018) do. In our case we will use a KModes clustering technique to carry out this classification. Finally, Aragón-Correa et al (2008) show that more environmentally proactive firms have better financial performance. In this paper, we will study whether such a positive relationship exists.

We selected the 27 European countries at this moment for this Research. Firms number by country – after cleaning the database - shown in table 1. We have a total of 14,008 firms.

To identify possible groupings of companies according to the cited variables, we will use a clustering technique.

Clustering is an unsupervised learning method whose task is to divide the population or data points into a number of groups, such that data points in a group are more similar to other data points in the same group and dissimilar to the data points in other groups. It is basically a collection of objects based on similarity and dissimilarity between them (Harika Bonthu, 2022).

Since all the variables we know for each of the companies are categorical variables, we will use the k-modes method to perform our clustering analysis. We will implement the k-modes method in Python. (Naren Castellon, 2022).

In a preliminary version, we already detected differences between the behaviour of Nordic and Mediterranean countries, probably associated with cultural differences. Therefore, we expect to obtain clusters according to different entrepreneurial behaviours.

158 A Quantitative Evaluation Framework of Community Thermal Resilience in Response to Power Outage Events in Heat Waves

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Abstract

As global warming intensifies, there is an increasing frequency of extreme heat events and power outages. This exposes the population to dangerous levels of heat, especially when air conditioning systems are not functioning properly. In such situations, the thermal comfort and health of residents heavily rely on the thermal resilience of the community, which derives from the concept of building thermal resilience, referring to the ability to maintain or recover a habitable level of temperature after a disruptive event, such as the failure of the heating, ventilation, and air conditioning (HVAC) system. As the indoor temperature increases to an inhabitable level, residents must evacuate their homes and seek refuge in cooling shelters for safety. Within the community, various facilities such as parks, libraries, swimming pools, cinemas, cafes, and more, collectively termed as social infrastructure facilities, serve this purpose.

In this study, a quantitative framework is proposed to evaluate community thermal resilience, considering both building thermal resilience and social infrastructure accessibility. Building thermal resilience is influenced not only by building attributes, such as roof types, wall materials, and construction years, but also by external environmental factors. However, limited efforts have been made to investigate the impact of microclimate conditions on the thermal insulation performance of buildings due to the lack of high-precision building information models and computational resources. To address this, the urban weather generator (UWG) model is used to simulate local microclimate conditions based on urban morphology, simplifying the calculation procedure. And this model is combined with a building energy model to simulate indoor thermal stress, with the primary indicator being the time it takes to reach a critical level. A longer time to critical level indicates higher thermal resilience. Regarding the accessibility of social infrastructures, we employ a navigation API to measure travel time from home to the destination, reflecting real-world resistances instead of using straight-line distances traditionally. A shorter travel time indicates higher thermal resilience.

The proposed framework is applied to several communities in Philadelphia, Pennsylvania, USA. The results reveal significant differences in thermal resilience among these communities. Older urban areas with high building density exhibit shorter thermal insulation time and travel time. Although these areas experience a rapid increase in indoor thermal stress after a power outage, residents can quickly transfer to social infrastructures within close proximity. In contrast, suburban areas face different challenges. These findings provide nuanced references for the interventions of urban heat adaptation and mitigation, such as enhancing the resilience of electric power system, establishing temporary emergency infrastructures, and establishing urban heat management programs.

159 Sustainable, Family-Friendly Organizations in Hungary

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Abstract

This study examines the family-friendly organization practices in Hungary from the perspective of sustainability. Balancing family life and professional responsibilities is a daily challenge for employees today. Work-life balance is becoming more important not only for employees, but also for organizations and society. There is increasing attention to creating family-friendly organizations, which help their employees reconcile their work commitments with their personal life. These organizations can offer a wide range of workplace practices, for example flexible working arrangements, childcare opportunities, and other benefits. The literature shows that introducing family-friendly practices can have many positive aspects, both for workers and their families, as well as for organizations and society. Family-friendly policies can contribute to improving the quality of life of employees, can increase employee satisfaction and commitment to the organization, and the reconciliation of work and family can lead to increased female employment and improved birth rates which is very important from a demographic point of view.

This research explores the workplace practices of family-friendly organizations in Hungary. It is based on an online questionnaire survey conducted among Hungarian employers with “Family-Friendly Workplace” trademark certificate in 2023. The questionnaire was sent to 702 workplaces and it was completed by the leaders of 116 organizations. Almost half of the participants came from the for-profit sector, but state and municipal employers, and organizations from the civil/non-profit sectors are also represented in the research.

The research shows that atypical and flexible working arrangements are the most common practices among respondents. 99% of organizations offer various forms of atypical work, such as flexible working hours, part-time work and telecommuting. 98.3% offer family-friendly leave arrangements and 94.8% organize family and children's programs for their colleagues and their families. Most organizations support the reintegration of mothers with young children into work with various measures, such as reintegration programs, and organize prevention and health promotion programs, and trainings. In addition, more than 50% of the organizations implement other CSR-programs, such as local fundraisers, education and labour training programs, waste collection and other environmental protection programs, as well as various community, health and safety programs.

The main conclusion of the research is that family-friendly organizations in Hungary support their employees and the local communities with practices that are in line with the Sustainable Development Goals (SDGs), such as Good Health and Well-being (SDG 3) and Gender Equality (SDG 5).

160 Comparison of European and Ukrainian Approaches to Rural Development

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Abstract

The purpose of the study is to compare approaches to rural development in European and Ukrainian science, and state and local policy, to determine their main differences and to assess their impact on the current vision of rural communities of their future. The primary research method was a comparative analysis of the evolution of scientific concepts in Ukraine and Europe and their reflection on modern rural development policy. It has been established that the starting point when European and Ukrainian approaches to development began to diverge in diametrically opposite directions was the occupation of Ukraine by the soviet regime in the early 1920s. These were ideological differences associated with the communist and capitalist visions of development. The most significant differences, which continue to influence and determine Ukraine's current and future rural development, are grouped into several groups. The first group concerns the attitude toward understanding man's role in rural development. The second group is about the place of the village in the regional settlement system and the relationship between the city and the village. The third group is related to methodological research approaches to rural development.

In Ukraine, rural development policy is not coherent and consistent. Today, due to the lack of concept as one document, it is directly or indirectly regulated by regional, sustainable development, agrarian, economic, environmental, and other sectoral policies. Our analysis of these policies confirms that they are inconsistent and contain various contradictory approaches, ideas, and concepts. As a result, the current Ukrainian rural development policy is a struggle of neoliberal ideas, remnants of marxist approaches to territorial development, market economy, state regulation, and decentralization. All this is complicated by the soviet totalitarian past and the russia-Ukrainian war, which requires the centralization of many processes and finding a new balance of interests of different actors in rural development.

Ukrainian rural development policy significantly differs from European policy in content, formation, and implementation. There are problems with public participation in adopting policies and their development based on the study of the real needs of the population. The discrepancy between what is declared and what is expected to be achieved attempts to ape the European experience without considering the specifics and trends of rural development in Ukraine.

To understand what kind of development model residents of rural communities of Ukraine are inclined to implement, we analysed 50 strategies of rural communities from all regions of Ukraine, which have been developed since the beginning of decentralization in 2015. Only strategies created with the public's participation were chosen for our research. As a result, we concluded that all community development strategies developed from 2015 to 2022 are very similar in structure and content and reflect current trends in the community. We concluded that residents of rural communities in Ukraine demand "urbanization of the rural areas" and a move away from the exclusive focus on agricultural production.

Keywords

Rural development, comparison, state policy, development concept, scientific and methodological approaches, territorial communities, Ukraine.

162 Economic Complexity Index and Economic Development in Romania

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Abstract

In the last two decades, Romania has undergone a strong economic growth, catching up to advanced economies and producing one of the best economic performances in the world. Along with these positive changes, industrial product diversification has increased through expanded foreign economic relations, all these supporting the complexity of economic activities. Even though there is a world ranking of countries showing the highest level of economic complexity, there is no information about the regional contribution to the overall score in Romania. This paper fills this gap by measuring the economic complexity of Romania's subnational areas (counties) in the last ten years. To calculate the Economic Complexity Index (ECI) at regional level, a number of 615 economic activities (four-digit classes according to the NACE classification) were taken into consideration, grouped into 68 cluster categories. The results show that significant changes in economic complexity have mainly occurred in less developed areas, the upper and middle ranked counties' positions' being relatively stable. Further, we have examined the impact of complexity on growth and convergence, finding that the ECI index is a good predictor both for future economic growth as well as for the evolution of income inequalities.

163 Effect of Information about Wild Boar on Consumers' Behaviours

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Abstract

Agricultural damage by wildlife is severe in Japan. The utilization of wild animals has been encouraged to prevent damage, but eating the meat of wild animals, like wild boar and deer is still not so common in Japan. The diffusion of consumption of game meat is possibly good for preventing wildlife damage and reducing environmental load. So, it is important to clarify the impact of information about wild animal's meat on consumers' behaviours.

In this paper, we evaluated the effect of information about game meat on consumers' behaviours by stated preference methods. We analysed bidding behaviours on wild boar meat. Contingent valuation method (CVM) or conjoint analysis has been commonly used to analyse bidding behaviours. However, there are several problems with them estimating bidding behaviours on a good that many consumers have not consumed. So, we decided to use a different method in this research. We conducted an online questionnaire survey with a payment card method to evaluate bidding by each consumer with different information. We informed three groups of 226 consumers, 678 consumers in total in Japan of different information which are the quality and process of wild boar meat, the impact of wild boar meat on the environment, and wildlife damage. We also informed another 226 consumers in Japan of nothing about wild boar meat. There is a choice that consumer does not buy wild boar meat in this payment card method so we can estimate the equations of consumers' behaviours in two steps. We supposed that consumer implicitly makes their decisions whether to buy or not wild boar meat in advance and then the consumer who decided to buy bids on it. In this model, we can estimate equations of consumers' behaviours using a binomial logit model and a grouped data regression analysis.

Our online questionnaire survey shows that any information which is quality, environment, and wildlife damage improves the possibility of decision making to buy wild boar meat. It also shows that information about the environment has a negative effect on consumers' bidding. It is concluded that 1. Informing consumers of wild boar meat is one of the key factors of a widespread, 2. There are two types of game meat consumption which are typical consumption and atypical/special occasion consumption, and 3. It is a better strategy to sell game meat at a high price by focusing on a niche market that has a demand related to atypical/special occasion consumption.

164 Evaluating S3 Interventions: An Application of the GMR Model in Centro Region, Portugal

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Abstract

As the first planning period of Smart Specialization (2014-2020) ended, the monitoring and evaluation of the strategy became crucial. Analysing the successes and failures of S3 through a good monitoring and evaluation system contributes to the essential evidence base on which an efficient redesign and improvement of S3 can be performed. In this paper, we use an extended version of the GMR-Europe economic impact assessment model to contribute to evaluating Smart Specialization Strategy in Centro region based on actual data: Cohesion Policy funds between 2014 and 2023. Our simulation results indicate that different supported policy instruments and policy mixes of priorities tend to perform with different efficiency.

167 Wage Premium of Recent Movers – Better Matches or Compensating Differentials?

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Abstract

In this study we propose that beyond offering potential one-sided gains for firms and individuals, geographic mobility may play a vital role in facilitating better worker-firm matches and enhancing labour market productivity.

We utilize Swedish linked employer-employee data, following the labour market and residence history of individuals on a yearly basis. The empirical analysis focuses on newly hired workers and compares the wages of employees who have recently relocated with those hired from the local labour market. To account for the selectivity of movers (selection bias), the unobserved characteristics of individuals, hiring organizations and local labour markets, different sets of fixed effects are applied. Thus, when identifying the wage premia of movers, we are taking into consideration both the individuals' previous labour market history and the characteristics of their new firms after moving. Additionally, we control for the wage-setting power of firms through measures of local labour market concentration to account for a major alternative explanation that a worker-specific compensation may be paid for mobile individuals, offsetting the direct and indirect costs of mobility.

In line with our expectations, we find a positive – albeit weak – correlation between labour market concentration and the wage premium of mobile workers compared to local ones. That is, in more concentrated areas, differences are somewhat (although not significantly) higher. But most importantly, our findings reveal a noteworthy wage premium for mobile workers over local ones (of similar skills and within the same firms) even in competitive labour markets.

This contradicts with the predictions of basic microeconomic theory that implies no wage difference between workers of the same skill level. Differences in match quality could be an explanation for this, if movers have better-quality matches that are recognized and compensated by firms through higher salaries. Thus, we interpret the finding as an indirect evidence for the presence of better employer-employer matches being created through residential mobility.

The results are robust to the definition of local labour markets (geographic range defined as municipalities vs. functional labour markets and category boundaries defined by industries vs. occupations), the choice of controls, and the identification strategy used for measuring market concentration (HHI vs. HHI with instrumental variable approach vs. HHI with labour productivity control).

170 Regional Backshoring as a Source of Manufacturing Employment Growth

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Abstract

The theorised reorganisation of GVCs during crisis periods and the EU advocating for a relaunch of manufacturing activities in favour of jobs' creation bring about the crucial question whether a relaunch of manufacturing employment via a backshoring in Europe takes place with an intensity large enough to be captured by aggregate statistics or if this phenomenon is still to be treated in an anecdotal way, with macroeconomic effects on home countries still to come. Defining regional backshoring as a condition for an area of a concurrent decreased dependence on GVCs and a reindustrialisation process, the paper operationalizes the definition using suitable indicators at the NUTS2 level, and econometrically indicates the effects of a regional backshoring on manufacturing employment dynamics. Interesting results emerge. While backshoring in general does not lead to an increase in employment growth, it produces positive effects in regions historically specialised in manufacturing, suggesting that this process helps in relaunching traditional industrial know-how and vocations in manufacturing regions in Europe. Backshoring in emerging manufacturing regions, instead, is accompanied by a relaunch of an intensive production process. These different results suggest that strategies of modern reindustrialization and of relaunch of manufacturing employment have to be pursued in different regions.

174 Poverty Measures at the Regional Level

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Abstract

There are many composite indicators regarding poverty measures for general use and national purposes. Some countries also have more detailed regional statistics on poverty and deprivation. Eurostat covers this topic at the NUTS 2 level of the European Union only through basic, traditional indicators like rate of at-risk-of-poverty and severe material deprivation rate. However, there is a need to further understand the diversity of NUTS 2 regions from the point of view of inequalities and poverty properties. Thus, we aim to construct a composite indicator for the regional level. Extensive literature defines the potential (income and non-income-based) variables. We apply factor and reliability analysis and analyze the variables' homogeneity (coefficient of variation) in the selection phase. Several weighting techniques are experimented with to find the best solution. We aim to support the poverty pillars' non-compensability approach and build the absolute threshold concept into the framework.

175 A Double Bell Theory of Regional Income Inequalities: an Integrated Inter and Intra Regional Approach

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Abstract

Despite the large attention given to regional inequalities, an approach simultaneously explaining the inter and intra- regional development processes over time is still missing. A vast set of empirical analyses on inter-regional income inequalities exist. In most cases it witnesses the existence of the famous Williamson's inverted U-shaped curve between GDP per capita and interregional income inequalities. Even if much more limited, the same relationship has been studied at the intra-regional level. Our claim in this paper is that a double bell theory must be formulated in which the two processes are interlinked, and an integrated inter and intra-regional approach to income disparities is needed to better understand the evolution of regional income inequality. Empirical evidence is provided for such an approach for what concerns European regions.

176 Searching for the Impact of Network Connectivity on Borrowing Performance: The Case of Turkey

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Abstract

The decline of large cities and the rise of second-tier cities have been observed as a global trend, with significant implications for economic development and urban planning. In this context, the concepts of agglomeration shadow and borrowed size have gained importance as network externalities that affect the growth and development of surrounding areas. Istanbul, Izmir, and Ankara are Turkey's most significant metropolitan cities and play a significant role in the country's economy. The surrounding cities rely on these metropolitan cities for economic growth and development. However, the concentration of resources and investment in a single location can lead to agglomeration shadows in the surrounding areas. On the other hand, network connectivity between metropolitan and second-tier cities can result in borrowed function, and performance, enabling smaller cities to access resources, investment, and knowledge they would not otherwise have access.

The study hypothesizes that network connectivity between second-tier and metropolitan cities in Turkey enables second-tier cities to improve their urban performance by borrowing size through these networks. In order to discuss the concepts of "borrowing size" and "borrowing performance", it will be interpreted whether secondary cities exhibit a performance beyond their population size by being included in networks. The term "size" in the context of "borrowed size" is a bit ambiguous because it can relate to both the functions and economic activity found in larger cities as well as the performance level associated with larger cities. The urban performance index, which was selected as the dependent variable, includes parameters that measure not only economic activities and functions but also the livability of the city. Because of their large population, primary cities have a favorable position, as evidenced by studies in the literature, and secondary cities benefit from being close to these key cities. The effect of the independent variables of network connectivity, size, and proximity on the dependent variable of urban performance will be analysed in order to explore the extent to which network connectivity complements urbanization economies and whether a network-based performance can be borrowed beyond local factors such as size and proximity.

Multiple regression analysis will be used, and it will be interpreted which parameter affects the secondary city performance most among the variables of network connectivity, size, and proximity to primary cities. The population of the provinces will be used for size, and the distance of the provinces to the closest one from the Istanbul-Izmir-Ankara trio will be used for the proximity parameter. Network connectivity will be measured with provincial data on parameters such as cargo carried on domestic and international lines by air transportation, mobile signal data, and total exports. The urban performance will be measured by the ranking of the SEGE-2017 index (Socioeconomic Development Index of Provinces). The contribution of the study lies in its empirical investigation of how network connectivity can act as a catalyst for the development and prosperity of second-tier cities in Turkey, and whether there is an advantage of being involved in a network beyond the factors of size and proximity.

178 Impact of FDI on Regional Economic Development (Growth and Productivity) in Central and Eastern Europe Revisited

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Abstract

This study examines the spatial relationships between foreign direct investment (FDI) and productivity, economic output, and wage levels in 60 regions throughout Eastern Europe, including Czechia, Hungary, Slovakia, Austria, Romania, and Poland. By using spatial econometric models, we analyse the impact of FDI on economic outcomes in each region, taking into account the spatial interdependence between neighbouring regions.

FDI significantly affects productivity, GDP, and salary levels, suggesting that FDI has a positive spillover effect on economic performance in the region, however the impact of the FDI-led development model on GDP growth is smaller than commonly expected. At the same time, despite its smaller development impact, it further increases regional disparities.

Development impact of FDI is often short-term and geographically limited and negatively significant in certain regions. Furthermore, the results emphasize the importance of accounting for spatial dependence, as neglecting this interdependence can lead to biased estimates of FDI's effects.

In addition to contributing to the literature on foreign direct investment and economic development, the study provides new insights into the spatial relationships between foreign direct investment and economic outcomes in Eastern Europe. These findings have significant implications for policymakers and investors, as they suggest that FDI can be a single powerful tool for promoting economic growth and improving living standards. However, this conclusion is more controversial when applied to FDI dependent market economies.

179 Urban Heat Resilience Assessment Based on PSR Framework

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Abstract

As global climate change accelerates, extreme heat events are occurring frequently around the world, posing challenges for regional governance and urban resilience development. In previous academic research, most of the studies on extreme heat events are limited to risk identification and vulnerability assessment, but there are fewer studies on urban heat resilience management, lacking a comprehensive consideration of cities' proactive responses, disaster mitigation, and self-recovery capabilities. This study aims to enhance understanding of urban heat resilience assessment, present the perspective of "Pressure-State-Response" to the urban heat resilience process decomposition scientifically and objectively construct an evaluation system of urban heat resilience, and put forward recommendations for urban resilience enhancement strategies.

First of all, based on the framework of Pressure-State-Response (PSR) model, this paper deconstructs urban heat resilience into pressure resilience, state resilience, and response resilience, which characterize the danger of extreme heat events, the vulnerability of the urban disaster-bearing body, and the adaptive recovery of the city in response to extreme heat events, respectively. Urban resilience possesses a procedural attribute, whereby the city undergoes a dynamic process of a stable state—shock state—post-shock stable state after experiencing impacts and disturbances. However, in existing resilience assessments, there is a tendency to decompose urban systems into adaptive developments of subsystems such as economy, ecology, and society, with less emphasis on the front-end and the positive/negative feedback processes involving urban entities. The PSR model's logical framework of "cause-effect-response" precisely addresses the shortcomings in the current resilience assessment systems. It provides a more accurate depiction of the procedural attributes of system resilience by considering the feedback processes involving the causes, effects, and responses within urban contexts.

Additionally, the paper reviews existing indicators used to assess urban heat resilience. Through correlation analysis, preliminary screening of indicators is conducted, eliminating those with significantly high correlation coefficients. Subsequently, in conjunction with data from the "China Urban Statistical Yearbook" and the National Meteorological Information Center spanning from 2010 to 2022, the rough set attribute reduction algorithm will be employed to further refine indicators and ascertain indicator weights. The rough set attribute reduction algorithm can extract information from data, determining indicator weights based on the importance of attributes and knowledge granularity. It reflects the varying roles of different indicators in rough set classification, identifying the contribution levels of different indicators to the differentiation of evaluation objects. This objective weighting approach mitigates subjectivity in assessment results.

The anticipated conclusions of this study encompass an in-depth analysis of the resilience development process of cities, covering the phases of impact, disaster resistance, and recovery adaptation to extreme high-temperature events. The constructed indicator system weights are expected to objectively reflect the primary factors influencing the level of urban heat resilience. Moreover, the paper will present recommendations for urban regional advancement, emphasizing the necessity to establish resilient cities and enhance climate adaptability.

180 Creating Demographic Projections for Hungary using Agent-Based Modelling – First Results from the 2022 Population Census

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Abstract

The aim of this presentation is twofold: (I.) to introduce my earlier spatial forecast of the demographic processes of Hungary using agent-based modelling and data from the 2011 Census and (II) to present the first results of a spatial forecast with an updated methodology, utilizing statistical matching procedure and with recent data from the 2022 population census.

The fundamental building blocks of the agent-based methods are the autonomous agents, which each possess a unique set of attributes and rules of behaviour. In my earlier model, the agents represented the inhabitants of Hungary. Each agent possessed the following attributes: age group, sex, residence and a socioeconomic background index (based on the municipality). In each cycle, every agent faces two possible natural movement events (child bearing, passing away), and may participate in one of the four possible migration decisions (employment related migration, university related migration, suburbanisation, counterurbanisation).

I examined multiple scenarios, which differed in their fertility and mortality assumptions, their climatic predictions, and their anticipated socioeconomic paradigm. According to the low natural movement scenarios, the Hungarian population may shrink to 8 342 thousand inhabitants to 2051, while the high natural movement scenarios anticipate 9 138 thousand inhabitants. A drastic shift in the age structure can also be expected: the old-age-dependency ratio will increase from 25% (2011) to 61–65%. The projections reveal big spatial differences. Due to the continuing suburbanisation, the commuting settlements around Budapest and the regional centres preserve or may even increase their population, despite the general decrease. The territorial differences in ageing will also deepen. This methodology could not integrate every aspect and factor I intended to take into account. Thus, I decided the further refinement of the modelling methodology.

One key challenge is the creation of agents which possess a more detailed set of attributes. Since the record level data of the general population census cannot be used directly, a workaround is needed. Statistical matching provides the solution. The aim of the statistical matching is to integrate two or more data sources related to the same target population to derive a unique synthetic data set in which the variables from the different sources are jointly available. The elaboration of the iterative statistical matching procedure, which uses publicly available aggregated data tables of the population census to create a novel agent attribute value table, is presented through an example. The aim of the subtask is to create 9 603 634 agents with 6 unique attributes (municipality, sex, age group, marital status, education attainment, economic activity) which reflect the stratification of the country based on the recent population census. The presentation will also discuss first results of this updated modelling procedure

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181 Poverty and Suburbanization in Urban-Rural Fringe

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Abstract

The distinctiveness of the Hungarian settlement network lies in the presence of permanently inhabited outskirts and inner areas alongside the main built-up areas of settlements. Within the restructured fringe areas of urban centers, spatial processes exhibit differentiation below settlement level. This manifests in the simultaneous development of rapidly urbanizing spaces alongside rural enclaves.

To this end, we focus on less studied elements of urban development, concentrating on specific, relatively densely populated suburbs, typically adjacent to built-up areas. These include vineyards, former allotments and recreational areas.

In our presentation, we will use examples from Hungary to show how suburban areas have been transformed by the displacement of marginalised social groups from the city, and the social and land-use dimensions of this transformation due to legal and income bottlenecks.

182 Revitalization of Urban Brownfield Sites in Hungary, 2014-2020

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Abstract

The research is based on the evaluation of winning projects of the Territorial and settlement development OP, code number TOP-2.1.1-15 and TOP-6.3.1-15, both entitled "Rehabilitation of brownfield sites" in Hungary between 2014 and 2020. The investment priorities set out in the relevant Regulation of the European Parliament and of the Council include, inter alia, the preservation and protection of the environment, the promotion of resource efficiency, and (among other measures) urban environmental development, urban renewal, brownfield redevelopment and decontamination.

Environmental remediation and revitalisation of brownfield sites, or even the demolition of former infrastructure to make the site suitable for new investments all contribute to the implementation of circular economy in land use, which is one of the most significant challenges of our time. The National Development 2030 – Concept of Regional Development in Hungary also emphasizes economical and thoughtful land use. In a country with a rapidly changing economy like Hungary, research showing the success and limitations of the functional change of brownfield sites is particularly important. At the same time, these are still strongly focused on capital and regional centres in Hungary.

Therefore, the analysis of 64 brownfield sites and investment projects in 18 counties of Hungary, which are very diverse in their original function and transformation, can greatly enrich the research related to brownfields redevelopment in Hungary. The analysis includes the territorial distribution of projects, comparing project support, interpreting original and new functions and clusters among investment projects based on different aspects (region, previous function, and degree of completion). Based on the analyses carried out, the new function is determined more by the social needs of the present than by the nature of the previous use. In the case of a significant part of the investments, attention was also paid to strengthening the income generation capacity of local governments.

184 Rethinking Social Resilience – New Approach and Measurement Concept

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Abstract

Over the past two decades, resilience has gained considerable popularity in both social and economic sciences, reinforced by the effects of various economic and social shocks and the pandemic that has spread worldwide. On the other hand, more and more detailed and extensive studies have been launched on the various types of resilience (social, economic, ecological, etc.), which, in addition to the undoubtedly useful scientific results, have highlighted the elusive nature of the phenomenon and the lack of a centripetal force to channel the various lines of research in a single direction and unify the various interpretative frameworks.

It is always a contribution to the discipline to rethink a phenomenon like resilience from time to time. This study will attempt to clarify the concept of social resilience on the basis of the available theoretical frameworks, and with the help of previous research results it will define a set of indicators for this concept in order to test and verify it in the context of an empirical research in a Hungarian rural area. The refinement of the indicator set and the definition also provides an opportunity to partially distinguish between different types of resilience, thus contributing to a more accurate scientific understanding.

Keywords

Resilience, social resilience, indicator set, social science, definition.

JEL Classification

A10, 035

185 Informal Land Buyers' Perspectives in Dilla City, Southern Ethiopia

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Abstract

Dilla city an administrative seat of Gedeo zone, centre for newly established Southern Ethiopia Regional State, surrounded by recently UNESCO recognized indigenous Gedeo cultural world's heritages, the home of world's quality Coffee, and transport hub connecting East Africa. Dilla attracts attention of diverse segments of people ranging from student to businessmen who wants to work, do business, and learn and coupled with its high population growth is a home of a multitudes. This created enormous residential plot demand the city. Dilla is surrounded by permanent cash crops and trees from Gedeo agroforestry practices which makes difficult for land expropriation and preparations of serviced land because of inefficient land governance and lack of political commitment. Due to this fact the formal urban land market is unable to supply adequate residential plot that could shoulder the prevailing demand from low and middle income people and hence people shift to informal land market that despite being deprived of critical infrastructural services they choose to live in harsh neighbourhood even though this practice is cursed by local administration as illegal. Therefore, the aim of the proposed paper "Informal Land Buyers' Perspectives in Dilla City, Southern Ethiopia" was meant to explore the buyers' expectations of infrastructure and various related municipal services that they deprive of. As a methodology a mixed approach was deployed. As primary data sources, a survey was employed by Dilla University staff September on 2022 that covered 186 randomly selected respondents from the direction of major outward expanding directions where informal land market was rampant. In addition to observations, Focus Group Discussion was used with municipal experts. As secondary data sources six years (2017/18-2022/23) data of formal land market was considered from Dilla municipality. Analysis was made qualitatively by the help of descriptive statistics. The result of the study revealed that the pushing factors of informal land market proliferation in Dilla city is due to the lack of formal land supply from Dilla municipality which is only 6.6% so that the remaining great majority (97.3%) of the study area residents expect at least one service (road, water, electricity, drainage, monitoring services) from Dilla municipality to improve deprivation of basic infrastructural services, notwithstanding the need of land monitoring services such as surveying and title deeds. The situations call for design a pro-poor land and housing policy, adequate compensation during expropriation of farmers for adequate serviced supply of land, creating awareness about formal land markets, and working in collaboration with rural counterparts in basis of rural – urban collaboration frameworks.

Keywords

Critical physical infrastructures, informal land market, land governance, residential land.

186 Regional Development and the Migrants' Challenges: An Investigation on Bangladeshi Students in Hungary

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Abstract

The dynamics of sustainable regional economic growth are significantly shaped by migration, as people cross borders in search of better opportunities. Partly to ensure a better economy, European regions allow migrants from different regions. The changing pattern of migration policies also creates European countries as a hotspot for young and educated out-migrants from Bangladesh. From the academic discourses, it is obvious that regional and spatial disparities play a significant role in shaping the challenges faced by migrants. There are also few studies on Bangladeshi migration but not on the socio-cultural and geographical aspects especially not from the perspective of the geographical scales. This shortcoming would be partially filled by the author's Ph.D. research, which applies world systems, postcolonial, and feminist approaches. This study examines the impacts of regional economic differences and inequalities that exist on migrant students in Hungary. An aspect of the conceptual framework of the research, which describes Hungary as a semi-periphery of the world systems, can contribute to revealing the regional importance of economic inequalities for the Bangladeshi migrants who are coming from the periphery. The applied theories also help to understand the migrants' different experiences and attitudes depending partly on economic, cultural, and gender relations at different geographical scales to reveal the life, problems, and attitudes toward networking, integration, cross-cultural challenges, and adaptation of Bangladeshi migrants in Hungary. In this presentation, the author will concentrate on some data analysis of a questionnaire survey conducted on the subgroups of Bangladeshi student migrants temporarily living in different cities in Hungary highlighting spatial differences, the migrants' economic conditions, networking, integration, challenges, and adjustment with host societies and their background situation. The sample was collected from the final nomination lists of Stipendium Hungaricum Scholarship holders (2019, 2020, 2021 and 2022) uploaded by the Ministry of Education, Bangladesh. The preliminary results of the survey show that though student migrants think that due to spatial differences, there are inequalities and problems regarding othering, their integration, and cultural and religious issues in Hungary, there are also better opportunities for earning money, getting a better education, and moving to third countries. These experiences and opinions can inspire further research about how student migration can contribute to developing a sustainable economy in the European region.

Keywords

Hungary, Bangladesh, (semi)-periphery, migrants' problems.

187 Ethnoregionalism and Tertiary Education – The Educational Positions of Hungarian Ethnoregional Communities in Central and Eastern Europe

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Abstract

In the post-socialist countries of Central and Eastern Europe, the decades after the collapse of the socialist systems were accompanied not only by a general improvement in living conditions, but also by increasing social and territorial inequalities. Rising inequalities tend to affect such vulnerable social groups like autochthonous ethnic minorities even stronger.

One of the largest autochthonous national minority communities in Europe is minority Hungarians, numbering around 1.8-2.0 million. It can be even considered the largest one when comparing to the population of the kin-state, Hungary. There are significant number of ethnic Hungarians in all the countries neighbouring Hungary, and in three of them the Hungarian ethnoregional communities have more than 100,000 members. Although, there is much information on the political and minority rights status of these communities, their actual socio-economic positions comparing to the titular ethnic group or the kin-state are relatively less revealed.

According to many theoretical concepts and empirical studies, one of the basic indicators of socio-economic position is educational attainment. And, as a result of the expansion of higher education, the proportion of people with tertiary education can be a particularly good explanation of the socio-economic position of a community in Central and Eastern European countries as well. Therefore, the the socio-economic position of the Hungarian ethnoregional communities can be more or less presented by analysing the tertiary educational positions of these groups.

Despite its importance, there is limited information about the educational positions of Hungarian ethnoregional communities, especially comparing to the titular ethnic group or the kin-state. Even less is said about the geographical context and territorial aspects of the topic. This research therefore attempts a more comprehensive comparative analysis of the changes in the tertiary educational positions of the three biggest Hungarian ethnoregional communities in recent decades, from a territorial perspective. The analysis also includes available related results from the latest censuses.

188 The Resilient Dimension of the “Smart Tourism”? A Case Study on Urban Areas

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Abstract

Cities around the world have been pressured to become smarter and implement smart initiatives to keep up with global trends, especially for the highly dynamic economic activities, such as tourism. The pace of progress varies between countries, and post-communist urban areas face obstacles related to financing, understanding, and stakeholder involvement. Our study focuses on the introduction, evolution, and implementation of the smart city concept in Romanian cities, as well as transparency in smart projects, in relation with tourism development. We found that authorities are increasingly open to integrating smart components into the city profile, particularly in the smart mobility domain, using apps and online platforms. However, there is little information available about smart projects, with discrepancies between statistics and available information. Clarification and harmonized statistics are needed for more effective, evidence-based policies.

Additionally, our study reveals discrepancies in the implementation of smart tourism initiatives. Despite their potential benefits, such as enhancing the visitor experience and increasing revenue, the integration of smart tourism solutions in Romanian cities is still in its early stages. This highlights the need for more concerted efforts to promote smart tourism initiatives and improve their implementation in Romanian cities.

It is important to note, however, that while smart tourism initiatives have been successful in some areas, their applicability is not universal, and careful consideration must be given to the unique characteristics and needs of each city when implementing smart tourism solutions.

189 Looking for Trust in All the Wrong Places: Territorial Predictors of Trust in Local Authorities during a Crisis

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Abstract

Trust can be a powerful predictor of human behaviour in modern societies, as represents the glue that maintains long-term and beneficial social relationships between both individuals and groups. Trust in national and local authorities can differ based on several factors, such as the level of proximity between citizens and authorities, the scope of responsibilities of the authorities, and the complexity of issues they deal with. Research suggests that people tend to have higher levels of trust in local institutions compared to national institutions. For example, a study conducted in the US (Pew Research Center, 2020) found that 68% of Americans had a favourable view of local government, while only 31% had a favourable view of the federal government.

While local and regional authorities in many European countries were given more responsibilities, our understanding of the factors that shape citizens' support for these levels of government remains limited. As such, we were interested in examining the level of trust in local institutions in a representative sample of Romanian citizens and its potential historical, social, political, and economic predictors. We also focused on the territorial characteristics (rural versus urban, economic prowess, responsibilities of various territorial policymakers) that may explain the variations in trust.

Our sample included 1205 Romanian respondents (45.4% rural, 51.7% women, $Mage = 48.35$, $SD = 16.22$). Participants filled in a Computer Assisted Telephone Interviewing (CATI) questionnaire. We measured overall trust in local institutions, perceived level of assistance during crises, satisfaction with local institutions, drivers of trust, and respect for rights and freedoms.

Our results indicated that trust in local institutions varied depending on factors, such as the geographical regions with trust being the lowest in the Bucharest-Ilfov region - the most developed economic region - compared to all other regions in Romania). Furthermore, the best predictors for trust are linked to satisfaction with local institutions' decisions and the assistance provided during crises, e.g. sanitary crises such as Covid-19.

192 Using Spatial Analysis to Assess Cohesion for Sustainable Development Goals

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Abstract

Our study explores the integration of spatial analysis methodologies within the context of the Sustainable Development Goals (SDGs) at the regional level in European Union countries. The application of spatial analysis allows for a nuanced understanding of SDGs progress and obstacles within specific territorial units.

Adopted by the United Nations, the Sustainable Development Goals (SDGs) provide an all-encompassing framework for tackling global issues in the social, economic, and environmental spheres. Through the examination of geographic data, spatial analysis techniques give a distinct perspective and can provide important insights into regional inequities and localised difficulties. Spatial analysis—which includes spatial autocorrelation tools—provides a visual narrative of regional cohesion and offers a deep understanding of the distribution and connectivity of SDGs accomplishments across various territorial units.

For planners, stakeholders, and politicians, this visual aid is invaluable as it facilitates informed decision-making that leads to more integrated policies.

Furthermore, the application of spatial analysis methods makes it easier to allocate resources efficiently and track progress towards the SDGs. It allows for authorities, decision-makers, and interested parties to plan resources effectively, rank interventions in order of importance, and monitor the effects of programmes locally.

Our study extensively employs available data at the NUTS 3 level, providing a comprehensive measurement of SDGs achievements. Through a close examination of data at the NUTS 3 level, our research offers a comprehensive evaluation of SDGs' accomplishments, facilitating an in-depth comprehension of advancements and discrepancies within certain territorial units. Additionally, this strategy is in line with the cohesion process strategically, making it possible to assess these goals' contributions to fair development and regional cohesion more thoroughly.

Our research emphasises the relationship between achieving Sustainable Development Goals and regional cohesion by focusing on the cohesion process. This emphasises how important it is to accomplish not just the individual goals but also to promote inclusivity, lessen inequality, and unite people in various geographical contexts.

Thus, our research contributes to a more inclusive and unified approach to sustainable development within the European Union by enhancing our understanding of SDGs progress at a granular level and highlighting the significance of these accomplishments in fostering cohesion. Furthermore, we stress the significance of utilising spatial analytic techniques to improve the execution, observation, and assessment of plans intended to accomplish the SDGs.

193 Serbia on the Border between East and West - Urban and Geoeconomic Perspectives

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Abstract

The aim of the presentation is to review the development of the five largest cities of Serbia in the post-Yugoslav period. In the introduction, the general development of the urban network and spatial structure of the Balkans will be presented in a historical context, as well as the geographical location and geopolitical situation of Serbia.

The urban network bears the marks of the fundamental spatial implications of social, economic and political processes, but it is also the object of future aspirations. The urban network is characterised by a high degree of stability, exhibiting changes only in the long term. In order to unveil its deep-seated structures, it is worth providing a brief overview of the historical development of the urban system. The evolution of the settlement network in the Balkans was shaped to a large extent by three overlapping clusters of factors (Hajdú-Rác 2011): 1) complex natural geographical features; 2) its perception as a space of changing empires due to the frequent modification of state borders and shifting centres of power, and the permanent reorganisation of its core; 3) ethno-cultural specificities.

Over the last three decades, the state structure of Serbia has undergone several fundamental transformations, which have had a significant impact on the development of these cities. This is analysed in terms of the transformation of administrative and spatial characteristics. Finally, the development, economic and demographic processes of Belgrade, Novi Sad, Nis, Kragujevac and Subotica are examined in detail.

194 Spatial Variations of the Unemployment Rate's Determinants at Regional European Level

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Abstract

Unemployment is an essential indicator for the performance of an economy, having both social and economic dimensions. Higher levels of unemployment are usually associated with lower incomes, deteriorated living standards and a lower overall life satisfaction of individuals, with various negative social effects. At government level, increased unemployment levels put pressure on social benefits spending and decrease tax revenues. From an economic perspective, unemployment implies that the production will not meet its potential, consequently the gross domestic product will be lower. Thus, reducing the unemployment levels is a key aspect of any macroeconomic policy.

Being a multidimensional phenomenon, unemployment is determined by many variables, its influence factors being the subject of several empirical studies. Unemployment rates are usually strongly related to Gross Domestic product (theorized by Okun's law), but also with the level of wages. Based on the neoclassical theory, another important factor influencing unemployment rate would be migration. However, there are mixed results in the literature regarding the real impact of migrants on the labour market. Another important determinant of unemployment is the education level, with higher unemployment rates for individuals with lower educational levels. Other important variables that might have an impact on unemployment could be foreign and domestic investments, new businesses created, but also the social security policy and the unemployment benefits.

Nonetheless, since most economic phenomena are influenced by spatial effects and exhibit regional heterogeneity, it is necessary to take the spatial factor into account explicitly in modeling the determinants of the unemployment rate. Usually, unemployment rate is characterized by a positive spatial autocorrelation, with a significant neighboring effect among regions. Moreover, the determinants of unemployment also exhibit spatial variation, with the influence of certain variables being stronger than in other areas and vice-versa.

Considering all the above, the main objective of this paper is to identify the determinants of unemployment rate at European regional level, using a spatial approach. Namely, we employ spatial regression models, including a geographically weighted regression to study the dependence between unemployment rate and its main economic determinants. Variable selection is done based on the specialty literature, but also considering data availability at NUTS level.

Results confirm the existence of a spatial dependence for the unemployment rate at regional European level. Additionally, the research shows there is spatial variation of the factors influencing unemployment rate. Thus, these factors do not have the same effect on unemployment across all regions, enabling identification of clusters of regions where the influence of certain variables is relatively similar. The results have important implications for labour market policies at regional level, especially considering the interest for diminishing the differences between regions in what concerns unemployment levels.

200 The Impact of Country Risk on FDI in European Countries

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Abstract

Risks and uncertainty lead to bad decisions, thus low level of profit from investments. That is why it is important to know as much information as possible when it comes to investments, especially in an uncertain context, such as the coronavirus crisis. This crisis appeared in 2019 has affected the entire humanity in all domains. In addition to the number of illnesses and deaths, the measures taken in order to prevent the spread of the virus have affected our lives both socially and economically. Therefore, the purpose of this study is to analyse the effect of country risk on direct foreign investment (FDI). Thus, to reflect the country risk we used the Euromoney Country Risk score, and the sample is represented by the European countries. The results of the study indicated that country risk significantly influences FDI.

201 Unraveling the Complexity of Globalization: A Multidimensional Analysis of Quality Parameters and Competitive Disadvantages

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Abstract

In an era marked by unprecedented globalization, understanding the intricate interconnections within our world has become imperative. As the global landscape continues to evolve, there is a growing recognition of the need to move beyond simplistic assessments of economic performance and embrace a more comprehensive understanding of complex, multidimensional phenomena. This study delves into the evolving landscape of composite indicators, such as the Regional Competitive Index, World Development Index, BES, and EQUI, which strive to capture the multifaceted nature of global dynamics.

Particularly in the developed world, there is a noticeable shift towards broadening the focus beyond traditional economic metrics. The emphasis now extends to encompass equity, social inequalities, and institutional factors. However, this expanding scope comes with its own set of challenges and risks, especially as developed regions may inadvertently transfer the costs of their quality standards to other regions through unethical practices.

This study addresses the imperative to scrutinize the downside of competition, introducing the concept of "quality penalties." It posits that, in the race for economic competitiveness, high-quality environments may overlap with markets characterized by poor quality due to unfair or illegal practices. To enrich the discussion, we propose innovative variables that account for negative externalities, including episodes of offshore leaks, the presence of societies securitizing debts, and the disparity between emissions consumed and emissions produced.

The empirical findings reveal significant variations in the classification of European countries when incorporating these "quality or reputation" indicators. This not only underscores the need for improved empirical research in this domain but also contributes theoretically by providing insights into the ongoing debate between cost-liberal and moderate democracies and their relationships with developing regions.

Furthermore, this study extends beyond the conventional measures of economic success to highlight the importance of incorporating ethical considerations in global assessments. By introducing the concept of "quality penalties," it opens avenues for policymakers, researchers, and stakeholders to engage in a more nuanced discourse on the implications of globalization, fostering a holistic understanding that goes beyond the pursuit of economic competitiveness.

202 Using an Inverse Planning Approach in the Aspect of Green Transition: Index Theory Study Using the Konüs Index and the Neo-Walrasian Equilibrium for Biofuels and Green Energy in the Regional Space

Tünde Olexó

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Abstract

In this study, we apply the inverse planning method for the technical implementation of the EU's greening ambitions and regulations. Kollár and his co-authors examined these methods primarily in relation to wind energy. The regional development innovation concept and hyper-localization definition are used based on Torre for strategic modeling purposes. In addition to presenting inverse design methods and examining their regional implementability, we also try to shed light of the green energy-based transition of EU countries in the automotive industry. Thus, the index-theoretical calculation of the transition from fuels to biofuels in accordance to used cars can also be established, taking into account innovating research and good practices. Building on Konüs's work, we examine the greening usefulness of the inverse design method in terms of demand, supply, regional origin and local circulation based on Dusek's territorial statistics and his interpretation of the Neo-Walrasian equilibrium and axiom system. The regional analysis of CO₂ emission statistics is presented on the basis of OECD statistics, while the distribution of used automotive statistics by fuel type is presented on the basis of EUROSTAT statistics.

204 Measuring Sustainability Using the Konüs Index, and Fuzzy-Konüs Index in the Context of the Bible Based Ethical Legislation System

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Abstract

Sustainable development is an essential condition for the survival of our society. For this reason, the EU has launched a number of initiatives. In the study, sustainable development and changes in consumption composition are examined with the help of the Konüs index and fuzzy-Konüs index, then the connection of the problem with fuzzy-cognitive-map theories are presented. In this way, it is possible to achieve social welfare, environmental well-being (the price index is defined as a welfare indicator). The following phrase perfectly illustrates the fundamental role of Hungary and agriculture: "we are what we eat" - in a broader sense, what we consume. A perfect example of this is György Matolcsy's consumption-based price index theory, where we examine measurability from a mathematical point of view and build a measurement system on it. We want to see goodness from a legal point of view, from a biblical-ethical perspective, as well as an optimum — because laws are designed to sustain and preserve the Environment as the Lord created it.

207 **How Industry-University Research Collabouration Shape Innovative Performance? A Multilayer Network Approach on the European Scale.**

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Abstract

The goal of our research is to explore the impact of intra- and inter-regional university-industry collabourations on knowledge production in the regions. In our analysis, we examined the Framework Programme's cooperative R&D network as a multilayer network. We formed layers based on the type of the participating organizations. This resulted in an industry-type layer and a university/research centre-type layer. Along these layers, we examined the impact of the resulting network structure of inter-layer and inter-regional cooperation on the knowledge production of the regions measured by patents. We investigate the extent to which interaction effects are observed for the network structure along layers and regions as well.

209 Universities as Regional Leaders for Sustainable Energy and Climate EU-Harmonized Policies

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Abstract

European Green Deal envisage a wide range of goals and milestones in order to provide a policy framework aimed on integration of innovative, educational and institutional components of the input from higher educational institutions towards green transition of their regions and countries. Since at initial European Commission's level role of the university sector was not fully formulated there's a need to create a new roadmap for their contribution. We foresee the following areas of impact from the universities in green transition of national economies: research and innovation, education, staff and infrastructure management and public/social impact.

210 Post-War Recovery Strategy in Ukraine: A Sustainable Development Prospect

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Abstract

The ongoing Russian invasion to Ukraine has unleashed devastating consequences, resulting in the widespread destruction of urban and rural landscapes across Ukraine. The relentless onslaught of shelling has left a stark trail of ruin, decimating not only infrastructure but also industrial facilities, rendering them non-operational. The aftermath reveals a desolate landscape marked by environmental degradation, contaminating arable lands, and a crippled energy system, exacerbating the challenges of recovery.

This paper proposes a comprehensive and phased strategy for the arduous task of post-war reconstruction in Ukraine, anchored firmly in the principles of sustainable development. It meticulously outlines a multi-dimensional approach that acknowledges the interconnectedness of rehabilitation, restoration, and revitalization efforts. The strategy emphasizes the imperative of adopting eco-centric methodologies for rebuilding infrastructure, rehabilitating communities, and reinvigorating economic activities.

The integration of sustainable practices throughout each facet of reconstruction stands as a testament to this paper's core mission: providing a holistic framework that transcends the immediate rehabilitation process. By embedding sustainability as a fundamental tenet, this approach aims not just to rebuild but to regenerate, cultivating resilience and propelling Ukraine toward a future characterized by sustainability and prosperity.

Alignment with the European Union's standards and prerequisites for membership serves as an integral facet of the proposed reconstruction and modernization endeavor. Ensuring that the revitalization efforts are not just confined to rehabilitation but also meet the stringent criteria set forth by the European Union becomes imperative. By meticulously incorporating European Union compliance benchmarks into the reconstruction framework, Ukraine not only aims at restoration but also strives for alignment with European norms. This alignment serves as a pivotal stepping stone, drawing Ukraine closer towards European Union accession aspirations. The meticulous attention to meeting and exceeding these standards is pivotal, positioning Ukraine favorably on the path towards European Union membership.

211 Regional Sustainability Transition: Evidence on Challenges and Responses from 10 Disadvantaged Danube Regions

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Abstract

We live in a time of grand societal challenges (GSCs), marked by climate change, the fourth industrial revolution, and rising spatial inequalities. Even though these challenges and shocks will presumably leave no place untouched, both the ways in which global challenges translate into specific geographical contexts and the nature and scope of problems confined to specific regions differ widely. This leaves some regions in rather advantageous positions, whilst others are characterised by different degrees and dimensions of 'disadvantaged-ness' in the face of transformations ahead and the danger of being or becoming 'left behind'.

This paper's first goal is to offer a comprehensive perspective on what it means for a region to be 'structurally disadvantaged' in an era of GSCs. In doing so, we develop composite indicators and cast light on various dimensions of region-specific problem-asset endowments, including economic (e.g., industrial background, specialisation in 'brown' industries, regional economy's connectedness), ecological (e.g., manifestations of climate change, current energy sources and renewable energy potential) and social (e.g., interregional, and interpersonal inequalities, economy's inclusiveness) ones.

While the indicators above can help to identify challenges, their concrete regional manifestations and severity, they tell us little about what could be labelled regional 'responsiveness' in the sense of ongoing agentic processes 'on the ground' to combat, mitigate or adapt (to) these challenges ('challenge-oriented initiatives'). As such, the paper's second goal is to draw attention to regional responsiveness, thereby casting light on the role of local and relevant non-local agents and their strategies based on an agency perspective.

Thus, based on a combination of structural and agency perspectives and quantitative and qualitative methods, this paper will provide valuable insights into regional sustainability processes. On the one hand, it will help better understand structural conditions in challenged regions and seek to answer the question, 'What does it mean concretely to be challenged/left behind'? On the other hand, the article will cast light on the responsiveness of regional and relevant non-regional actors to place-specific (manifestations of) challenges.

Empirically, the paper draws on rich quantitative datasets, statistical data analyses, semi-structured expert interviews, and intensive document analyses in 10 disadvantaged regions in 10 different countries in the Danube macro area. While being highly heterogeneous areas, all these regions share a fate in the sense that they face profound sustainability transition processes from a relatively unfavourable position. Hence, this work rests on highly interesting and rich empirical data to study different factettes of regional disadvantagedness and responsiveness in a comprehensive and comparative way.

215 Interfirm Networks behind Coagglomeration

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Abstract

The success of industry clusters is attributed to the advantages of co-locating companies that can exchange inputs, skilled labour or know-how. In this work, we examine how labour flows and input-output channels contribute to the co-location of industries in Hungary, and we do this through new, rarely available interfirm network data.

We build multiple measures of industrial coagglomeration from firm registers and test their relationship with input-output connections constructed from value-added tax records of companies and labour flows derived from an employer-employee administrative dataset. In addition to these aggregate indicators of industrial co-location, we use the firm-to-firm connections to test the importance of geographic proximity for ties in the nation-wide interfirm networks of labour flows and supplier connections.

Our results suggest that, first, that coagglomeration in Hungary is connected to both input-output and labour market linkages. Adopting the previously established instrumental variable approach, we show that this relationship is causal. We find that similarity of labour requirements has a stronger influence on coagglomeration than supply chain linkages. Second, we show that input-output and labour market channels reinforce each other in a way that any level of input-output connections support the effect of labour market channels on coagglomeration, but only after certain level of labour flows input-output channels matter for co-location. This suggests that industries that are similar in terms of labour and have strong supply chain connections are most likely to co-locate in space and labour flows are the driving force of this mechanism. Third, we use firm-level networks of labour flow and buyer-supplier ties and illustrate that labour market connections and especially connections between firms that exchange labour and supply each other are very sensitive to spatial proximity.

216 Ethnic Hungarians and Trans-Border Regions in the Social Media: Bipolar Communication on Nationhood and Belonging

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Abstract

The presentation will draw on the results of a netnographic analysis conducted as part of a research project on attitudes towards minority communities of Hungarians in different trans-border regions and the limits of extra-territorial nation-building in Hungary. The netnographic analysis conducted a trend and content analysis of edited content and related discourses on ethnic Hungarians published on social media between 2016 and 2022. Based on this empirical material, this presentation will seek to answer the question of the social perception of certain ethnic Hungarian communities and trans-border regions in Hungary. Are there any differences in the perception of each trans-border region and its Hungarians? What are the typical themes and contents associated with each area and community? By means of a quantitative and qualitative analysis of the topics related to the communities of ethnic Hungarians and trans-border regions, the analysis points out the characteristics of the discourses involved: the poverty of topics, the reduced discourse to a bipolar one, and the fact that the basic question of the discourses still revolves around the issue of nationhood and belonging.

220 Opportunistic Investment: The Political Economy Impacts of FEMA Hurricane Declarations

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Abstract

Every hurricane season, Florida is at risk of experiencing an extreme weather event. As recently as the 2017 and 2018 hurricane seasons, Florida experienced back-to-back hurricanes that were among the costliest to the state and the country. Given the susceptibility of the Florida peninsula to Atlantic hurricanes, business establishments in the state are at risk of physical damage, damage arising from lifeline service disruptions, supply chain disruptions, population displacement leading to both employee and customer migration, and business failure due to the consequences of the severe weather events.

In order to properly prepare for a hurricane, FEMA allows governments to apply for Emergency Declarations prior to the hurricane making landfall. This anticipatory declaration is helpful to local governments as it allows funding to be allocated in preparation of the storm. However, areas that may be classified as FEMA disaster areas ultimately and do not experience severe winds or impacts from the storm are still will be eligible for the benefits of classification as a FEMA disaster area. We analyse the effect of FEMA emergency declarations on the small businesses outcomes in the state of Florida.

Garrett and Sobel show that disaster declarations and FEMA disaster expenditures are politically motivated. First, using data on Florida elections we will document how political economy considerations affect the likelihood that areas are declared FEMA disaster areas. Specifically, we are gathering data on the party of the state-level representatives, Congress member, Senator, and Governor. This will help determine if the Governor is more likely to declare marginal areas as disaster areas if the representative is a member of his political party. We are also gathering data on swing districts, as it is also plausible that these areas are more likely to receive disaster declarations given their political importance.

Preliminary results indicate that those areas that were classified as FEMA disaster areas but did not actually experience hurricane force winds were more likely to see positive impacts on businesses. In fact, about 36 percent of areas in Florida that receive disaster declarations do not experience category 3 winds or higher from the storm. Approximately 14 percent of areas that experienced hurricane force winds were not declared FEMA disaster areas. Therefore, it is plausible that there are political considerations affecting which areas are declared disaster areas and which are not, and likely the amount of dollar received for different spending categories.

223 **Strengthening the Financial Capacity of Local Governments as Regards the Recovery of Sustainable Regional Development: An Empirical Case of Ukraine**

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Abstract

The recent challenges posed by the pandemic and global conflict have significantly affected the path of local community development in Ukraine. Despite the progress of the decentralization reform, which since 2014 has made a tremendous step in strengthening the fiscal capacity of communities, encouraging communities to amalgamate and interregional cooperation, and attracting additional private investment, the negative trends have affected various communities to variable degrees. Even though municipalities have substantially improved their medium-term planning, budgeting, and investment management processes, problems of efficient allocation of financial resources to meet urgent needs and sustainable development conditions remain. The scale of this impact is difficult to assess today, but the timely application of the necessary stabilization tools of fiscal coordination that take into account geographically differentiated needs and assets is clearly relevant. These pre-existing challenges should shape national and subnational responses as they seek to address immediate reconstruction needs and promote long-term recovery and resilience (OECD, 2022). Strengthening financial mechanisms for regional development with higher economic returns is an important objective of recovery policy. Local governments in Ukraine currently face a number of institutional constraints that, while not homogeneous, have a cumulative effect. Therefore, this article discusses the conditions and institutional framework for using effective mechanisms to strengthen the fiscal capacity of local communities. First, we present a literature review on the assessment of the relationship between financial difficulties and specific aspects of economic sustainability, and emphasize the importance of high-quality local government performance in strengthening the fiscal capacity of regions. Thus, we will analyse empirical studies of budgetary regulation instruments for achieving technology-oriented sustainable growth. Comparing the benchmarks of the European community in this regard, the second session describes the institutional conditions and procedures for further reforming the system of fiscal equalization and budget regulation in Ukraine, and shows the methods, actors and institutional mechanisms in different multi-level systems of crisis management of local public finances. Therefore, this article discusses the conditions and institutional framework for using effective mechanisms to strengthen the fiscal capacity of local communities. Thus, we will analyse empirical studies of budgetary adjustment instruments for achieving technology-oriented sustainable development. Comparing the benchmarks of the European community in this regard, the second part of the paper describes the institutional conditions and procedures for further reform of the fiscal equalization and budgetary adjustment system in Ukraine, and shows the methods, institutions and institutional mechanisms in different multi-level systems of anti-crisis management of local public finances. The analysis focuses on the role of decentralization, fiscal equalization schemes, and debt instruments in strengthening the fiscal capacity of local governments. This paper outlines some of the determinants of gaps in the mechanism of budgetary support for local development and discusses the impact and implications for sustainable community development. Our findings point to the importance of strengthening the financial capacity of local governments and the role of fiscal transformation in the policy of economic recovery in Ukraine, through effective multi-level fiscal management to address budgetary challenges in decentralized systems in the context of European integration.

224 Let's Change the World Together! – Co-Operation Possibilities of Social and Profit Oriented Enterprises

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Abstract

The United Nations' 17 Sustainable Development Goals lay out a framework for global action to create a better, more equitable, more sustainable future. Success will demand innovative, cross-sector action at scale.

Due to the COVID-19 pandemic, climate change, social inequalities, as well as the crisis and instability of the global supply chain, there is increasing pressure on enterprises in the world to undertake obligations to develop a business model that respects human rights and helps protect the state of the environment, sustainable and has a social impact. Change requires new, innovative solutions never seen before and the formation of new partnerships. Cooperation with social enterprises can facilitate the development of the new model and contains hitherto unexploited possibilities. In recent decades, social enterprises have proven that they are able to facilitate and accelerate the necessary changes with new ideas and new business models, and their inescapably valuable role has become even more evident during the pandemic, because they quickly and efficiently appeared in critical areas which were neglected by overburdened formal services and had a critical role in terms of the functioning of society. In our presentation, we would like to present what factors prevent the "meeting" of social enterprises and profit-oriented companies, and how they can be facilitated and supported so that a well-functioning relationship can be established between them, based on our empirical research. The research was carried out in 2020 as an online questionnaire among social enterprises and profit oriented enterprise in Central Europe. The aim of the research was to obtain information about social entrepreneurs (SE) and profit oriented enterprises, which would allow conclusions to be drawn about differences and similarities regarding their ethical corporate values. We intended to find out more about the fundamental ways in which entrepreneurs run their companies and whether companies are already dealing with dimensions of social and/or ecological sustainability. This way, the basic characteristics of both social entrepreneurs and profit oriented enterprises were determined to subsequently find similarities in business models and market-relevant orientations of them. Based on Sieger et al. (2016), the following item batteries were used in order to find out if Social Entrepreneurs and profit oriented entrepreneurs lean towards the concept of darwinians (pursue private issues, self-interested), communitarians (support and be supported by personal and social communities), or missionaries (advance a cause), and also to gain insights about similarities and differences in their perceptions (Gruber and Fauchart, 2011). There are many reasons for profit oriented companies to partner: Social enterprises are inherently innovators and risk-takers, and—when done right—their models are built for sustainability and scale. They bring a unique understanding of emerging markets and traditionally underserved customers, and they can forge meaningful access to the otherwise hidden stakeholders—factory workers, farmers, miners, communities—who increasingly power global supply chains.

By investing in, supporting, and working with social enterprises, companies access new mechanisms, models, and innovations for meeting their corporate sustainability goals, mitigating supply chain risks, and benefiting the communities they serve.

225 Natural Disasters, Emergency Declaration, and Corruption

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Abstract

Corruption is generally understood as taking advantage of public power for private benefit. It has been raised as one of the determinants of economic backwardness in developing countries. The main consequences include lower long-term growth, lower investment, higher inflation levels, and a consequent reduction in the provision of public goods and services. With information from Colombia between 2012 and 2022, this paper uses an instrumental variable approach to evaluate the relationship between emergency declarations and corruption. We take advantage of the exogeneity of the frequency of natural disasters to city level unobservable characteristics to construct our instrument. We consider natural disasters as exogenous shocks that increase the probability of declaring an emergency. Since emergency declarations increase the level of discretion of local officials, it is expected to see a rise in corruption. Our findings show a positive relationship between the frequency of natural disasters and the probability of emergency declaration, followed by an increase in observed corruption. An emergency declaration in the Colombian capital cities increases the total open cases with a possibility of corruption in 3.7 per every 100,000 people, and the amount of money involved per person increases in COP \$5,218 per capita. In addition, an emergency declaration increases the number of cases of corruption with conviction in 1.24 per every 100,000 people, and the amount involved increases in COP \$1,390 per capita. The higher level of discretion of public officials not only increases the number of open cases of corruption and the convictions, but also the amount of resources involved. We also find that the frequency of natural disasters is not associated with a higher level of expenditure in preemptive and relieve spending, nor is it generating unexpected spending, defined as the difference between the observed total expenditure and what was budgeted for preemptive and relieve spending. This suggests that what is behind the higher corruption after emergency declaration is a misappropriation of the budgeted resources in Colombian cities. This paper provides evidence on the impact of increasing public officials' discretion in a setting with weak institutions.

226 Investigating the Effect of Location on Urban Growth Worldwide: Contemporary Trends

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Abstract

According to the proposed explanation, urban growth is successful, only if several favorable attributes of location are present, while each attribute might become meaningless, if other locational attributes are weak or missing. In the present study, this hypothesis is verified in several stages. First, urban areas of the world are identified using worldwide population density data. Next, population change in each urban area is estimated by comparing its year-2000 and year-2020 population, while referencing the observed change to the total urban population of each country. The observed change in each urban area is next coded as a dichotomous variable – either a positive share change in the national hierarchy between 2000 and 2020 (1) or a negative change (0) – and linked to several performance measures, considered to be potentially important locational attributes. Significant locational determinants are then identified by a stepwise regression analysis. Each factor identified as significant is next analysed, to identify its value bins with the highest shares of urban localities exhibiting a positive population share change (PSC). Location in such “optimal bins” is defined as a locational advantage. The overall number of LP advantages is then counted for each urban area and compared across urban areas with different numbers of locational advantages counted. The analysis is performed for the entire worldwide urban system and for Western Europe, separately. In both cases, the odds of an urban area to exhibit a positive PSC is found to increase in line with the significance-weighted number of location advantages it has.

227 Resilient Tourism Regions in Central Europe – a Classification Approach

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Abstract

Motivation of the research: In the decade before the COVID-19 pandemic, the global international tourist traffic experienced monotonous growth, but the events of 2020 revealed its extreme sensitivity and vulnerability, shaking the entire sector. We examined the pattern of the restart through resilience in four countries of Central Europe (Austria, Czechia, Hungary, and Slovakia). Scope of the study: The study covers past 5 years' regional data on tourism nights and capacities. The hypothesis of the research is that seasonally more sensitive tourism destinations and areas due to their specificity are much vulnerable, but tend to recover rapidly, determined by spatial localisation. Methodology and data: Data are retrieved from Eurostat thematic and regional data bases. Quantile and Equal Intervals maps are used to visualise the spatial imbalances of the following variables: nights of domestic and foreign residence spent at tourism accommodation establishments monthly (by economic activities - NACE) in number, percentage change to previous year, percentage change to year before and percentage change to 2019 (NUTS1), nights spent at tourism accommodation establishments (NUTS2, annual data) and number of beds, number of establishments (NUTS 2, annual data). Classification models (hierarchical and spectral) are used to define spatial dependence of observations (LISA maps and local Moran's I statistics is used for spatial autoregression measure). The resilience classes are described with the volatility (both annual and over-the-years) and the level of the variables (nights, beds, establishments). The maintained membership in classes over years explains the persistence (i.e. resilience) of regions, while yearly forward shifts point out to recovery. The persistence is measured by the percentage of the number of regions remained in the same class from year to next year and to further years. Based on several tourism indicators, the study area showed significant regional differences even before the pandemic, which was strongly influenced by how individual regions were able to adapt to changing travel habits. Further researches: Taking into account the effects and consequences of the COVID-19 pandemic, the research examines important issues of the tourism sector, such as spatial and temporal inequalities in capacity utilization. To further the analysis, we suggest models regressing both spatially and time-lagged variables, over-the-year consistence of tourism nights and dummy origin of tourists (domestic vs international).

Keywords

Crisis, recovery, regional inequalities, resilience, tourism.

228 Glaeser Meets Ellison: Coagglomeration and Consumption Amenities

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Abstract

The nature of agglomeration economies has been mostly analysed in terms of the productive advantages accruing to firms deciding to locate in major urban areas. However, over the past couple of decades large cities, especially those located in developed countries, witnessed a substantial relocation pattern whereby productive plants fled urban areas, seeking to minimize high rent costs, and relocated productive activities to areas characterized by lower wage bills. Therefore, the usual empirical toolbox to explain the nature and rationale of large cities appears to a degree outdated, and, most importantly, incapable of capturing the determinants and effects of agglomerative patterns we still observe in cities. These, we believe, can be explained by two competing strands of the literature: one, revived after Glaeser et al. (2001) suggests an increasing relevance of consumption amenities; the other, spurred by Ellison et al. (2010), links Marshallian agglomerative forces with coagglomeration of industries.

This paper contributes to this literature with new evidence based on the universe of Dutch workers, and very large samples of Dutch firms with the aim to uncover the relationship between consumption amenities and firms coagglomerative behaviour. We employ a large data set covering the period 2005 through 2011, explaining the role of consumption amenities in driving coagglomeration of Dutch firms controlling for the classical Marshallian forces of agglomeration, i.e. labour market pooling, input sharing, and knowledge spillovers. Results show that indeed consumption amenities play a major role in driving the coagglomerative behaviour of firms, next to the classical marshallian forces. Moreover, we also find evidence of a decreasing role of input sharing as a driving force of coagglomerative mechanisms, while knowledge spillovers seem to increase in importance over the observed time period.

229 Knowledge Spillover Effects for Enhancing Authentic Tourism – the case of Interreg EUROPE Local Flavours Project

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Abstract

The overall objective of the Interreg EUROPE Local Flavours project is to improve policy instruments (PIs) supporting the sustainable exploitation of the cultural heritage of small and medium-sized towns with potentially attractive portfolios, that are unable to fully exploit their cultural legacies due to less-advantaged locations. In the project, partner regions aim to influence and develop authentic tourism products and services based on the interaction of locals and tourists, and to build new mechanisms for cooperation among host populations and private cultural and tourism actors, enhancing active relations between stakeholders. The three and a half year-long project, starting from 2019 August has two phases. Phase 1 is dedicated on one hand to Interregional Learning through the collection and discussion of Good Practices (PGs) aiming at enhancing the authentic tourism in partner regions, on the other hand Status Quo Assessment and Action Planning for helping the partner locations in their pursuit to become more integrated and integral players in local/regional tourism, based on their recognized and properly used authentic cultural assets. Phase 2 is dedicated to the implementation of the Action Plans aiming at enhancing authenticity-based tourism. The project has been implemented in a partnership with 9 institutions in 8 countries both from Western and Central and Eastern Europe.

Due to its outstanding cultural heritage both in terms of material and immaterial dimensions with a wide and diverse portfolio of museums, theatres, archaeological sites, historical cities, industrial sites as well as music and gastronomy, Europe has gained international attention of visitors. Challenging that, strategic management of cultural portfolios has become important either by public or private initiatives. Successful place-based regional tourism policy requires the integration of local and regional players for designing appropriate measures, actions which would target different challenges like sustainable development, adaptation to changes, integrity for long-term viability. Interreg projects funded by the EU has the potential to helping partner regions to either developing or fine-tuning their policies through interregional learning which may lead to knowledge spillover effects. This current study aims at identifying knowledge spillover effects due to the interregional learning of Phase 1 by qualitative measures. During the first phase, 31 GPs has been identified and discussed by participants in the field of (1) New evaluation methods of local authentic tourism potentials, (2) Public-private cooperation in cultural product, service, and destination development, (3) Vertical and horizontal cooperation mechanisms and (4) COVID-19. The analysis will carry out the range of those GPs which have been incorporated to the significant share of Action Plans developed during the project and will evaluate how key ideas have been transformed into concrete interventions considering the wide range of local specific attributes.

231 Relations of Prime and Fibonacci Numbers and Practical Implementations in Risk Management

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Abstract

Using Generalized Autoregressive Heteroscedasticity (GARCH) models, we assess the casual relation between prime and Fibonacci numbers on simulated time-variant volatility. Recent literature in technical analysis requires Fibonacci numbers to determine possible support and resistance levels, under market efficiency hypothesis. With a linear regression model, we can estimate the number of primes between two Fibonacci numbers, based on it, we evaluate how time-variant volatility can fluctuate among Fibonacci thresholds and Prime numbers. We also evaluate how this behaviour can affect Value at Risk and Expected shortfall models. Such risk management tools are widely used nowadays in risk management, therefore our results can have practical implementations. Thus, this paper makes a new contribution to the debate on the feasibility of technical analysis.

232 Fostering Energy Transition: How Local Authorities Can Overcome Challenges in Biogas Projects

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Abstract

In a global context shifting towards energy transition, anaerobic digestion, despite its potential as a renewable energy source, faces significant challenges, especially in France. This research examines the critical role of local authorities in the development of biogas projects, which confront a 20 to 30% abandonment rate mainly due to local opposition, coordination problems among stakeholders, and issues of territorial governance.

We employed semi-structured interviews with stakeholders involved in anaerobic digestion to identify the key functions of territorial intermediation that local authorities could perform to encourage the deployment and success of these projects. Local authorities act as intermediaries by ensuring spatial and cognitive proximities between actors, mobilizing territorial resources, fostering local anchorage, establishing trust among local stakeholders, and actively participating in the supply chain and purchasing of the energy produced.

This research highlights the multifaceted role of local authorities in navigating the complexities of anaerobic digestion projects. By acting as territorial intermediaries, they can address challenges such as local resistance and governance issues, thereby facilitating successful project implementation and contributing to the broader objectives of sustainable energy development and environmental transition in France.

233 Ethnical Culture as a Basis of a Local Development: Gyimesbükk/Ghimeş-Făget (RO)

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Abstract

The purpose of the study is to present the case of the village Gyimesbükk (Ghimeş-Făget) in the Eastern Carpathians (Romania). The village is located at the former border between Hungary and Romania and thanks to this position there were still many, partly ruined objects (railway guardhouse, fortress, quarantine-house, church) at the former border. In 2008 local and non-local actors decided to use, to renew these objects and to create new symbols to gain tourism for the village. Year by year there were next buildings renewed and the cultural and symbolic heritage became a basis of an ethnical and cultural tourism in the region. Gyimesbükk became a part of the offer Hungarian travel agencies, in the village there were museums, historical trails, new pensions and restaurants opened. The village became able to sell his position, his culture for tourists which catalysed the local economics for one part of the population.

234 On the Gender Pay Gap in Germany

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Abstract

Although a broad public debate on equal treatment in Germany, the conditional Gender Pay Gap is still pronounced and accounts for about 10 to 15 percent to the disadvantage of females. In this study, we add to the existing literature in several aspects. First, we consider the Oaxaca Blinder Decomposition together with the data and the choices done in more detail. Second, we control not just for individual and firm characteristics, but also for unobserved heterogeneity of the individuals and the firms. Third, we focus on regional heterogeneity; an issue that has not been stressed together with unobserved heterogeneity before. For this purpose, we make use of vast information of German employees, who work subject to social security contributions. The data basis covers a 10% sample of all fulltime working employees in Germany, such that sufficient variation is given. Although we consider a cross-section in 2018, we can build individual performance measures based on the entire (observed) employment and unemployment biography of each individual. Additionally to these observed individual performance measures, we control for unobserved heterogeneity by the so-called Card-Heining-Kline-effects, who provide measures for unobserved heterogeneity for this kind of data for cross-sectional analysis. First evidence is in line with the often estimated pay gap in Germany. However, unobserved heterogeneity matters and changes the relative composition of the pay gap. I.e. the endowment effect becomes stronger and the coefficient effect becomes less pronounced, indicating, that a part of the observed pay gap can be explained by unobserved heterogeneity. However, it does not mean that it is not discrimination. This aspect we discuss in more detail.

236 Unveiling Automation Anxiety and Inequalities in Cities

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Abstract

Since the Luddite movement that railed against the ways that mechanized manufacturers and their unskilled labourers undermined the skilled craftsmen of the day, automation technologies are a source of displacement effects, largely conceptualised and empirically proved in a vast literature, at the point of leading to an automation anxiety. This paper claims that, despite their non-manufacturing nature, cities are not exempted by the negative effects of automation. The paper empirically proves such a statement by analysing the effects on jobs and wage differentials among groups of workers associated with the diffusion of robot technologies in Italian cities in the period 2012-2019. Results are clear. Automation technologies in the form of robotisation do displace jobs, harming particularly low-skilled workers in non-metropolitan manufacturing regions, where inter-group wage inequalities increase. Importantly, through the creation of high-skilled jobs generated by the automation process in neighbouring non-metropolitan manufacturing regions, also cities experience a rise of inter-group workers inequalities. These results call for appropriate policies to cope with the changing occupational skills requested by the labour market.

242 Mapping the Evolution of Regional Digital Divide in Hungary

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Abstract

The new dynamics of digital economy leads to inequalities and one form of such inequality is the so-called digital divide, which is still an investigated topic. The term emerged three decades ago and its origin is related to digital technological conditions. At the early 2000s, however, the interest of policy makers in the topic decreased, considering the extent of the population's access to digital technologies (computers, Internet). At the same time, it became increasingly clear to researchers that inequality could stem from the differences in ICT skills as well.

This dimension of inequality is still primarily derived from the lack of technological infrastructure required for supporting digital connectivity on the one hand, and the differences in the level of ICT skills on the other. The phenomenon can be interpreted at the level of individuals, households, businesses, and geographical areas. The latter can be defined as regional digital divide, whose growing scale poses a number of challenges, especially in less developed regions. Latest results of the Digital Economy and Society Index (DESI) reveals that Hungary has made a significant progress in integrating digital technologies, but there is still a significant gap in digital skills, and the level of skills varies significantly across the regions in the country.

Out of several arising questions related to digital divide, the present research seeks to address, related to the question: is there a digital divide in Hungary in terms of ICT skills, if so, how has it changed over the past decades? If so, what are the changes that have taken place and how has the divide evolved? The research aims at revealing the role of geographic location and ICT skills in changing digital divides through the example of Hungary. It also informs stakeholders to develop initiatives to promote digital literacy, to close the digital gap.

The study investigate the regional digital divide in Hungary based on the data of population census on NUTS3 county level. The identification of occupations according to ICT skills is based on the OECD ISCO code-based categorization. In the perspective of 15 years, results show that regional digital divide can be detected in Hungary on the NUTS 3 level of counties, and it is changing over time. It seems that regions with lower level of digitalization have difficulty changing their relative position. In contrast, based on the employees pursuing digital-intensive occupations, one third of the counties perform above average and can be considered digitalized in decades. Furthermore, industrialized regions in Western Hungary tend to have a relatively higher concentration of ICT specialist-intensive occupations, whereas rural regions with universities primarily have occupations requiring generic ICT-skills.

243 Evaluation of Implementation Timing of COVID-19-related Policies and Regional Tourist Fluctuations: A Panel Data Approach

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Abstract

The COVID-19 pandemic has brought about major changes in travel associated with tourism and business. The decrease in tourists' and business travelers' consumption in these areas substantially affected the industries and local economies related to accommodation, food and beverage services, tourism, and transportation services. Various policies were implemented to support stagnant regional economic activities during the COVID-19 pandemic. Post-pandemic, the recovery of industries that have been impoverished by the response to the COVID-19 pandemic and the revitalization of regional economies have become crucial issues (Financial Policy Research Institute, 2022). Thus, in tourist areas, sustainable regional tourism, including disaster resilience, is required (Japan Tourism Agency/UNWTO 2020).

Studies have analyzed the impact of COVID-19 on travel and lodging, transportation, tourism, and local economies. Matsushima and Mitsui (2022) develop an index to understand the impact of COVID-19 on the local economy and analyzed the impact of the spread of COVID-19 on the local economy, regional disparities, and their factors. Oshima (2021) analyzes the impact of COVID-19 infection status and government measures against infectious diseases and economic measures on the accommodation industry; the paper considers the effects and challenges of the declaration of a state of emergency, various special measures by the government, support measures of financial institutions, and the GoTo travel business. Yamada (2021)'s research on Yamagata Prefecture uses information such as changes in the number of overnight guests, the implementation status of tourism policies, and the number of people infected with COVID-19 to estimate the spread of infection in prefectures. This study clarifies the impact on tourism behavior and residents' lives. Izu (2021) analyzes the impact of COVID-19 on Tsushima City, which has many foreign tourists visiting Japan, and proposes measures to revive tourism.

Matsumura and Saito (2022) have quantitatively analyzed the effectiveness of travel subsidies under the spread of infectious diseases by using the GoTo travel business as a case study. This study estimates the flow of overnight travelers between prefectures, using a regression model that shows the relationship between the number of people infected in the place of residence/stay and travel subsidies, and clarifies the effect of the GoTo travel business. Hasegawa (2020) uses a regional input-output model and analyzes the economic ripple effect of the decrease in tourism consumption caused by the decrease in the number of overnight guests, targeting six prefectures in the Kinki region. Soma and Hyodo (2022) propose an analysis method that utilizes the accuracy of spatial location information by creating master data linked to spatial location information by using individual records of overnight travel statistics. Kawakami and Kusuda (2021) focus on the number of employees in the accommodation and food service industry and develop a multiple regression prediction model that incorporates the impact of the declaration of a state of emergency. Kurihara et al. (2022) reviewed the status of COVID-19 and changes in lodging demand from Japanese and foreign tourists in 2020 and examined the lodging facilities that were affected by COVID-19 and those which were able to recover.

Research has evaluated the impact of specific regions or partial COVID-19-related policies during the coronavirus pandemic. However, few studies have considered and analyzed a series of policies related to the COVID-19 pandemic targeting prefectures across Japan.

A feature of this research is its explanation of the factors that changed the number of overnight guests in each prefecture during the COVID-19 pandemic from the perspective of the COVID-19 pandemic situation and the timing of the introduction of a series of COVID-19-related policies. Using a fixed effects model, we clarify the relationship between the timing of the introduction of COVID-19-related policies, such as state of emergency declaration, GoTo campaign, vaccination, prefectural discount, and nationwide travel support, and changes in the number of guests. Additionally, by analyzing guest categories by purpose of stay, accommodation facility, and place of residence, we examine the differences in the effects of each policy factor on changes in guest categories.

In this study, we use a fixed effects model to conduct a factor analysis, focusing on the COVID-19 epidemic (rate of severe cases) and the timing of introduction of COVID-19-related policies as factors that change the number of guests in areas affected by COVID-19. Overall, changes in the number of guests during the COVID-19 pandemic are due to negative factors (increase in severe cases of COVID-19 and the timing of the introduction of the state of emergency) and positive factors (e.g., GoTo campaign, vaccinations, prefectural discount). The results can be attributed to the timing of the introduction of national travel support.

In observing the timing of the introduction of various COVID-19-related policies, based on the purpose of overnight travel, a significant impact was observed mainly on overnight guests from outside the prefecture whose main purpose was sightseeing. By contrast, in observing accommodation facilities, the effect was shown to be pronounced on guests from outside the prefecture staying at city hotels and resort hotels.

In response to the outbreak of COVID-19 and its mutant strains, various countermeasures were introduced in quick succession because the infectivity and effects of COVID-19 were unclear. The results of this paper, from the perspective of changes in the number of guests staying, show that overall, the expected impacts were occurring at the time these policies were introduced. However, when guests were divided by purpose, facility, and place of residence, the results suggest that the effects differed. The results obtained in this study provide useful information for resilience policies against future infectious diseases.

Keywords

Regional Tourists, COVID-19, Fixed Effect Model, Policy Impact.

244 The Transformation of a Rural Area into a Functional Urban Area through a Hungarian Example

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Abstract

By the middle of the 20th century, the Szigetköz, a small area in the north-western corner of Hungary with a specific ecology, had become one of the country's key agricultural areas (described by many sources as the country's breadbasket). However, the agriculture of this area with its significant agro-culture has been largely transformed. As a result of the intensive development of the region (most notably the expansion of the Győr agglomeration), the agricultural production function of the Szigetköz settlements, which supplied and served local markets and needs, has been replaced by a series of suburban areas with urban functions, which have been created by the Győr agglomeration. For the analysis of the transformation of the area I used the databases of TEIR, KSH, NÉBIH, MÁK, Arcanum Mapire and FÖMI. Examining the land use of the settlements, based on contemporary descriptions and maps, it can be said that until the beginning of the 20th century agricultural production was structured in zones, with concentric circles, where a belt was formed according to the natural conditions. At present, however, larger territorial units (cities) are 'enclosing' smaller areas and exerting a centralised influence on the development of agricultural production, bypassing the potential of natural resources, i.e. the development of an agricultural economy based on local resources. This means the disappearance of agricultural production belts in villages, which had been concentric circles, replaced by zones around towns and cities. By the 21st century, the small kitchen gardens which used to occupy large areas and which were typical of the past, with a wide range of crops, are now scarce and are being replaced by the construction of family houses and estates. Small plots are not common, and there is a significant proportion of monoculture arable crops.

245 Mapping Regional Knowledge Flows in the Software Industry

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Abstract

Software is a keystone industry in the modern digital economy. Yet we know surprisingly little about geographic distribution of software developers and capabilities. On the one hand, software is immaterial, has low capital and no marginal costs to produce, and its production seems amenable to remote collaboration; suggesting that successful software could come from many places. On the other hand, we observe famous clusters in Silicon Valley, London, and Berlin, but also in emerging places like Prague and Bengaluru. Together, these observations suggest that there is immense value in software clusters, but also that new clusters can emerge in relatively short time frames.

To go beyond observation and understand mechanisms behind these patterns, we need data. It is difficult to derive information about capabilities in software from sources like patents. In this work I present a dataset on nearly 35 million question and answer pairs sourced from Stack Overflow, the largest online platform for asking questions about computer programming. I geolocate posters at regular intervals to country and FUA urban regions. I use the resulting dataset to map knowledge flows between countries and regions, noting when one place answers a question of another.

Preliminary results indicate a growing diffusion of software capabilities over time: countries like India are answering relatively more questions that they used to. Indeed, a network-based ranking approach ranks Bengaluru as the leading city in terms of answering questions. On the other hand, knowledge flows about relatively new languages and technologies like Rust and Tensorflow continue to spread from core places like Silicon Valley to the rest of the world. I argue that this kind of fine-grained data has significant unrealized potential to quantify local, regional, and national capabilities and their evolution.

246 Long-Run Dynamics of Carbon Dioxide Emissions, Economic Growth and Energy Efficiency at City Level in China

Bin Hu

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Abstract

Headlines around the world have focused on the number of coal-fired power plants being built in China: “China is building six times more new coal plants than other countries”. China’s coal consumption continues to rise since 2017, especially after Russian-Ukraine crisis, and energy security became a priority. In 2022, China’s coal use increases by as much as 4.3%, and likely to continue this trend at 2023. Whether China can peak its coal use before 2030 causes lots of attention around the world, and China faces a mounting pressure to realize its promise. In this paper, we hope to offer some insights by addressing China’s carbon peaking concerns from the perspective of energy efficiency.

We estimate the linkages among total Carbon dioxide (CO₂) emissions, total GDP and energy efficiency using China’s city panel data from 2001 to 2019. We first apply the extended stochastic frontier analysis (SFA) method that decomposes persistent and transient efficiency to estimate the city-level energy efficiency in China. SFA has the advantage of capturing the inefficiency error components and statistical noise in energy efficiency evaluation. Secondly, based on the calculated energy efficiency scores, the respective stage of economic development and energy mix of different provinces, we provide suggestions for realization of carbon peaking for different provinces. Thirdly, we then investigate the long-run dynamics among CO₂ emissions, economic growth, and energy efficiency by employing the panel-based error correction model. Our analysis shows that GDP has a positive impact on total CO₂ emissions in the short run and gains in energy efficiency have a significant negative effect on emissions in the long run. We provide similar insights after controlling the effects of the business cycle and cross-sectional difference. In addition, given the economic outlook of Chinese 14th five-year plan and different scenarios of energy efficiency improvement, we can roughly estimate the peaking level of CO₂ emissions for whole country and different provinces. Although China is leading the world renewable industry, we argue that by improving energy efficiency, China can achieve its carbon peaking target while balancing the economic growth and energy safety concern.

247 Theoretical and Empirical Considerations of the Creative Cities Sustainable Regions Programme in West Hungary

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Abstract

The global and regional socio-economic changes of recent years have necessitated a reassessment of traditional investment and rural development strategies, while valuing creativity, knowledge production, socio-economic cohesion and social innovation. It is therefore also worthwhile to focus on the so-called "soft factors" (creativity, innovation capacity, new knowledge creation, knowledge transfer, trust, cooperativeness) and their measurement. In response to the challenges mentioned above, the Institute of Advanced Studies in Kőszeg (IASK) has developed in recent years a concept aimed at providing sustainable solutions and attractive living conditions in response to new situations caused by global trends, taking into account local assets (e.g. local cultural heritage). The Creative City Sustainable Regions (Kraft) integrative urban and rural development strategy builds on a combination of three major potentials. The first is the potential for creativity and innovation, and the ability to generate new knowledge, going beyond conventional thinking, stepping out of the box, and developing new ideas and new solutions. The second is the constant development of social and relational capital and the opportunities offered by networks and interconnections, as well as the cooperative skills and abilities that form the basis for the cooperation needed for development. The third is the principle of sustainability, which guarantees the social, economic and ecological sustainability of development. The Kraft concept is based on a multidisciplinary (and multi-layered) spatial approach. It identifies quantifiable resources at the locations concerned and those that are difficult to measure - mainly internal ones - along several dimensions. This presentation will discuss how such elements are integrated and, in particular, how cultural heritage can be included in the model. As a practical implementation for the theoretical model, the presentation will introduce the development experiences of some model areas in West-Hungary. The Szigetköz region that lies near the Danube River appears to be a popular and prosperous area, but the local economy and society are clearly trying to thrive in an environment of unsustainable processes in the long term. The Szigetköz region has a particular importance for its water and landscape assets, which are under constant threat from climatic and human changes (from issues of water availability to the continuous change in agricultural land use and urbanisation trends). The challenges can be met by reassessing traditional cultural heritage or, for example, by sustainable 'new tourism'. Another example could be the functional revitalisation of the heritage elements of Kőszeg in West-Hungary. This small town of 12,000 inhabitants, rich in historical heritage elements, has seen local developments that are slowly boosting the development of local society. Specific development actions have enhanced the existing tourism and cultural offer (for example, through the revitalisation of the local synagogue), but they may also have triggered more complex socio-economic processes. This presentation will introduce the above mentioned theoretical concept, and will try to outline the development potential of West-Hungary with the help of some empirical findings.

248 Measuring and Analysing the Competitiveness of Hungarian Urban Regions

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Abstract

This presentation aims to present the Competence and Institutional Competitiveness Index (KIVI) and the results at the city-region level measured by the index. For decades, competitiveness has been a buzzword that has caught the attention of policymakers, economic development institutions, researchers, and international organisations. Regional competitiveness indices typically focus on the broad institutional environment. However, in addition to national-level approaches to competitiveness, since the 2010s there has been an increasing focus on measures and analyses focusing on smaller geographical units, as it has become increasingly clear that different territorial units are on different growth paths. The spatial concentration of the external factors that influence and shape firms' competitiveness varies. However, it is important to stress that the external environment is only one aspect of the factors that influence competitiveness and that the other aspect, the individual factors and competencies of firms, should not be overlooked. Even Porter and Krugman agree that competitiveness is not primarily a matter for countries, regions, or territorial units, but for the companies operating there. In our view, both institutional factors and individual competencies are important for territorial competitiveness. On the one hand, poor institutional conditions can significantly reduce the performance of otherwise competitive firms, and on the other hand, institutional development alone can only partially compensate for weak firm competencies (Szerb et al. 2023). Our Competence and Institutional Competitiveness Index (KIVI) is a new composite indicator for the analysis of small business competitiveness. The methodology incorporates individual firm competencies as well as institutional and industry factors, making it suitable for a complex measurement of the external-internal operating environment of small firms, and for the assessment of firms and territorial units. Competitiveness is measured at the urban agglomeration level, which is considered a real economic spot suitable for examining the differences arising from territorial disparities. Institutional and industry variables are constructed using indicators of external agglomeration factors affecting firms, many of which are developed in-house. Firm-level data were calculated using the methodology of the Hungarian Small Business Competitiveness Index. (Szerb et al. 2023). The final sample included 1283 Hungarian SMEs and 20 Hungarian urban agglomerations. If the institutional variables are well correlated with the level of development of the agglomeration, such a relationship with individual factors is not, which means that the environmental factors of competitiveness and the aggregate individual competencies of firms do not necessarily move in the same direction. To empirically demonstrate the application of the KIVI, three urban agglomerations (Budapest, Pécs, Nyíregyháza) were analysed in detail (Szerb et al. 2023), following the presentation of aggregate data.

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251 Safe Zones in Northern Syria: Displacement, Humanitarian, and Security Issues

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Abstract

The more than a decade-long war in Syria has created one of the most serious humanitarian crises of our time and one of the worst refugee crises since World War 2. Since the start of the conflict, most of the forcibly displaced Syrians are living as refugees in states bordering Syria. Turkey, with 3.2 million Syrian refugees on its territory, is one of the world's largest refugee hosting states, and is also the country most affected by the humanitarian consequences of the conflict. On the other hand, the relationship between Turkey and the Syrian war involves geopolitical, foreign policy and security factors that go far beyond the refugee issue and the conflict's humanitarian impacts. In parallel with the surge in refugee population, Turkey has also attempted to address the refugee issue outside its borders, most notably by creating a buffer zone/safe zone between Turkey and Syria. Although the concept is closely linked to Turkey's military interventions in northern Syria and the foreign policy intentions behind them, Ankara has justified the existence of safe zones primarily on humanitarian grounds and the possible large-scale repatriation of refugees and IDPs. The conference presentation will approach and analyse the safe zones in northern Syria from the latter perspective. The aim is to examine the situation of forced migration, refugee return and the humanitarian situation in a de-facto entity caused by a protracted armed conflict and a geopolitical environment that, on the one hand, has no international legitimacy and, on the other, exceeds humanitarian concerns. After a brief theoretical framework and an overview of safe zones in past conflict areas, the paper is divided into three main sections. First, it discusses the evolution of Turkey's safe zone concept during the years of the Syrian conflict, focusing on the circumstances that shaped Turkey's position. Second, it examines how the numbers and situation of Syrian refugees and IDPs have changed with the establishment of the safe zones in northern Syria, and whether the hopes (and promises) of large-scale repatriation have been fulfilled. Third, the research will also cover the humanitarian situation inside the safe zones, with a particular focus on the humanitarian needs of the affected population, the implementation of humanitarian aid and the international and local actors involved. The results and findings of the research will be based mainly on qualitative analysis of reports from relevant international and local organisations, Turkish government documents available in English, articles from relevant press articles. In addition, in-depth interviews with experts will be conducted to explore perceptions of the effectiveness and challenges of the safe zones.

254 Approaches to the Sustainability of the European Regions Based on the New Energy Sustainability Model for the Transition to Climate Neutrality

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Abstract

Europe's energy sector is important for economic growth and European security. This sector is a generator of prosperity for society and its sustainable development aims to modernize and improve energy services and boost economic competitiveness. At regional level, the use of renewable resources is proposed to guarantee energy security, balance European independence, and efficiently interconnect European regions in the Climate Neutrality Strategy. Accelerating the clean energy transition of the European regional economies means increasing renewable energy consumption, phasing out fossil fuel imports and electrifying hydrogen industries. We aim to analyse the sustainability of the European regional economies based on a new energy sustainability model for the transition to climate neutrality. The methods used consist of a literature review on the sustainability of the European regional economies in the context of the transition to climate neutrality, consolidation of a database and econometric modelling. The results of the study will be useful for economic and energy policy makers to identify regional vulnerabilities.

258 Social Network Analysis and Qualitative Insights to Understand Learning Processes Within Clusters. A Case in the Vegetable Seed Breeding Industry in China

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Abstract

Over the past decade, social network analysis (SNA) has gained extensive traction as a tool for relational exploration, notably in investigating the significance of cluster networks within learning and innovation processes (Broekel et al., 2014; Giuliani, 2007; Golra et al., 2023; Hjertvikrem and Fitjar, 2021; Maghssudipour et al., 2020; Torre et al., 2019). However, empirical studies have predominantly delved into the structural aspects, network evolution, and the influence of proximity factors, but they have somewhat overlooked the broader context shaping these networks' existence (Glückler and Panitz, 2021).

Merely focusing on structural analysis limits the comprehensive potential of relational analysis, which truly thrives when it encompasses both the topological network characteristics and their contextual significance (Pachucki and Breiger, 2010). As highlighted by Glückler and Panitz (2021), achieving this demands a symbiotic relationship between formal network analysis and broader relational approaches, necessitating deep immersion in the field. This immersion extends beyond processing secondary data; it requires a qualitative understanding fostered by mixed-method approaches. However, the integration of qualitative and quantitative network analysis in mixed-method designs remains an emerging area (Crossley, 2010; Crossley and Edwards, 2016; Glückler et al., 2020; González Canché, 2019; Nooraie et al., 2018). Glückler's 2021 meta-analysis revealed that only a small share of studies used multiple methods to analyse networks, indicating an underexplored avenue in current research.

In this paper, we propose to conduct a social network analysis and inductive qualitative study to delve into the mechanisms shaping cluster knowledge relations, focusing on local firms in China's Shouguang cluster within the vegetable seed breeding industry. This study hopes to contribute to understanding the local fabric of firm's learning process and mechanism, provide an analytical framework by integrating social network analysis with qualitative study, and offer some policy discussions about local learning and cluster development.

This research draws from primary data collected through face-to-face interviews and questionnaires supplemented by secondary sources like official statistics and media coverage. Social network analysis identifies knowledge networks' structures, while qualitative analysis of interviews uncovers the underlying mechanisms driving their formation.

Our preliminary findings reveal that the technical knowledge network in the Shouguang cluster comprises various connections, including local, non-local, temporary, and non-temporary networks. Inductive analysis highlights three interconnected themes — value, proximity, and trust — that categorize the process of establishing knowledge connections. These themes further branch into aspects like technical knowledge value, social capital value, geographical proximity, organized proximity, personal trust, organizational trust, and more. A "Value-Proximity-Trust" motivation model emerges, explaining how knowledge networks are constructed and impact the level and structure of knowledge flows.

259 Local Impact Factor (LIF) Analysis for Spatial Autocorrelation

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Abstract

Spatial autocorrelation measures have become vital tools in empirical research, particularly during the exploratory data analysis (EDA) phase. EDA is crucial for identifying spatial dependencies and patterns in various phenomena. Traditional measures of spatial autocorrelation often operate under the assumption that the variable being studied follows a normal distribution. This assumption, however, can be overly restrictive. In real-world scenarios, especially in published studies, the data frequently contain outliers that deviate significantly from a normal distribution. These outliers can skew the results of spatial autocorrelation analysis, leading to misleading conclusions about spatial relationships and dependencies. To address this issue, we introduce the Local Impact Factor (LIF), a measure inspired by the robust indicators found in the literature. The LIF is designed to account for the presence of extreme values in the data and their specific locations on the map. This approach is fundamentally different from traditional measures that might excessively focus on central tendencies or assume normality. By acknowledging the presence and impact of outliers, the LIF provides a more nuanced and accurate picture of spatial relationships. The LIF operates by assessing the potential impact of a perturbation in the reported value of a specific location. This assessment aims to identify the most influential areas on the map, considering not only the extreme values themselves but also their spatial context. This methodology is particularly relevant in fields like environmental studies, urban planning, and public health, where spatial outliers can significantly influence the overall analysis. Our results reveal that the area's most influential in terms of spatial autocorrelation are not necessarily those with the most extreme values. Instead, they are areas that, due to their specific location and the values they hold, most significantly affect the overall measure of spatial autocorrelation. This finding challenges the traditional emphasis on extreme values alone and highlights the importance of considering the spatial context in which these values occur. In conclusion, the Local Impact Factor represents a significant advancement in the field of spatial analysis. By incorporating the influence of outliers and their spatial context, the LIF offers a more robust and comprehensive tool for exploratory data analysis. This measure is not only a valuable addition to the toolkit of researchers and practitioners but also a step towards a more nuanced understanding of spatial phenomena.

260 Institutional Relaxation, University Knowledge Spillover, and Start-up Formation: Evidence from Amendments to the Law of Promoting the Transformation of Scientific and Technological Achievements

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Abstract

Institutional restrictions on the transformation of scientific achievements significantly affect university–industry collaborations. Exploiting the amendments to the Law of the People’s Republic of China on Promoting the Transformation of Scientific and Technological Achievements, this study examines the effects of relaxing these constraints on the formation of start-ups near universities. The results suggest that the amendment significantly influences the formation of start-ups, which decreases significantly with distance over a range of approximately 9 km. The mechanism is the amendment increasing the transfer of patents invented by universities to new start-ups, promoting collaborative inventions of patents between universities and new start-ups, and enhancing the innovation capacity of start-ups around universities. This study identifies a substitutional relationship between the external institutional relaxation by the government and the internal capacity strengthening by the university. Moreover, it offers evidence on the spatial effects of innovation policies targeting universities on the formation of start-ups and insights into improving the coordination of innovation policies within and outside the organization.

261 Urban Waste Management Reinforcement for Combined Environmental and Socioeconomic Benefits Globally

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Abstract

Global urbanization requires a proactive approach to municipal solid waste (MSW) management, combining forecasting, evaluation, and optimization of systems. Increasingly, researchers are emphasizing predictive analytics, technological advancements, policy reforms, and management-focused solutions to address the future challenges of global MSW management. Given this, our study aims to use cutting-edge methods to investigate the current situation of global MSW and to forecast the future developments. A reinforced MSW management system is designed integrating localized development realities with trade-offs between different technical parameters and potential of future MSW for the evaluation of combined environmental and socioeconomic benefits under different management scenarios. This will provide decision support for achieving the global sustainable development goals.

To address the data gaps on MSW across different countries or regions, we integrate Shared Socio-economic Pathways (SSPs) and Machine Learning to estimate the MSW generation and composition from 2030 to 2100, based on the available historical data, which results in a forecast database of MSW. Next, we apply Material Flow Analysis from a life cycle perspective to evaluate the resource, energy and socioeconomic implications of various MSW components under different disposal technologies, as well as the associated environmental impacts, which yields a functional unit parameter database of MSW. Using the above two databases, we construct different scenarios of MSW management with varying levels of intensity. By optimizing the shares of different technologies, we assessed the future potential of MSW in terms of resource and energy recovery, environmental impact mitigations, and socioeconomic contributions.

Our research aims to explore the following aspects: (1) The generation and composition of MSW, and how they are influenced by various socioeconomic factors (such as aging, education, poverty level, etc.), as well as their projected trend from 2030 to 2100; (2) The resource, energy and socioeconomic implications of different urban MSW treatment technologies, and the associated environmental impacts throughout the life cycle; (3) The potential combined socioeconomic and environmental benefits from different MSW management scenarios with varying levels of intensity in the future. (4) The necessity and feasibility of developing advanced integrated MSW management systems that can account for the regional differences and future development conditions, and tackling climate and environmental risks posed by the current waste management practices. Our research provides a comprehensive strategy that integrates predictive analytics, technological advancements, policy reforms, and management-focused solutions to effectively tackle the future challenges of global urban waste management.

262 Spatial Analysis of Crime in Ecuador

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Abstract

According to the United Nations (UNDP, 2021), the Latin American and the Caribbean region has become the most violent region in the world. Within this context, Ecuador has experienced an increase in violence due to the presence of street gangs, added to the presence of criminal groups from Colombia, Mexico and Europe for being a strategic point for cocaine trafficking. By 2022 the rate of violent deaths was 25.32 violent deaths per 100 thousand inhabitants, making it one of the most dangerous countries in Latin America. Within the country, the cantons that register the highest violent death rate are: Pueblo Viejo, La Troncal, Naranjal, Nangaritza, Esmeraldas, Quevedo, El Empalme, Huaquillas, Guayaquil and Pedernales with 41.85, 40.45, 37.88, 36.10, 34.47, 33.61, 31.09, 30.91, 30.20 and 29.71 violent deaths per 100 thousand inhabitants, respectively. These cantons are located in the coastal area, specifically in the provinces of Los Ríos, Guayas, Esmeraldas, El Oro and Manabí, one in the Sierra region, in the province of Cañar, suggesting that there is a spatial pattern of crime. This may be due to the struggle for territories by more important criminal gangs (OECD, 2023). Based on this, the objective of this study is to determine the level of spatial dependence of crime, measured through violent murders, in Ecuador and its determining factors, emphasizing on the effect of the judicial system. In this context, understanding and addressing crime requires a spatial approach, since crime is not randomly distributed across space (Aguayo & Medellín, 2014; Carrión, 2007; Glaeser et al. 1996) and it diffuses over space (Anselin et al. 2000).

While in the existent literature clusters of crime are identified using spatial analysis, less attention is paid to clusters of non-crime or other types of regions considering their crime dynamics. To address crime, apart from identifying clusters of crime, it is also important to identify regions where crime is not high but are surrounded by regions with high crime levels, and vice-versa. In addition, crime has been analyzed considering the intricate interplay of factors like socioeconomic conditions, urban planning, and law enforcement strategies, contributing to specific crime patterns (Graif et al 2014). In developing countries, apart from aforementioned factors, the low quality of institutions, encompassing law enforcement, the judiciary and penal system, can make that crime deterrence policies be not effective (Paternoster, 2010).

Based on this, the objective of this study is to determine the level of spatial dependence of crime, measured through violent murders, in Ecuador and its determining factors, emphasizing on the effect of the judicial system. To carry out the study, different data sources are used: the Ministry of the Interior, the Ministry of Education, the National Employment and Unemployment Survey (ENEMDU), the State Attorney General's Office, the Ombudsman's Office, the National Service for Attention to Adults Deprived of Liberty and Adolescent Offenders (SNAI) and the Ecuadorian Observatory of Organized Crime (OECE). Our database accounts for information of 218 cantons from 2011 to 2021. An Exploratory Spatial Data Analysis and a spatial econometric models are used. Based on the LISA indicator, different types of clusters were identified: clusters of crime, clusters of non-crime, crime islands, non-crime islands and changing cantons. Crime clusters prevail over time, showing greater presence in the areas of the Coast region, while the non-crime cluster locates in the highland region. Changing dynamics of crime in cantons could be identified using a temporal analysis. This analysis allows developing strategies to mitigating crime. Based on our spatial econometric model estimations, the variables of interest related to the judicial system are significant. The judicial congestion rate and the unsentenced prison index are associated with higher violent murder rates. These results evidence the inefficiency of the judicial system, which constitutes a driver of crime.

Other factors such as income poverty rate, the percentage of Young people who do not study and the level of drug seizures are associated with high crime levels. The employment rate and the level of serious complaints decrease the level of murders.

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264 The Probability of Migrating and Universities in Peru

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Abstract

Internal migration patterns are influenced by inherent individual factors and specific characteristics of localities (Lucas, 2015; Ackah & Medvedev, 2012). People move to places not only attracted by better job opportunities but also by better amenities (Albouy et al., 2021). One important amenity of places is the presence of universities, which attract not only students but also firms who can profit from the professionals coming out from those educational institutions. Universities, which are centers of learning, constitute a triggering force that induces agglomeration, enhancing spatial disparities within countries. Indeed, many studies show that skilled workers disproportionately locate in big cities in a sorting process with self-selection. One of the reasons is that cities encourage learning and therefore attract learners (Bacolod et al. 2023). Motivated by this, this study aims to determine the impact of the presence of universities on the internal migration at the departmental level in Peru.

The case study of Peru is of high relevance since the agglomeration pattern in this country shows prominent inequality. By 2022, Lima, the capital city of the country accounts for 29.32% of the total population (10.45 millions out of 35.64 millions) and 42% of the total number of firms (1.33 million firms out of 3.1 million firms). In what concerns the education offer, which is the focus in this study, Lima has concentrated 42.6% of the total number of universities in the country since 2009 to 2019. In this framework, young people or entire families from cities with no or limited offer of universities in their places of origin might seek to migrate to big cities with more availability and variety of educational offer. After finishing their careers, they would be very likely to stay and enter the labor market in such big cities, which generally offer more and better labor opportunities. In fact, Huarancca et al. (2020) in a migration study for Peru show that Lima register more inter-departmental and intra-provincial migrants between 2012 and 2017.

Therefore, the aim of this study is to determine the impact of the presence of universities in cities on the internal migration at the departmental level in Peru. To do so, data at the department level from 2009 to 2022 regarding universities from SUNEDU Register is combined with the National Household Survey (ENAHU, acronym in Spanish). We focus on families with young children between 17 and 18 years old.

Our resulting database contains information on 26993 households from 2015 to 2022.

To analyze the household's choice to migrate between departments within the country, we estimate a binomial linear regression model, for which we assume a logistic link function. Where $P(migrant_i = 1)$ is the probability that the i -th household migrates to a different department. Our variable $migrant_i$ takes the value of 1 if the head of household declares that 5 years ago, he or she did not live in the department where he or she lives at the time of the survey. The dependent variable is 0 if either the i -th household did not migrate at all.

Our results show that on average, a 1 point increase in the number of universities per million inhabitants in departments is associated with an increase in the likelihood to migrating between departments. Lima es the main attractor through higher education institutions. However, this effect vanishes when the characteristics of departments are considered. Individual and household characteristics influence on the probability of migrating between departments. The relationship between the probability of migrating and the parent age is non-monotone. It seems that young

parents are less likely to migrate than older parents. It could be due to job stability. Afro-descendants are less likely to migrate than mestizos. Households with more dependent members are less likely to migrate. Households with more income are more likely to migrate. They are able to cover the movement costs. The features of the destination department are also important for migrants. More access to water induces more migration. Crime in the destination is a deterrent factor for migration.

266 The Urban Industrial Landscape: How Digital Advancements Reshape Location Choices

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Abstract

This research provides a fresh look at how the growth of digital technologies is affecting where industries choose to locate within cities. By analysing data from over 1,600 South Korean firms using a generalized structural equation model, the findings go beyond theory to show actual patterns. A key finding is that digital advances lead to better productivity and use of space, which makes urban areas more attractive to industries. However, the expected link between digitalization and environmentally friendly production isn't as straightforward as previously thought. This study sheds light on the complex ways technology is redefining urban industrial zones, focusing on the indirect effects of digitalization on where industries settle, thereby advancing the scholarly conversation about the evolution of urban industrial spaces.

270 **Are Linguistic Policies a Barrier to Interregional Migrations? A Case of Study in Catalonia**

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Abstract

This study explores the impact of linguistic policies on interregional migration, focusing on the Linguistic Normalization Act (LNA) implemented in Catalonia in 1983. Utilizing a synthetic control method with lasso (SCUL) for causal analysis, the research assesses migration flows from various Spanish autonomous communities to Catalonia. The paper contributes to migration literature by employing a quasi-experimental design to investigate language barriers. Initial findings indicate that linguistic policies, particularly those promoting local languages, can act as significant determinants in migration decisions. By analysing migration patterns before and after the implementation of the LNA, this study sheds light on the often-overlooked cultural and linguistic factors influencing migration, providing a nuanced understanding of migration dynamics within Spain.

271 Urbanization and Slums: Evidence from Ecuador

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Abstract

Slums represent one of the challenges of urbanization in developing economies. This paper analyses the relationship between slums, urban population, and city expansion in Ecuadorian cities between 1990 and 2010. In particular, we define a slum severity index based on a set of household characteristics such as housing material, basic services, and overcrowding rate and we focus on the growth of territorial extension of cities occurred between the 1990-2001-2010 censuses using historical maps to define the territorial extension of urban areas across periods. We use a two step-methodology to analyse this relationship and perform IV estimates to handle the endogeneity of the relationship. Our results point out that, while in general terms larger cities present a lower level of deprivation with respect to smaller cities, in newly created areas it happens the opposite, i.e. newly created areas present higher slum characteristics in larger cities. The analysis of the drivers suggests urban poverty as the main determinant behind the detected results, while both rural-urban migration and faster urban population growth seems to play a minor role.

273 A province Level Input-Output Approach to Assess the Economic Impacts of Morocco's 2023 Earthquake

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Abstract

Economic growth theory gives no consensus about the exact impact natural disasters such as an earthquake, can have on economic growth. Categorizing this impact as positive or negative largely depends on the magnitude of the earthquake, the considered time horizon, and most of all, whether there is a reconstruction impulse package or not. Falling under this topic, our paper aims to quantify the economic loss of the Earthquake that hit Morocco on the 8th of September 2023, as well as to evaluate the impact of the 5-year reconstruction plan, that will account for roughly 9% of GDP. Given the geographically concentrated location of the earthquake, that hit some provinces in the central part of Morocco, our methodology relies on an inter-province inter-industry Input-Output (IIO) table for Morocco.

Assuming that the resources to be spent on infrastructure reconstruction efforts represent the actual loss of capital stock suffered in the provinces, and by allocating the estimated regional capital stock losses on provinces according to each province's share of its regional output, we use an already estimated capital factor demand to output elasticity (Haddad et al., 2022) to compute the intraregional elasticity of sectoral output to regional capital stocks. Then, using these elasticities coupled with the estimated capital stock losses we calculate the regional output loss caused by the earthquake. This information is used to obtain the sector-level F factors representing the unaffected local output. With these factors, we operate a partial hypothetical extraction on the Moroccan IIO system to simulate the damages suffered by each sector.

To estimate the impact of the reconstruction plan, we use the official information on households' transfers and residential reconstruction aids, in addition to the investment efforts to rehabilitate damaged infrastructure to calculate the final demand shocks linked to these efforts. Thus, we build an alternative scenario based on computed numbers for 2023 using the previously estimated capital stock losses, and then the following years with the cumulative demand shocks caused by the relief efforts. For a comparison purpose, we build a counterfactual baseline scenario (i.e the earthquake did not happen) using the IMF 2022-2028 macroeconomic scenario as a reference to construct time series for GDP and final demand components, that will be used with the IIO model to downscale estimates and obtain counterfactual province-level GRP trajectories.

Our findings suggest that the earthquake will lead to a growth loss of 0.23% of Morocco's GDP in 2023. Regarding the reconstruction plan, its impact on Morocco's overall economic growth is expected to be mild. However, it is likely to significantly affect the GRP of the affected provinces, the magnitude of which will heavily depend on whether the allocated funds represent new injections into the economy or merely reallocations of investments across regions.

275 A Novel Study on “SOULFUL” in “Information and Business Driven”: List of 2020’s Pandemic Data for Class; “General and Unification Phenomenon”, Japan

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Abstract

This paper is the study of “SOULFURIAN” who survived the predicament in crisis on digital era in “SOULFUL study” which means phenomenon who survived the predicament in crisis on the digital era. In this paper, the 2020’s pandemic crisis is the COVID-19 crisis. Previous theories of novel COVID-19 appear to have a serious deficiency: Because we have been the current crisis of COVID-19 is unprecedented things, In the world, most people do not know about real COVID-19, and all over the world that is not well, completely, understood even among experts yet. Because COVID-19 is happening in reality now. In this paper, following Hayama’s study in 2020, 2021, 2022 and 2023 all data over the three years from February 2020 to August 2023. And this paper was analysed from February 2020 to May 2023, and, this paper compares the data on the number of infected and deaths with each data investigated on "traffic modes" and the number of people "not wearing masks" in the shopping street area that new variable that has investigated a variable that has not been studied by other researchers, and analysed discussed the risk factors of COVID-19 which variables are valid and whether there are any other factors by simple regression analyses($p < 0.05$). In this paper, simple regression analyses of one hundred fifteen items of data in total were significant, and although the analysis seemed to show a lot of resilience in the use of different "traffic modes" or "not wearing masks" Broadly speaking, there was shown different messages that five items about traffic modes and six items about not wearing masks. In the future, it needs to analyse SOULFUL study in the world including KARAHORIAN as SOULFULIAN, behaviour characteristics of Micro wave era (from the first wave and first silent wave to final wave and silent wave). It is important to study and analyse before, after, and after the N wave with the X crisis, and "Silent Wave" and so on by “The General and Unification Study” that the study proves that all events are closely related perspective in the future. Organizing through this research will become “the assets” to be studied in the next future.

276 What Drives the Individual's Perception of the Ecological Transition? Evidence from Spain

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Abstract

This paper is about individual perception about ecological transition in Spain. To do that, a national survey of 7,029 individuals has been implemented in order to obtain a complete overview of several dimensions of ecological transition, both in terms of social preferences related to acceptance of energy infrastructures (e.g., nuclear plants, wind farms, etc.) and actions carried out by citizens (e.g., waste sorting, use of electric cars, etc.). By this way, we can provide an overview of internal (e.g., age, education, etc.) and external (e.g., region, municipality size, etc.) factors that drive peoples' beliefs and actions related with ecological transition. Concretely, we assume that these perceptions are shaped by the urban and regional characteristics, as there are important spatial inequalities (e.g., agglomeration, implementation of green energies, etc.) that interact with individual characteristics generating heterogeneous responses to climate and environmental challenges. Overall, identifying these heterogeneities is of crucial importance in view that ecological transition relies on social support and commitment that may differ across cities and regions according to previously discussed dimensions. In this sense, to ensure this social commitment it is needed to understand the way in which urban and regional specificities shape social acceptance of ecological transition. Our econometric results provide numerous policy implications in terms of understanding mechanisms driving towards ecological transition and designing policy actions to boost this process.

277 Spatial Dimension of Ecological Transition and the Social Acceptance of Energy Communities

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Abstract

This paper analyses whether spatial dimension matters in terms of knowledge and social acceptance of Energy Communities (EC), which are conceived as an organizational structure allowing the involvement of citizens in the energy system within a democratic, flexible and innovative framework which ensures the empowerment of population in energy issues as well as stimulates the use of renewable sources of energy in a decentralized network. To do that, a survey of 1,840 individuals has been implemented in several municipalities in Catalonia (Spain) according to a double dimension: urban and rural municipalities with or without EC. Our results provide an overview of internal (e.g., age, education, etc.) and external (e.g., region, municipality size, EC implementation, etc.) factors that drive peoples' perceptions related with EC. Accordingly, the aim of this paper is to contribute to the empirical literature on the social acceptance of ECs by focusing on the spatial dimension to understand how space shape individuals' perceptions related to the organisational solutions to be implemented to boost ecological and energy transition. Accordingly, our econometric results provide numerous policy implications in terms of understanding the way in which spatial dimension shape knowledge and acceptance of EC, as well as the catalysers' role of them once settle down.

280 The Four Waves of Regional Policy: Towards an Era of Trade-Offs?

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Abstract

While regional policy is not a unitary concept and comprehends many different types of intervention, it has also evolved in time, most notably in terms of justification and objectives. The conceptual bases and political motivations on which it is implemented nowadays are very different from those of the 1950s and 1960s, and the objectives have also evolved, although with a certain degree of continuity which will be clear later in the paper.

Understanding the conceptual evolution of regional policy is helpful to understand the reasons why, nowadays, it is applied, and what might be its next evolution. For this reason, this paper reviews the conceptual developments of regional policy from the Second World War until present times. It will show that three waves have followed to each other, each with different theoretical underpinnings and practical deployment, namely a “disparities”, a “competitiveness” and a “potentials” one. The evolution is shown to depend on the theories developed at that time, on the results of previous policy attempts and on the political objectives of policies. The three phases, as always happens with complex concepts, are not fully consecutive and elements of the one are present in the other, so that there is no precise date for the passage from one to another, although, conceptually, there is a clear distinctiveness of each one.

The paper also shows that a fourth phase, one of “trade-offs” might be starting, based on the recent evolution of empirical and conceptual evidence. This stems from the practical and conceptual difficulties in reconciling conflicting objectives, so that choices on which objective to favour will be needed, even if some room for two-way policies still exists.

The aim of the paper is not to provide a history of regional policy, illustrating what has been done and where, nor it is to refer to a history of the political thought on regional policy. Instead, the aim is to provide a stylized historical description of the conceptual advancements and of the justifications and objectives which were developed in time.

While there is a sequential logic of the four phases, these are not disjoint from each other. The ideas developed during a wave often get lower importance in the next one, but are rarely fully forgotten. Moreover, there were several ideas in a wave which anticipated those of the next ones. This also depends on the fact that different scholars are supportive of different theories and, while the pre-eminence of one against another can change in time, the concepts developed by the papers by one are seldom forgotten once other scholars put forward new theories.

281 The Territorial Distribution of Amputations and Peripheral Artery Disease Endovascular Treatment Options in Healthcare and Social Context in Hungary

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Abstract

Peripheral Artery Disease (PAD) and Lower Extremity Artery Disease (LEAD) occur in approximately 6% of the Hungarian population. Moreover, lower limb vascular amputations represent serious problem in the vascular care, a lifetime risk, therefore not only the effective revascularization is to be achieved but the importance of the early recognition of peripheral arterial disease, no delay in referral to special vascular care, effective vascular risk prevention and collaboration in multidisciplinary teams should be also emphasized.

During the last few years several studies were conducting to measure these associations between the dependent and independent factors. (Kolossváry et. al., 2017, 2021, 2022, Dózsa et. al., 2020). Additionally, in Hungary a special project was carried out to set up a webpage on vascular epidemiology and treatment data (open, endovascular interventions, amputations including territorial aspects (hunvascdata.hu).

The aim of this presentation is to summary the territorial differences within Hungary with regard to the care pathways, treatment options of these diseases and the unwarranted clinical variations. In our presentation we outline the territorial (small districts and county) differences in the incidence, prevalence and treatment data of LEAD and PAD.

We summary the main results and consequences of the last few year studies on the demographic and territorial differences on these diseases and treatment options. In these studies spatial variation at local administrative unit level was evaluated and logistic regression model was run through a retrospective analysis using national healthcare administrative data of all beneficiaries in Hungary. The small district level analysis (n=175) revealed 4 times differences across the country proving that high domestic amputation rates are partially due to the extreme amputation rates in 30 percent of the small districts. In a further study other researchers showed that patients living in different locations of Hungary face very different odds of having lower extremity revascularisation procedures (open or endovascular). This spatial variation is thought to be related mainly to the failure in vascular service organisation. The incidence and effective treatment of these diseases highly depend on the demographic characteristics and territorial differences in the access to appropriate care incl. vascular centres.

In Hungary, in former study (2016-2017) the number of major amputations is 6798 was in the observed period. With timely and appropriate treatment leg amputation, (30-day mortality 20 %, 2-year mortality 40-60%) can be effectively reduced.

Regional and social disparities in incidence, prevalence and mortality rates significantly vary greatly across Hungary, but also provider vascular treatment capacities (with relevant competencies) and advanced endovascular treatment solutions strongly influence the development and progression of the disease.

282 Long-Term Assessment of the Readiness of EU Countries to Achieve the Goals of the 2030 Agenda through the Digital Transformation of the Local Government Economy

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Abstract

The transition to the digital era has become imperative in the last decades, especially after the COVID pandemic, which accelerated the need for digital transformation and growth of the digital economy. Digital transformation is a conceptual framework that is viable in an evolving society and is achieved through the adaptation of applications and services provided by the new industry 4.0. This new approach not only leads to technological achievements, but also enhances economic and social relations, as well as the bond of local governments and their citizens.

The Europe 2030 Agenda for Sustainable Development gives emphasis to people and to sustainable way of life. Sustainable development was identified as important aspect for European Strategy 2020, which is based on three pillars of growth: 1. Smart growth, 2. Sustainable growth, 3. Inclusive growth. It implicates the introduction of new technologies, smart management, and integrated innovations together with the participatory process of the citizens.

Given the fact that the services provided to citizens by local governments and that their general administrative structure and culture differ between member states due to political traditions and historical, geopolitical as well as socio-economic conditions, five main types of organization can be distinguished: the Napoleonic, the Anglo-Saxon, the Scandinavian, the Federal and the East European. The scope of this study is to assess the long-term assessment (before and after the Covid period) of the different types of local authorities of the EU Member States regarding the implementation of the digital transformation of their services by comparing the extent to which the pandemic has pushed each Member State to adopt measures to achieve the transition to the digital era. To achieve this scope, the goals of the study are:

1. the discussion of the concept of digital transformation
2. the description of the Sustainable Development Goals (SDGs) of the Agenda 2030
3. the recording of the administration typology of local governments of the member states and finally
4. the assessment of the readiness of EU countries to proceed with the digital transformation and their comparison at the level of adoption of measures to achieve this transformation, in correlation to their typology.

Keywords

Digital Transformation, Local Government, SDGs.

283 Exploring Narratives of Social Integration: Civic Roles in Alleviating Poverty

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Abstract

This paper seeks to add to the literature interrogating dominant accounts of social integration by examining the role of civic organisations in local developments projects. Civic action often addresses various forms of crisis and is also a key element in achieving social change. The expansion of neoliberal policies at the global level, shrinking spaces for democracy, growing distrust in public institutions and social polarisation are all deepening the crises we are experiencing, which are particularly threatening to marginalised sections of society. While numerous civic organizations are actively engaged in mitigating these threats, the crucial question lies in how they strategically position themselves amidst diverse political and economic obstacles.

Local development has predominantly relied on concepts and organisational models generated by neoliberal approaches, conducted in a project-based context, resulting in lacking development potentials. Many have argued that local development activity has lost its radical edge, or has become a victim of the politics of neoliberal experimentation, which relies on the voluntarism of the third sector. Civil action in local development, when viewed in a structural framework, can be seen as part of the problem, ultimately perpetuating and reproducing power imbalances, but this does not mean that projects are doomed to failure. Time and again, research has shown that sensitive, emancipatory approaches to local development are better able to address the problems of smaller communities and rural peripheries.

The paper examines these strategies in Hungary through a historical perspective, tracing the evolution of civil society's involvement in poverty alleviation and local development efforts since the 1990s. From grassroots movements to EU and international funds, examining key historical events provides insights into a critical analysis of the transformative power of civil society in addressing poverty.

The aim of the research is to analyse social integration practices carried out by different NGOs. How are the challenges of social integration in Hungary affected by the transformation of the welfare state system? What strategies are used by different NGOs in response to these changes? What are the different ideological and operational differences and how do they affect the way marginalised situations are addressed? What narratives are used to mitigate the negative effects of marginalisation? Anchoring the methodology in a cultural political economic approach, the research seeks to analyse the narrative dimensions and practices of social integration.

Overall, this paper advocates for a reconsideration of civic strategies in social integration, positing the need for a more encompassing perspective on the ways in which civil society can actively contribute to poverty alleviation within the confines of a neoliberal environment. Macro-level data on these processes are available, but only to a limited extent. Little is known so far about the understanding and strategies of different NGOs.

287 Urban Scaling, Innovation Growth and Urban Recapitulation between Different Administration in China

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Abstract

Urban scaling laws have been instrumental in depicting the relationship between urban population and innovation efficiency, yet research validating these laws within the framework of urban power systems is scarce. Given the unique administrative management system in China, its urban system can be broadly classified into provincial-level cities, prefecture-level cities, and county-level cities. These cities exert varying degrees of attractiveness for resources and possess different capacities in urban management and talent attraction, leading to varying levels of innovation efficiency. Moreover, due to the constraints of regional development policies and urban cluster development policies, apart from geographical proximity, there exists a phenomenon of administrative hierarchy transmission in urban development.

Utilizing data from 594 Chinese cities and patent invention numbers across 35 industries from 2006 to 2019, we investigate the comparative advantages of cities at different administrative levels in China and measure their innovation efficiency. Our analysis reveals that provincial-level cities tend to concentrate more on industries with higher knowledge content, while county-level cities tend to exploratory development across various industries. This indicates that the distribution of innovative activities across administrative levels is not uniform and is influenced by factors such as resource availability, policy orientation, and economic structure.

Further examination of urban development degrees shows that provincial-level cities generally exhibit higher urban development degrees, with scaling indices closer to theoretical simulation values, while county-level cities are more inclined towards unregulated growth. This suggests that the level of urban development and the adherence to urban scaling laws vary across administrative levels, which in turn affects the innovation efficiency of these cities.

By analysing the development trajectories of cities at different administrative levels in China using the reenactment coefficient, we find that policy-bound urban clusters demonstrate higher similarity in innovation development trajectories, with a higher degree of similarity in clusters with higher central city levels. This indicates that policy interventions and regional development strategies play a significant role in shaping the innovation paths of urban clusters. Additionally, we observe that urban clusters with lower similarity in development trajectories exhibit more technological relevance between cities within the cluster and external cities, highlighting the role of external knowledge flows and collaboration in driving innovation in these clusters.

In conclusion, our study provides insights into the role of administrative hierarchy in shaping urban innovation efficiency in China. The findings suggest that administrative hierarchy influences not only the distribution of innovative activities across cities but also the development trajectories and innovation networks within urban clusters. Understanding these dynamics is crucial for policymakers and urban planners seeking to foster innovation and sustainable urban development in China and other countries with similar administrative structures.

289 Wartime Migration of the Hungarian Minority from Ukraine

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Abstract

The only census in independent Ukraine in 2001 registered 152,000 ethnic Hungarians in Transcarpathia, the country's westernmost oblast. In the recent decades, due to the permanent political turmoil, and the subsequent economic downturns various forms of temporal and permanent migration emerged in Transcarpathia. Hungary's kin-state politics facilitated these processes, primarily through implementing preferential, non-residential citizenship in 2011. Following the Revolution of Dignity and the eruption of the armed conflict in Eastern Ukraine, migration has gained new impetus in the region.

Demographic surveys suggest that before the outbreak of the Russo-Ukrainian war in 2022, approximately 130,000 ethnic Hungarians lived in Transcarpathia, in a relatively compact area along the Hungarian-Ukrainian border. The Russian invasion and its socio-economic consequences induced dramatic changes in the region, including population movements. Since 2022, tens of thousands of Hungarians are estimated to have left Transcarpathia, primarily the men obliged for military service, but entire families have also emigrated. Most of those leaving resettled in Hungary or moved to western EU countries as Hungarian citizens. In parallel, tens of thousands of IDPs arrived in Transcarpathia from the war-affected oblasts, a significant number of whom remained permanently in the region, mostly in urban areas.

This paper aims to shed light on how the migration trends of ethnic Hungarians have changed in recent decades and how geopolitical events have influenced these processes in Ukraine. The study also intends to explore how war-induced cross-border practices have been transformed in the Ukrainian-Hungarian border region.

Based on some relevant and available statistics and the qualitative field research carried out in Transcarpathia since 2016 and in the Hungarian side of the border since 2022, we argue that current patterns of migration are part of a longer process, essentially from 2014 onwards. Coping strategies developed after 2014 are based on (temporary, permanent, circular, etc.) migration. Accordingly, the outbreak of full-scale war did not fundamentally transform coping strategies, but only changed some of their characteristics. Ethnic Hungarians in Transcarpathia have shifted from sustaining dual residency to living in Hungary; temporary places of residence became permanent.

After two mass waves of selective emigration of ethnic Hungarians induced by the geopolitical events, Hungarian villages in Ukraine have been largely depopulated. At the same time, mass emigration also affected urban areas, however this was counterbalanced by the settlement of IDPs from Eastern parts of Ukraine, resulting in population change and shifting ethnic proportions. The unfavourable demographic trends for Hungarians seriously threatens the maintenance of the Hungarian educational and cultural institutional network and undermine bargaining power in the struggle for language and minority rights, further exacerbating the chances of sustaining Hungarian communities in Ukraine.

290 Regional Convergence of Skills and Schooling in Brazilian Manufacturing

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Abstract

This study deals with regional skill convergence in private manufacturing in Brazil. We use a quintile analysis to identify spatial heterogeneities; in addition, we use sectoral groupings for analyses of sectoral heterogeneity in manufacturing. The baseline and the heterogeneities were estimated using spatial econometrics. We use microdata of official statistics of formal employment. We show that social skills converge faster than motor and cognitive skills in manufacturing in the Brazilian regions. When analysing the top 25% of skills, we found that cognitive skills converge faster than social and motor skills. The evidence shows that cognitive and motor skills converge faster for capital-intensive and non-agribusiness than labour-intensive; the other sectors converge faster in social skills. Less industrialized regions converge within their clusters, but more industrialized regions are not. Moving from skills to formal education, we found convergence of schooling levels for all clusters, meaning that regions converge on schooling within their clubs. There is a mismatch between the required skills (labour demand) and formal education (labour supply): firms in the regions are demanding the same skills, although workers are becoming more educated. We show evidence that the dynamics of convergence of skills in manufacturing depend on spatial and non-spatial variables and the type of industry.

291 The Economic Effect of Child Benefit on Fertility in a Two-Sector OLG Model

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Abstract

As a country becomes more developed and urbanized, it tends to experience a decline in the fertility rate. For example, according to the World Development Indicators database for 2020, the total fertility rate between 1968 and 2017 fell from 4.79 to 0.95 in Hong Kong, 2.0 to 1.29 in Japan, 2.45 to 1.37 in Germany, 2.48 to 2.0 in the United States, 2.49 to 1.64 in the United Kingdom, and 2.55 to 1.87 in France. The decline in fertility rates raises significant social concerns, including the sustainability of PAYG (Pay-As-You-Go) pension and health insurance systems, a shortage of skilled labour, and decreased productivity. Many governments implement various family policies to address the decline in fertility rates, including legislation for childcare leave and the provision of nurseries and child benefits. In this paper, we examine the efficacy of the child benefit policy among these measures in a two-sector model.

In a one-sector model, Fanti and Gori (2009) pointed out that a child “tax” may actually increase the fertility rate, contrary to intuition. The mechanism behind their argument is as follows: the direct effect of the child tax initially reduces the fertility rate due to increased child-rearing costs. However, this also leads to a shift in household expenditure towards savings and capital accumulation. This indirect effect can outweigh the direct effect.

In a two-sector model, we find that the same conclusion holds, but the mechanism differs. In fact, the impact of the child subsidy policy depends on the labour intensity ranking in the two sectors. If the consumption goods sector is labour-intensive, an increase in capital stock induced by an increase in the child tax always results in increased wages, as predicted by the Rybczynski and Stolper-Samuelson effects. This is essentially the same indirect effect as in Fanti and Gori (2009). However, in a two-sector model, there is an additional indirect effect through price changes: the child tax shifts household expenditure towards savings, creating excess demand in the investment goods market. This leads to an increase in the price of investment goods and a decrease in the wage rate. This second indirect effect is not observed in a one-sector model because there is a separate market for physical capital (investment goods) distinct from the market for financial capital in a two-sector model. In this market, savings constitute the demand for investment goods, and there is a clearly defined supply of investment goods.

Despite the second indirect effect supporting the direct effect, the overall impact of the child tax is ambiguous. Our analysis suggests that the counterintuitive result also applies to a two-sector model, so the government should carefully rely on the child subsidy policy.

292 Digital Entrepreneurship Ecosystem in the Central Eastern European countries in the 2017-2019 Time Period

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Abstract

While economic transition from planned economy to market economy seems to be over for most of the countries after 25 years, socialist heritage could have long lasting effects. In this paper, we focus on a specific group of nations, the former European socialist countries that transitioned from the planned to the market economy system. While the transition research was a popular topic in the 1990s and 2000s, the interest has declined by the 2010s. Now these countries are viewed as variants of the capitalist system. However, current research shows that the socialist past has not passed without a trace (Havrylyshyn 2009). Szerb and Trumbull (2016) found that Central and Eastern European (CEE) countries' cultural support to business creation lags behind Western European nations. In addition, CEE countries' performance is not uniform – there are considerable differences (Chepurenko 2017). While the EU member CEE country handicaps are diminishing, Balkan countries are falling behind Western Europe significantly. The development of digital technologies provides an alternative way for these countries to close the development lag. So, it worth investigating how the CEE countries perform in the digital technology fueled digital entrepreneurship. In this paper we aim to answer to the following two research questions: (1) How deeply have Central and Eastern European (CEE) countries proceeded in digital entrepreneurship? (2) Are there some specific digital entrepreneurship characteristics of the CEE countries that can be explained by the socialist heritage? We applied the Digital Entrepreneurship Ecosystem (DEE) Index methodology, developed by Szerb et al. (2022) to evaluate the former socialist CEE country performances in their digital entrepreneurship ecosystem development. While the US is on the top of the rank of the full dataset including 115 countries, European nations perform well. The non-EU member Western countries are the best performers in Europe, but EU-member Western countries are close to them. The Southern European country group performance is close to the EU-member CEE country cluster, implying that these countries have caught up with most Southern European countries in their DEE development. The former SU country group and the non-EU Balkan country cluster are very similar to each other. We also examined the four sub-indices and the twelve pillars and concluded that DEE score varies significantly over the European countries, but these differences can be explained by economic development and not the long-lasting effects of the socialist system. We also provide the detailed DEE profile of Hungary including the four-sub-indices, twelve pillars and 24 variables that explain Hungary's performance in the digital entrepreneurship ecosystem development.

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293 Vojvodina as a Borderland

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Abstract

Vojvodina is a region in Central Europe of great diversity, very much as a consequence of frequent territorial changes, its frontier character and close proximity of various boundaries of different scales and characters. All these features are represented somehow in the (political) geographical landscape and in the multiple differences within the society. The region has been a constant frontier zone for centuries, with hybrid spaces and overlapping territories of neighbouring regions, a contested landscape by all the neighbouring nations but especially by Serbs and Hungarians. By the once again changing geopolitical situation from the early 90ies new ways of influencing and asserting interests as well as new actors appeared. The dissolution of Yugoslavia and the expansion of Western integrations into the region further increased the borderland nature of Vojvodina by establishing new boundaries (EU non-EU, NATO non-NATO) and thus cross border movements. The growing geopolitical tensions of the recent years (from migration crisis to the war in Ukraine) added new factors to the region's borderland nature.

In the last decade Serbo-Hungarian relations have been surprisingly cordial (from a historical perspective) in which the North Serbian region and Hungary's activity in it plays a crucial role. Soaring Hungarian economic investments and trade, major cross-border developments as well as unprecedented political relations also characterize Hungary's growing involvement in the region, despite the erection of the infamous border fence. In the meantime, the share of ethnic Hungarian population, upon which Hungary's policy relies on in the region, is decreasing steadily, as well as the whole population is experiencing a significant decline in numbers.

We analyse the changing geopolitical position of the region, we argue that it is strongly linked to its borderland nature, and focusing especially on the growing Hungarian involvement in the region, which has been an important agent in utilizing Vojvodina's borderland character.

294 On the Areas Being Left-Behind

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Abstract

Territorial inequalities are barely studied at a local level in Europe in a comprehensive way mainly due to the lack of comparative data or proxies of economic activity. Without local data it is impossible to proof the agglomeration of economic activity (in the cities) and therefore the growing gap between rural and urban areas, between the centre and the periphery of the country or between the core and the fringe of the large metropolitan areas. This is one of the reason why, when studying the areas that have been left-behind, instead of focusing on areas researchers have to either focus on regions (if trying to cover a country or the whole EU) or focusing on case study (and therefore just having a partial image of the issue).

In the European Project EXIT we try to combine both qualitative and quantitative research on areas (as opposed to regions) that indeed have been left-behind the paths of economic growth of prosperity. The aim would be answering some of the following questions: What is the meaning of the left-behindness concept? How can we identify the left-behind areas? Where are those areas? What are their characteristics? What quantitative data are available to study left-behindness? Are there any common past characteristics that might explain their present situation? What can be done at the different levels of governance (European, national and local) to improve their situation? What has been done in different areas of Europe? And what about regional or local stakeholders? Are citizens mobilizing somehow to either protest or react in order to reverse their localities' situation?

In order to answer all those questions, data at local level is needed, and the first essential variable is some proxy of well-being or income. However, in the European databases and due to confidentiality reasons, in the best of the cases only information on the NUTS2 region of residence is provided. Thus, information on household income is provided at *regional* level but is not available at *local* level. Combining the EU-SILC - which contain detailed information on the economic characteristics of the households that reside in a specific region-, with Population microcensus databases -that offers information at a very small scale but does not provide information on household *income*- the methodology suggested in Fernandez et al (2022) to disaggregate regional data gets consistent estimations of income and poverty at local level.

These estimates, combined with data collected at local level on several socioeconomic indicators such as employed population, aged population, population structure, accessibility to public services etc., will offer a multidimensional approach of the areas being left behind in some European countries where local information is available.

297 Effects of Commuting Subsidies on Commuting Distance and Mode Choice: The Role of Urban Structure

Tainá Pacheco

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Abstract

This paper studies the effect of commuting subsidies on the commuting distance and commute mode choice of employees. It shows that the lack of access to a public transportation voucher can make workers travel shorter distances and use more active modes of transportation. However, the urban structure changes the way individuals respond to the transport subsidy: individuals are indifferent to the subsidy in areas with high accessibility to jobs.

In Brazil, since 1985 formal workers are entitled to a public transport commuting voucher: employers pay for the full cost of public transportation in a voucher and discount 6% of employees' gross wage. In this context, the voucher works as an implicit subsidy. Thereby, I exploit the existence of two kinds of workers facing different effective transit costs to examine the commuting patterns of each group.

I use data from São Paulo. The city runs a travel survey every 10 years since 1967. I use the 2017 edition that surveyed 22 thousand households, or 57 thousand individuals. I restricted the data for workers with a non-fixed contract with a private company, regardless of their type of contract (formal or informal). My final data has 12,573 individuals: 11,252 are and 1,321 are not entitled to the voucher (informal workers). Since workers entitled and not entitled to the benefit were not comparable in observable characteristics, I rely on a matching strategy for estimating causal effects. The variables used were: type of occupation, level of education, position in the household, age, household income and size, accessibility to jobs by transit from place of residence, housing status (owner, renter), and dummies for working in downtown area, female, and living in the downtown area.

I find that not being entitled to the benefit makes commuting distances 820 meters shorter and increase 9% the likelihood of walking to work. If compared to the median commute distance in the sample (7.5 km for those entitled to the voucher and 5.6 km for those not entitled to it), not being able to access the voucher explains 42% of the difference in commuting distance among the two groups. This result is driven by individuals living outside the downtown area of the city. The central area concentrates amenities, services, and jobs, therefore people who live in this area have higher accessibility to jobs by all transport modes and are indifferent to receiving the subsidy. However, in the periphery, individuals not entitled to the subsidy travel 1.3 km shorter distances and are 11% more likely to use active modes of transportation if compared to those entitled to the subsidy.

By generating empirical evidence about the effects of transit subsidy, this paper is relevant in a policy perspective, and contributes to the literature of determinants of commuting pattern and behaviour. It shows that commuting pattern and behaviour can be influenced by the urban structure.

300 Escaping from the Middle-Income Trap: An Historical Perspective over the European Regions 1900-2015

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Abstract

In the last decades an increasing number of well-off regions or old industrial centers in Western Europe are entrapped or in risk of being trapped in what has been called a “regional development trap” (Diemer et al., 2022). This concept entails difficulties to recover past dynamism or to improve the income levels of the residents in the entrapped regions. This fact coexists with another one that persists over time. It is possible to observe that a handful of regions usually manage to escape from this trap and use to figure at the forefront positions. For instance, there is a clear group of leading regions: London, Paris - Île-de-France- and Zurich, that remain in the top ten for the 115 years period and, other regions figure in the top ten three or four times: Luxembourg, Hamburg, Stockholm and Helsinki. In this paper we move the spotlight to this fact. Our purpose is to uncover the economic forces and the characteristics shared by these regions. We adopt a long run perspective and, extend our period of analysis for more than a century, from 1900 to 2015.

For this aim we take the Roses and Wolf dataset (2021, version 6). It gathers data for 173 European regions belonging to 15 nation states at level NUTS-2 for 1900-2015. This dataset reconstructs historical data since for 1900-1950 and, takes official data on regional incomes from the national statistical offices for 1960-1990. Since 1990 onward the regional data are taken from Eurostat. In order to guarantee data consistency, the authors have taken the decision to preserve the regional borders across the entire period. The 15 countries recorded are Austria, Belgium, Denmark, Finland, France, Germany, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and Ireland. Historical data are collected for different benchmark years that usually correspond with census years (1900, 1910, 1925, 1938, 1950, 1960, 1970, 1980, 1990, 2000 and 2010). The variables reported at level NUTS-2 are regional GDP, population size and, the shares of agriculture, industry and mining and, services in total employment. Our aim is to gather up also human capital variables and geographical indicators.

Our analysis is based in a Principal Component Analysis (PCA) and, more specifically, in the Uniform Manyfold Approximation and Projection (UMAP) methodology. This methodology let to cluster the regions according to a big set of dimensions with higher accuracy than other PCA techniques. The preliminary results show that the clusters of regions obtained according to the 4 dimensions processed match very well with the history of the European regions across the 20th century. Additionally, the richest regions used to cluster in the same group across time and share a characteristic that differentiate them from the others, a persistently higher population density.

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302 Transit-Oriented Development, Land Use and Travel Behaviour: The Case of Curitiba, Brazil

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Abstract

Transit-oriented development (TOD) has gained prominence worldwide as one of the most effective policies to promote urban and transport sustainability due to its influence on land use patterns and travel behaviour. However, doubts remain about the ability of this policy to enhance less car-dependent mobility in the context of growing private motorizing and suburbanization of cities or metropolitan areas. This paper aims to investigate how TOD and land use patterns affect transport mode choices for trips in the city of Curitiba, Brazil. Analysing the case of Curitiba is of great interest for urban planning because this city is credited as pioneering in adopting TOD policy based on the integration of transport planning with land use regulation and bus rapid transit system. Using a data set of the household travel survey conducted in 2017 for the Curitiba Metropolitan Area and multinomial logistic regression, we estimate the effect of socioeconomic factors and TOD/land use patterns on travel behaviour in Curitiba. Our findings show the likelihood of travel by bus is 1.35 higher in the structural zoning areas, which correspond to the BRT system and the linear axis of high residential density. However, the probability of using the car as a travel mode remains higher than the bus in all zoning areas controlled in the logistic multinomial regression. This evidence suggests that Curitiba's TOD policy has been not successful in reducing car dependence on travel mobility.

303 **Analysing the Multifaceted Impact of E-Commerce: A Conceptual Framework across Different Urban Planning Scales**

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Abstract

E-commerce has grown significantly in recent years, owing to the rise of global internet movements. The e-commerce economy model, where production and consumption evolved without geographical location and time constraints, has gone beyond being a virtual concept and has become an important phenomenon for the future development of cities with a variety of potential impacts. Research has shown that these effects can have different positive and negative effects at international, regional, urban, and local levels. It is debated whether e-commerce can create export mobility by facilitating the global flow of goods and services, boosting local consumption, creating new job opportunities, supporting regional economic development, and reducing territorial inequality. On the other hand, many studies have shown that increased physical mobility of goods causes environmental pollution. The ordering and delivery intensity of e-commerce models is directly related to urban transportation and logistics planning (Morganti et al., 2014). The dimensions of the spatial impact are also often highlighted because logistics activities result in functional and spatially evolving transformations that inevitably transform the areas allocated for logistics. In the cyber city of tomorrow, e-commerce and truck delivery travel will replace personal shopping trips and lead to the emergence of goods distribution centers in some parts of the city, but they will also create a strong land-use impact, such as past transportation innovations, and will be an aspect of ongoing structural change (Cervero, 2000). Urban planners and politicians see this as an important issue that could have short- and long-term effects on cities and regions. E-commerce has the power to restructure demand for commercial real estate in the city center by switching from traditional store formats to online sales (Muhanna and Wolf, 2002; Moss, 2015; Spencer, 2015). Instead of setting up high-cost stores in central business areas, companies can allow them to build warehouses or retail sales facilities in suburbs without any sales losses (Nahiduzzaman et al., 2019). Online shopping is accompanied by traditional retailers making it possible to shop over the Internet, as well as by virtual stores making use of physical pick-up points, click-and-collect stores, and warehouses within the city. This is an indication that there will be a long-term change and transformation process in the city's commercial areas (Rai, 2021). While it is widely accepted that the growth trend in e-commerce may have significant short- and long-term effects on transport, mobility, and land use structures, there is limited knowledge about how the increasing impact of e-business is addressed in planning practices (Pettersen et al., 2020). Thus, in order to manage the advantages of the e-commerce economy model in a way that tries to avoid its disadvantages, its potential impacts need to be presented on a multi-scale and multidimensional basis from the perspective of urban planning.

306 Unintended Consequence of Historic Preservation on Firms' Output: Evidence from the Awarding of the Historic City Title in China

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Abstract

Historic preservation policies have garnered increasing attention and recognition from countries worldwide. However, most studies have focused on local livelihoods and housing, with few examining the effects on firms' production activities. Exploiting the awarding of the *Historic City* title in China, this paper provides the first empirical evidence of historic preservation's impact on industrial firms' output.

1) Identification Strategy. This paper uses a difference-in-differences approach to identify the impact. The dependent variable, measuring the gross output or sales of industrial firms. The regressor of interest reflects whether the city (where the firm is located) is a *Historic City*. We add control variables at the firm-level and city-level. We also control for year fixed effects, city fixed effects, and firm fixed effects. The standard errors are clustered at city level.

We use an event-study approach to test whether the treatment and control groups are comparable. Since cities receive the *Historic City* title in different years, it is a staggered-DID setting. We also re-estimate it using the staggered-DID methods.

2) Data. We collect data at the firm and city levels. Firm-level data are from the China Industrial Enterprise Database, and the sample interval is 1998–2013. City-level data include the time when the Historic City was selected, as well as data on urban economic characteristics.

3) Conclusion. Receiving the *Historic City* title reduces local industrial firms' output by 6.9%. The main mechanisms are restrictions on land use and industrial development. First, land use in historic cities is strictly restricted to protect the traditional landscape from being changed. We find that the *Historic City* title leads to a 32.4% and 46.7% decrease in urban land supply and land support, respectively. It indicates that these cities face stronger land use restrictions. Second, historic cities have restrictions on industry development for firms in addition to land supply restrictions. The regulations for historic cities place higher requirements on ecological protection, which restricts the development of polluting industries. The gross output of firms in the heavily polluting industries, which is subject to explicit industry development restrictions, fell by 8.4%; whereas those engaged in other industries fell by only 3.7%. The coefficients between industries are significantly different at the 1% level.

Furthermore, the historic preservation policy has a negative macro effect at the city level, causing an average decline of 16.5% in secondary industry output and 9.3% in GDP. These findings contribute to a more comprehensive understanding of the effects of historic preservation policies.

307 Industrial Digitalization, Government Digital Attention and Low-Carbon Transformation of Energy Structures

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Abstract

The double fixed-effect model investigates the influence and mechanism of industrial digitization on the low-carbon transformation of regional energy structures based on the 2011–2019 China provincial panel data. It also looks at the government's focus on digital energy in the process of digital empowerment of the carbon-neutral and low-carbon transformation effects. The study reveals that: (1) the overall trend of digitization is rising, with significant regional increases in 2017; (2) the development of an industrial digital scale can support the low-carbon transition of the regional energy structure; the conclusion is subject to normalcy, sample period changes, and explanations of the stability test's core variability as well as the Union Cause's inherent solution, the survival of the remaining variability in leakage, and the defeat of the government's misguided internal life treatment; and (3) The role of digitalization of industry in the low-carbon transformation of regional energy structures is facilitated by financial capital consolidation and green technology innovation; (4) The impact of industry digitalization on the reduction of carbon transformation in the energy structure of the region varies depending on various geographical locations, phenomena, and levels of industrialization; (5) It has also been found that government attention to digital transformation can amplify its energy transformation effect. In addition to giving experience evidence that China should take advantage of digital technology opportunities in a new wave of information and technology revolution and promote industrial digitization, the conclusion explains the energy effect brought about by the development of industrial digital scale.

308 Exploring the Optimal Policy Pathway for Maximizing the Economic, Environmental and Energy Value of Biomass Resources with a Dynamic Simulation Model

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Abstract

Generally, biomass resource primarily originates from agricultural and husbandry residues, which could create economic, environmental and energy value if it were properly used, or, it would lead to tremendous environmental and economic damage, especially for the agricultural country such as China. This paper aims to seek the optimal policy combination and corresponding pathways to facilitate the effective utilization of regional biomass resource and, so as to maximize the value of biomass resources. For this purpose, this paper first outlines a complete biomass flow incorporating bioresource procurement, feedstock supply, product conversion and consumption to industrialize the development and utilization of biomass. Furtherly, a dynamic simulation model based on input-output is developed to assess the energy, economic and environmental performances of biomass resources under various scenarios within a 19-year time horizon by introducing biomass related industries into the regional socioeconomic, energy production and consumption system and fertilizer production and consumption system. The 19-term simulation from 2017 to 2035 is performed in scenarios present based on various technical, price subsidy, tax preference policies and distinct levels of environmental pollutants including greenhouse gas, water pollutants chemical oxygen demand (COD), air pollutants sulphur dioxide (SO₂) emission constraints, as well as the constraints on the reduction of chemical fertilizer consumption. An empirical study based on prefecture-level city level data is conducted and to validate and apply the model.

In the optimal scenario, both biomass industrial development and energy supply and demand are optimized; the reduction on chemical fertilizer consumption was realized, which contributing to a 5.41% average gross regional product growth rate and 19.9%,30%.18% reduction in accumulative greenhouse gas, COD and SO₂ emissions, and 20% reduction on chemical fertilizer consumption compared with the base scenario. By 2035, the supply of bioenergy and biofertilizer could be increased from and 0.5million tons of standard coal (TCE) and 2 two million tons. The consumption ratio bioenergy in total primary energy and biofertilizer in total fertilizer could be increased from 0.5% to 4.2% and 1% to10%, respectively. The economic, environmental value of local biomass resources could increase from 50500 to 490000 CNY. The optimal policy combination and corresponding pathways to promote the development of biomass industries and the maximum of biomass resource value could be promoted are also elaborated. The methodology presented is capable of estimating and assessing the resource value and detecting the optimal policy combination for the utilization of natural resources.

309 The Domestic and the International Value Chains of China's Manufacturing Industry and Their Interactive Relationships

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Abstract

This paper intends to analyse the domestic and the international value chains of the manufacturing industry in China and their interactive relationships by taking 34 provincial administrative units (31 provinces in main land, Hong Kong, Macao, and Taiwan) as examples. First, we construct world input-output tables for 2010-2019 which include China's 34 provincial administrative units based on Multi-regional Input-output Table for the Global Emerging Economies (EMERGING)v2 for 2010, 2015-2019, and China Multi-Regional Input-Output Table 2012, 2015, 2017. Secondly, we extend the research on the method of decomposing a country's trade flows put forward by Wang et al. (2015) to the regional level within a country and decompose the interregional and international value-added trade flows into domestic value chain and international value chain for a region. Thirdly, the domestic and the international value chains of the manufacturing industry in China's 34 provincial administrative units are measured and analysed. Finally, a simultaneous equation model is established to test the interactive relationships between the domestic and the international value chains.

The results show that trades of manufacturing industry in provinces in China are primarily bilateral. Both the proportion of indirect value-added outflows and exports and the proportion of indirect value-added inflows and imports are very low. From the sector's perspective, most of the manufacturing industries are located in the upstream in the domestic value chain and downstream in the international value chain. From the provincial perspective, there are significant gaps among the provinces in the vertical specialization of the manufacturing industry. Within the domestic value chain, 15 provinces are located in the upstream, 19 provinces are located in the downstream. While in the international value chain, only 11 provinces are located in the upstream and the other 23 provinces are located in the downstream. A clear two-way interactive relationship has been formed between the domestic and the international value chains of the manufacturing industry in every province in China.

310 Research on the Impact of Urban Space Governance on Green Economic Efficiency from the Perspective of Ecological Civilization – A case study of Beijing-Tianjin-Hebei and Surrounding Areas as an Example

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Abstract

The disorderly development and utilization of urban space has led to increasingly serious ecological and environmental problems. To restore the ecological nature of land space by means of governance, it has become an important direction for regional development by forcing the green transformation of the economy. In China, the governance methods for green development are no longer environmental independent dimensions, but more inclined towards systematic governance of urban spaces. This paper establishes the “resource-ecology-environment” trinity of urban space system governance, and constructs an urban space governance system from the perspective of ecological civilization from three dimensions: resource utilization management and control, ecological function restoration, and environmental pollution regulation. This paper uses data from the European Aviation Administration and the National Statistical Yearbook of China to objectively and truthfully study the impact of urban spatial governance on regional green economic efficiency. At the same time, we establish the space dubin model and spatial mediation effect model to test the theoretical hypothesis which is urban spatial governance affects the efficiency of green economy from the perspective of direct effect and the mediating effect of advanced industrial structure. The study found that the urban spatial governance intensity of Beijing-Tianjin-Hebei and surrounding areas has a multi-layered "core-periphery" intensity structure pattern; the green economic efficiency presents a zonal difference of "taking Beijing as the core, high in the southeast and low in the northwest". The impact of urban space governance on the green economic efficiency of the region and surrounding areas shows a "U"-shaped relationship that first decreases and then increases, with an inflection point value of 0.4620, which means that the intensity of governance needs to surpass the inflection point value in order to achieve governance effectiveness. What's more, urban spatial governance can affect the green economic efficiency of each region by adjusting the industrial structure of the local and neighbouring regions, and the impact is in the form of a "U"-shaped relationship. By comparing the inflection point values, it is found that urban spatial governance is more likely to give priority to the effect of industrial structure upgrading. The policy inspiration drawn from this paper is that, on the one hand, it is necessary to establish a "resource-ecology-environment" urban space system governance concept, carry out comprehensive and systematic governance actions, and ensure the green background of urban space; Cross the inflection point as soon as possible, give full play to the positive externality of governance, and improve the efficiency of green economy through industrial upgrading.

312 Wind, Solar, and Beyond: Mapping the Progress of Sustainable Energy Transition in Jordan

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Abstract

The governments of the Middle East have long faced the challenge of achieving sustainable development. On one front, they must meet the rising energy demand driven by expanding economic activities. Simultaneously, the worsening environmental conditions pose a significant apprehension for political economists. Across the Middle East countries, the challenges encompass bridging the expanding disparity between energy supply and demand, dependency on fossil fuels, and the ascent of global prices. The Middle East can utilize its ample potential in renewable energy to address these challenges related to sustainable transition. Like many developing nations, Jordan grapples with challenges, constraints, and obstacles in augmenting the integration of renewable energy technologies. A compelling rationale for embracing these technologies in Jordan lies in the country's scarcity of traditional commercial energy sources juxtaposed with its rich solar and wind reserves. To be straightforward, Renewable energy technologies involve low operating and maintenance costs and inherently possess more excellent environmental friendliness than conventional energy sources, rendering those indispensable elements in the regional and national energy portfolio.

The future trajectory of renewable energy technology is shaped by three pivotal factors: economic considerations, scientific and technological aspects, and the commitment to environmental cleanliness. Despite favourable solar and wind conditions, the likelihood of greater integration of renewable energy technologies into the energy portfolios of developing nations, including Jordan, is limited compared to more developed counterparts. The economic challenges confronting developing countries, combined with a deficient foundation in science and technology, impede the advancement of renewable energy technology. Additionally, the insufficient environmental awareness in developing countries fails to generate sufficient momentum for adopting renewable energy technology. This study thoroughly investigates the complex interconnection among sustainable development, renewable energy, and the unique context of Jordan within the broader context of the Middle East. Utilizing a methodological approach that integrates qualitative data from various sources, including research studies, government statistics, and reports from international organizations, the study examines Jordan's landscape in renewable energy. It emphasizes explicitly policy frameworks, projects, and government initiatives.

Jordan is making significant strides in renewable energy, driven by the country's commitment to diversify its energy mix, reduce dependence on imported fossil fuels, and address environmental concerns. Despite facing challenges such as a growing population, economic uncertainties, and geopolitical complexities, Jordan has emerged as a regional leader in renewable energy capacity, particularly in wind and solar energy. The study affirms Jordan's significant strides in renewable energy, emphasizing the need for strategic attention to overcome challenges. By implementing the provided recommendations, Jordan has the potential to secure its energy future, foster regional economic development, and fortify environmental sustainability.

314 **Disentangling Urban Network Externalities: A Juxtaposition of Central Place Theory and Central Flow Theory**

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Abstract

With the intense connections between cities and the rapid population agglomeration towards mega-regions, urban network externality has become increasingly important in promoting urban economic growth. This study integrates the theory of agglomeration externality and external economy, and proposes the two types of urban network externalities under two distinct external urban relations based on the central place theory (CPT) and the central flow theory (CFT). Accordingly, an urban growth model is estimated with spatial econometric model specifications based on 284 cities in China to examine the differences between the two types of urban network externalities. It is found that urban network externalities generated by CPT external urban relations (CPT-UNE) mainly take the form of sharing of the labour force, whereas urban network externalities generated by CFT external urban relations (CFT-UNE) mainly take the form of sharing of capital stock and technology. Moreover, the CPT-UNE are asymmetrical, which implies that there may exist agglomeration shadows. The findings have explicit theoretical and practical implications for fostering regional coordinated development.

315 Latecomers' Catch-Up in the 4th Technological Revolution: Based on the Perspective of Knowledge Complexity

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Abstract

Knowledge is a fundamental driver of long-term economic growth (Romer, 1986; Solow, 1956). From an evolutionary perspective, two ways for latecomers to catch up are imitation and innovation (Kim, 1997). Earlier literature defines economic catch-up as a narrowing of the economic gap between latecomers and forerunners (Fagerberg et al., 2005). The latecomers try to assimilate and adapt frontier knowledge and technology from advanced countries and the narrowing process depends on such imitation of latecomers (Lee & Lim, 2001). However, in this way, the leaderfollower situation will not change. Knowledge spillovers are subject to geographic proximity, social proximity, cognitive proximity, organizational proximity, institutional proximity, and many other influencing factors (Agrawal et al., 2008; Boschma, 2005; Cao et al., 2019; Jaffe et al., 1993; Knoblen & Oerlemans, 2006; Li et al., 2024; Mao & Mao, 2021; Marshall, 1920; Quatraro & Usai, 2017). Knowledge cannot completely transfer from forerunners to latecomers, and latecomers cannot exactly copy what the forerunners do. Only with the opening up of new trajectories of advancements can latecomers successfully catch up and even overtake the incumbent (Malerba & Lee, 2021).

319 **Financing the Climate Transition of Cities – A Financing Model for Hungarian Cities**

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Abstract

The European Union agreed on the Green Deal in 2019 and set ambitious targets in order to fight against global warming and consequences of climate change, and to turn it into an opportunity for economic growth and a new geopolitical centrality. The EU has set up an action plan focusing on energy transition, circular economy, and biodiversity and preventing pollution. Europe aims to be the first climate neutral continent by 2050.

A significant majority of the global population lives in urban areas. Cities are hubs of economic activity, and their population density makes them major contributors to carbon emissions. Addressing climate change requires a focus on the areas where people are concentrated, and cities play a central role in this regard. At the same time cities are often vulnerable to the impacts of climate change, including extreme weather events, heatwaves. Climate resilience planning in cities is essential to protect infrastructure, communities, and ecosystems from the adverse effects of a changing climate.

My study focuses on the financing of urban climate transition, which is a complex and multifaceted challenge that requires careful consideration of various factors. Local governments have the authority to implement policies related to land use, building codes, transportation, cities can enact regulations and policies that support climate goals, such as renewable energy mandates, green building standards, and emission reduction targets. The European Union selected 100 EU member states cities in the frame of the Horizon Europe programme in order to accelerate their transition. The study elaborates the climate financing issues generally within the frame of the EU Mission programme, and elaborates case study for the Hungarian participating cities: Pécs and Miskolc.

The study assesses current financing models adapted by cities, the most effective financing models for climate transition projects and assesses the existing investment gaps in financing for climate-related projects. Elaborates what types of financial incentives are most effective in encouraging sustainable practices at the city level, and what innovative financial instruments can be developed to support climate-resilient infrastructure and initiatives in cities.

The climate financing options are very different in the member states. Hungarian municipalities does not have room for manouvre for reallocating investment budget in favour of climate transition. Local authorities have extensive experience in applying for grants and managing EU project, however do not have experience with financing mechanisms and innovative financial solutions. The essay will examine these opportunities, barriers and adaptability, measures that are needed to enhance the financial capacity of local governments to plan and implement climate transition projects

As an outcome the study offers a policy framework as a tool that is conducive to attracting investment for climate transition in urban areas and aligns city policies to create an enabling environment for sustainable financing. The policy framework includes the measuring impact as well, metrics and indicators to be used to measure the effectiveness and impact of climate transition financing in urban areas, and reporting on the outcomes of their climate-related investments.

321 Economic and Demographic Challenges in Border Areas: The Case of Central Europe

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Abstract

The European Union's cohesion policy has been successful in reducing disparities between countries. However, it has not been able to contribute to the upgrading of peripheral and rural areas in the countries of Central Europe, contrary to its original ambivalent objective. The disparities between regions are widening, such as: economic, social, demographic, regarding spatial or economic access to public services; with peripheralization steadily increasing in many regions (mostly border regions). For this reason, it is particularly important in peripheral regions to operate horizontal and vertical networks, to dynamize low economic performance and development, and to make recommendations for improving infrastructure and demographic indicators.

The difficult situation of border regions (e.g. negative demographic characteristics, lower economic performance than the national average) has long been a concern for researchers. The different causes and consequences of this peripheral location could be highlighted (e.g. transport geography, settlement networks, fewer jobs, emigration, ageing), while improving the living standards of border region residents has been a priority area for EU funding. Migration is one of the most striking determinants of population change in these areas which also influences the overall economic performance of these regions.

Our analysis covers nine countries in Central Europe (with two countries not covering the entire territory): Austria, Czech Republic, Hungary, Croatia, North-Italy, East-Germany, Poland, Slovak Republic and Slovenia. This macro-region can be considered the heart of the European Union, as it forms a bridge between the north and the south, and between the east and the west. Like the European population as a whole, this region is facing a declining population, high migration rates, ageing, unemployment and a high proportion of nationalities and minorities. As a result, the number of people living below the poverty line is increasing year by year, and regional GDP in the region is increasingly linked to regional centres and capitals.

Our research has shown that the most deprived areas are mostly located in border areas. Although border regions have a very diverse demographic profile, the entire eastern part of the study area is also an external border with the Schengen area and part of the EU, where daily commuting is greatly restricted by border controls. Border demarcation seems to be associated with negative demographic trends mainly at the eastern and southern borders, i.e. Polish, Slovakian, Hungarian and Croatian borders, while the borders between the internal borders of the Schengen area (e.g. Czech-German, Austrian-Slovenian, Austrian-German) are experiencing population growth, partly due to international migration and partly due to suburbanisation processes.

The aim of this presentation is to distinguish between Central European regions based on economic and demographic performances. For this study, statistical analyses were carried out at NUTS 3 territorial level using the Eurostat database.

322 Impact of Social and Political Instabilities on the Economic Growth of Countries

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Abstract

Peace and economic growth are strongly correlated. The absence of conflict and threats from within and without leads countries to invest their resources in developing human conditions, which in turn leads to higher human development and economic growth. Countries facing internal and external threats often invest their resources in wars or preventing wars, keeping the general population in a state of relative underdevelopment. Besides the economic costs, the conflicts and instabilities also lead to human rights violations and tragic losses of human lives. Since World War II, several institutions have emerged that attempt to negotiate and bring peace between warring countries. They also watch the internal conflicts between the countries and attempt to negotiate for better human developmental outcomes.

However, despite all the institutional measures at global level, and constitutional democracy and governance in several countries, many countries and regions remain affected by conflicts, both internal and external, as a result diverting their precious resources on war-machines or building their military defence systems. It is equally true that some of the countries now specialise in selling the war-machines and geopolitically create regional wars for export and demands of their war machines and as such increasing their economic outcomes. However, for the affected and/or poor countries, burden of import of war machines remains economically unproductive sucking their hard-earned and essential capital. The internal conflicts of the countries create adverse environment for the poorer sections while elites may benefit from the same, as such this may further the existing developmental inequalities between different classes of the people.

In this context, the present paper using panel data across the countries attempts to examine the impact of political stability, civil liberties (indicator of hidden social conflicts), security threat, group grievance, human right and rule of law, external intervention, and arm imports, and homicides on economic performance of countries, especially the economic growth and inequalities. The data for the study has been extracted from various publications of leading global institutions like the World Bank, IMF, etc. The paper concludes that peace is not only morally preferable, but it has its outcome also in the form of better economic and human development.

323 Diversity of Investments and International Migration in Central and Eastern Europe

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Abstract

Population decline is the source of many problems in the post-socialist countries occurred in the last two decades. Not only ageing problems, but permanent and massive out-migration hit hard these countries, more especially the border regions. While the most dynamic economic centres (e.g., the capital or regional centre and its agglomeration) were focal points of investments (e.g. FDI inflows) and enjoyed the increase of population, border regions suffered from the opposite outcomes. The loss of population, whether it happens due to natural change or out-migration, means a real threat for the region, both in an economic and in a demographic context. Though, the COVID-19 pandemic resulted a massive halt in the field of international migration, and the revaluation of rural places were visible in population dataset, the start of vaccination programmes allowed the relief of restrictions in (international) mobility. However, do we find the same trends in population change and migration, or there are new patterns at the regional level (NUTS 2 and NUTS 3 level)? What kind of linkage could be measured between FDI and migration in Central Europe? Furthermore, the impact of population loss or increase on FDI trends will be also examined at the regional level. Using statistical data analysis, the change and intensity of population change will be also presented, and different types of regions will be detected.

324 Blue Sky or Bright Light? An Empirical Analysis for a Campaign-Style Environmental Enforcement in China

Bin Hu

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Abstract

Both environmental challenges and achievements in China are well known. In this study, we use monthly PM2.5 and night-time light data for prefectural-level cities in China to empirically illustrate that Central Environmental Inspection, a national campaign-style enforcement which was institutionalized with cadre evaluation system and informal political networks, was effective to deliver quick but short-lived pollution reduction at significant economic cost. Our estimates show that the economic sacrifice was outweighed the benefits of cleaner environment through CEIs. City political leaders bearing network ties with the incumbent provincial leaders tend to respond with different degree of vigor to fulfil administrative tasks for environmental protection. By using patron-client network as a proxy to quantify *informal* institutional channel, we do find that city Secretaries with or without informal connections had *strategically* arranged their efforts to control environmental pollution, a pressing policy issue specifically designed for CEIs. The empirical results support that when city Secretary had informal ties to the incumbent provincial Party Secretary, she/he tend to deliver better environmental performance than those without such connections. This trend is especially evident in the ordinary prefectural-level cities or in more polluted cities. The effect of homophilous association with governors accumulated by the city Secretaries, however, was not responsive to explain air quality or night-time light intensity. The study adds to a growing body of literature to bring formal and informal institutional factors under an analytical lens to empirically investigate the proactive role of these factors in shaping trajectory of environmental and economic change in China.

325 How Cities are prepared for Accepting Autonomous Vehicles?

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Abstract

Cities face enormous problems and challenges regarding making urban mobility systems sustainable, while autonomous vehicles are expected to revolutionize transportation. The presentation aims to systematically review the international literature on the integration of autonomous vehicles in cities; as a result of structured international literature search, around 45 relevant studies were identified and analysed.

On the one hand, the presentation is going to address the urban visions concerning the deployment of autonomous vehicles; these represent the first step towards the integration of autonomous vehicles into cities. According to the state of the art literature, autonomous vehicles – as part of the public transportation system as well as in case of their shared usage – may change the whole system of urban mobility in favour of sustainability. At the same time, introducing autonomous vehicles into the urban transportation system is going to comprise considerable urban governance challenges, as distinct interests of different sectors and actors should be harmonised and also set into the interest of cities and towns.

On the other hand, the presentation examines the extent to which urban planners and policy makers are prepared to welcome autonomous vehicles in their cities. The mentioned harmonisation and adaptation process is going to require careful preparation and deployment from cities regarding urban transportation, infrastructure and land use planning, as well as restructuring the city budget and regulations. To help cities cope with the challenges they face, new urban planning principles have already been published (NACTO 2019), but urban planning methods should also be renewed. Furthermore, it is going to require flexibility and willingness to change from individuals as well as from economic and social groups and actors. Based on an in-depth analysis of the international literature, the presentation is going to paint a picture of where cities are in their preparations for autonomous vehicles; what factors are hindering the process, and what recommendations and solutions are emerging to move forward.

Third, the presentation is going to sum up the experiences of cities carrying out different types of autonomous vehicles' tests. Cities and towns being in the phase of urban road testing, represent the highest level of AV readiness at local level.

In addition to these main dimensions, geographical contexts of the examined studies, as well as their used methodology are also going to be considered. Furthermore, the state of the art literature regarding AV readiness of developing countries, as well as their motivations and obstacles of introducing autonomous vehicles are also going to be summarized.

327 Cultural Tourism Development in the Komárom-Komarno Cross Border Area

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Abstract

The presentation is based on the results of a three-years Horizon 2020 international project titled SPOT, and implemented by a consortium of 14 European countries and Israel. The aim of the research project was to explore the possibilities of developing cultural tourism in touristically problematic (disadvantaged or suffering from over-tourism) areas in each partner country. The Hungarian research team studied the cultural tourism development characteristics of the Komárom-Komarno cross-border area. The town Komárom lies along the Hungarian-Slovakian border, located 100 kilometres away from the Hungarian capital city (Budapest); it has been divided by the Trianon Peace Treaty in 1920 and became "forgotten" during the decades of socialism, despite its significant cultural heritage going back to ancient times. The European Union membership of Hungary and Slovakia enhanced both territorial and cross border cooperation possibilities, which were used in favour of fostering connectivity and Europeanisation. Recently, considerable developments were achieved in the Komárom-Komarno area related to cultural tourism and transportation, e.g. considerable building reconstructions happened with touristic purposes, bicycle routes and cross-border public bicycle rental system were developed, as well as cultural playgrounds were constructed in cross-border context.

The Hungarian research team surveyed tourists, local residents as well as local entrepreneurs to investigate the cultural tourism development characteristics of the Komárom-Komarno case study area. Furthermore, interviews with local actors and organisations as well as on the spot field trips were carried out in order to gain a deeper understanding of the local cultural tourism development processes. Research results show that, despite a shared history, language and culture, the two towns have two different identities due to their different historical development paths and, despite efforts, the area cannot be considered as a single tourist destination. In the long term, there is little or no development cooperation, so it is important to put this area on the European map as a common destination and increase the number of foreign tourists. This will require tourism development and cooperation, which can be achieved with the help of an innovative GIS-based tool (SPOT-IT) developed as a result of the SPOT project for all case study areas (including Komárom-Komarno), in order to provide decision-making support related to the development of cultural heritage attractions. In addition to this, the main recent cultural tourism development projects were studied deeply by interviews and field trips; as a result, good practices were identified and described. Different forms of partnership and cooperation were identified and regarded as key success factors of cultural tourism development projects in the Komárom-Komarno cross-border area, and it is expected to be in the future as well.

328 **Kecskemét is the Economic Center of the Southern Great Plain**

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John von Neumann University, Hungary

Abstract

This presentation aims to delve into the economic significance of Kecskemét, positioning it as the key economic center in the Southern Great Plain. The rationale behind choosing this topic lies in Kecskemét's pivotal role in regional economic dynamics, prompting the need for a nuanced understanding of its contributions to the area's development.

The research question centers on how Kecskemét, as the economic nucleus of the Southern Great Plain, contributes to the region's growth and the factors influencing this position. The methodology involves a comprehensive analysis of the city's economic statistics and development plans, coupled with interviews among local businesses and decision-makers. Emphasizing international relevance, the research of medium-sized cities is important from the perspective of development policy.

Anticipated research results aim to provide deeper insights into Kecskemét's economic dynamics, contributing to the formulation of the Southern Great Plain's economic development strategy. The conclusion will summarize the city's strengths, weaknesses, and potential areas for further development, offering participants a comprehensive understanding of Kecskemét's role as the economic center in the Southern Great Plain region.

333 Territorial Levels of SMEs' activities – Analyses of Firms in Győr, Hungary

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Abstract

Companies are very different from the point of view their activities' territorial levels. There are firms which are only local but also ones which operation reaches the global level. Activities from territorial approach can be analysed in different ways answering e.g. the following questions: Where companies purchase their inputs to produce or serve from? Where are the markets they can sell their products? Where they can have employees from?, etc. To answer these questions data have to be collected about their sell, investments, employees, social activities, etc. In my presentation I would like to present a different method about how to measure the territorial levels of different activities of firms.

I made an interview research about business society relations among 30 SMEs in Győr, Hungary between August 2021 and September 2022 with a special focus on CSR, sustainability and territorial levels of the firms. Based on this research the aim of my presentation is to provide information about the territorial levels of SMEs' activities. I asked owner-managers to indicate to what extent certain territorial unit (from local until global) is characterized in the case of its input, output, relations and impacts. Scales are between 0 and 9 where 0 is when the firm has no inputs, sells, relations etc. at the certain territorial unit and 9 is when the firm is totally characterized at the certain level. Based on evaluation and on owner-managers' thoughts every companies and their activities can be characterized with a territorial level, and also all of the firms involved in the research can be characterized with a territorial level.

It is widely believed that rather big companies are national or global while smaller ones are rather local or regional. My research proved that also SMEs can have such kind of activities which are characterized at national or even global level. There is a difference between their social and economic impact, their social impact is more likely local or regional than their economic impact. Several owner-managers were sceptic when they had to evaluate their impact because they felt that the SMEs are too small to have meaningful economic or social impact at any levels but during the interviews they realized that smaller firms can also have impact not just at local but even higher level. They understood that their impact is smaller than big companies' but its value and importance could be important among SMEs as well.

The method of my research was a first attempt in Győr to measure firms' territorial level, of course the method and also the size of the sample can be improving to have more complex data. However, I believe that my method could be useful for firms when they would like to have a quick view on their territorial role to be able to make more conscious decisions, and also researchers can use it to map the territorial level of companies in a certain area with the owner-managers' opinions.

334 The Effect of Cultural Capital on Income Distribution

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Abstract

This paper aims to analyse the effect of cultural capital on income distribution. Recently, Tubadji et al. (2022) hypothesized that the accumulation of individual cultural capital has the potential to reduce income distribution within a country. Using Italian panel data, they find that cultural capital is the main engine and that two types of capital—social and human—have complementary effects on cultural capital, thereby reducing income inequality.

The concept of cultural capital was initially defined by Broudieu (1986) in sociology and later introduced to economics by Throsby (1999). In economics, cultural capital refers to both tangible and intangible goods that embody, accumulate, and generate both cultural and economic values. Tangible goods comprise works of art, cultural artefacts, heritage buildings, and ruins, whereas intangible goods comprise literature and music, as pure public goods and inherited traditions, as well as values and beliefs that embody a group's culture (Rizzo and Throsby, 2006). This cultural capital, with both its tangible and intangible forms, changes individual behaviour when individuals recognize the cultural value of cultural capital (Ateca-Amestoy, 2007; Champarnaud, Ginsburgh, and Michel, 2008). This, moreover, changes production behaviour, affecting the income level of the future generation. In other words, we expect the presence of cultural capital to affect income distribution. In economics, since Kuznetz (1955), the effect of various types of capital, mainly physical and human, on income distribution has been studied (Acemoglu and Robinson, 2002; Aghion and Bolton, 2007). Among them, Galor and Zeira (1993) is a pioneering study that shows that income distribution due to differences between borrowing rates and lending rates arises from capital market imperfections. This is one of the main ideas explaining contemporary income distribution and has been accepted to be factual with various types of theoretical and empirical extensions.

This paper presents a new perspective on theoretical consideration vis-à-vis the effect of cultural capital on income distribution. In particular, we use Galor and Zeira (1993) as a base model to examine how the results of Tubadji et al. (2022), which empirically show that the amount of cultural capital can reduce income inequality, can be theoretically explained. Our analysis suggests that the presence of cultural capital changes the behaviour of educated individuals and raises the income level of educated borrowers, regardless of their initial borrower status, specifically through its effect of cultural capital on their consumption saving patterns. The reason behind this is that individuals always find value in cultural capital. This finding suggests that countries that accumulate cultural capital and provide cultural education are more desirable in terms of income distribution than those that cannot.

335 How does the Creative Space Shape a Creative City? Evidence from China

Xueli Wang

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Abstract

New economic geography highlights that the benefits of urban clusters in large cities are often enhanced through the networks of urban areas. This network provides smaller and medium-sized cities the opportunity to leverage the advantages of larger cities, compensating for their own limitations in size. Our research employs the Fuzzy Regression Discontinuity Design (Fuzzy RDD) method, focusing on the externalities of creative space clusters in 286 prefecture-level cities in China between 2013 and 2021. We explore the effects of these clusters within a 1-hour commute radius of provincial capitals, aiming to understand the geographical and spatial dynamics of these agglomerations. The paper also delves into the roles of knowledge externalities and the centrality of venture capital financing networks in influencing these agglomeration effects, alongside examining variations across the Hu Huanyong Line.

Cafés serve as pivotal third spaces, distinct from the office and home, providing an environment conducive to communication and brainstorming. They act as social hubs where individuals meet, engage in conversations, form connections, and share ideas. These interactions often spark new opportunities and foster innovative thinking, which can lead to the establishment of new businesses. In our study, cafés symbolize creative spaces, and we utilize Point of Interest (POI) data from Baidu Map API to analyse their presence and impact. Additionally, we measure the vibrancy of a creative city by the frequency of venture capital investments, with data sourced from the Zero2IPO Group. This approach allows us to examine the correlation between the proliferation of cafés and the entrepreneurial activity within a city, highlighting the role of these spaces in the broader context of urban creativity and economic development.

Our findings indicate a higher concentration of creative spaces, such as cafes, near provincial capitals. These areas are also more successful in attracting venture capital, thereby fostering creative cities. This pattern is particularly evident to the right of the Hu Huanyong Line, underscoring the regional developmental disparities in China. Furthermore, we find that the concentration of cafes not only draws in more venture capital but does so by leveraging the centrality of the urban venture capital network and the knowledge externalities in these cities. These factors – network centrality and knowledge externalities – are key in the ability of creative space clusters to attract venture capital. The study's conclusions are supported by various robustness tests, affirming the significant impact of these factors in the creation and development of creative cities.

336 **Role of Interpersonal Support in Community Resilience**

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Abstract

Natural disasters unequally affect poor and wealthy populations, which can be observed everywhere regardless of the economic performance of the respective country. Paradigms focusing on physical hazards and response cannot be considered, while social, political and cultural causes are rarely mentioned in the discussions around particular disaster events. Marginalized households and communities, and populations with less income are more affected by disasters. A significant proportion of Hungary's settlements are deprived or otherwise marginalized, which makes it necessary to raise social and economic questions related to disasters and investigate them from a spatial aspect.

This study is based on case studies of five disaster-affected settlements and encompasses a social vulnerability approach. The research is based on interviews with key informants involved in response to the respective disasters and broadened with an experiment to use the Interpersonal Support Evaluation List as an instrument to investigate community resilience. With the usage of ISEL, scholars are capable of observing the individuals' self-perception of themselves in their communities and how they can rely on others in their environment. The survey, with the participation of 103 people, discovered discrepancies in the level and structure of interpersonal support, which is tangible based on the interviews.

337 Concentration of Exports of the Main Agricultural Products of Mercosur. An Inter-Regional and International Analysis for the Period 2013-2022

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Abstract

The Southern Common Market (MERCOSUR) is a regional economic and political integration organization made up of several South American countries. Its full active members are Argentina, Brazil, Uruguay and Paraguay. Venezuela is currently a member in suspension and Bolivia is in the accession process. The territory occupied by MERCOSUR constitutes one of the main producing and exporting regions of agri-food in the world. Considering the dynamism of international markets influenced by changes in consumer behaviour, geopolitics and climate, the general objective of this work is to analyse the concentration of exports of the main agri-food products produced in MERCOSUR in a disaggregated manner, way to understand the importance of the sector in the regional and global economy. Available data were used, corresponding to the tariff items (harmonized system - HS) of export values (thousands of current USD) and volumes (tons), in digital format by TRADEMAP, for the period 2013 - 2022 (last 10 years). The Herfindahl and Hirschman Index (HHI) was used, which is a measure used in economics to report on the economic concentration of a market, or, conversely, the measure of lack of competition in an economic system. A high index expresses a very concentrated and uncompetitive market. Characterizing the main agri-food sectors exported by MERCOSUR, the following stand out: firstly, seeds and oilseed fruits (SA12), followed by meat and edible offal (SA02), in third place, cereals (SA10), with percentage averages for the study period of 10.29%, 6.11% and 4.68% respectively. The other sectors correspond to averages less than 3.00%. Analysing by product group, Brazil is the main exporter of SA02 and SA12; Argentina is the main exporter of SA10. The quantities produced and exported of SA02, SA10 and SA12 from Paraguay and Uruguay correspond to less than 5% of the Block's total. Concerning concentrations, SA02 presents an HHI value at the beginning of the period equal to 0.0531 (diversified exports) and 0.2059 (concentrated exports) at the end. The People's Republic of China is the main importer of this group of products. For SA10, it presents an average HHI for the study period of 0.0451 (diversified exports). It should be noted that in this market, the interregional dynamic is high between Argentina and Brazil. Finally, for SA12, it presents an average HHI for the study period of 0.4616 (concentrated exports), with the People's Republic of China being the main destination for exports in this sector. In conclusion, we can affirm that MERCOSUR is an important supplier of agri-food to the world, of which two of the main sectors have a concentration in the Asian market (SA02 and SA12), while SA10, intra-regionally, has a greater impact.

338 Dependence on Fertilizers in Paraguay. Analysis of the Concentration of Imports for the Period 2003-2022

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Abstract

The use of fertilizers in Paraguay has been growing due to the need to increase the yield of agricultural production to meet global food needs. Paraguay does not have industries responsible for the production of chemical fertilizers, for this reason, it depends exclusively on imports of these products to cover national demand. The value in current US dollars of fertilizer imports ranks 4th in the total imports made by the country in 2022. These products are registered under the Harmonized System of Tariff Items (HS), these being SA3101: fertilizers organic, SA3102, nitrogen fertilizers, SA3103 phosphate fertilizers, SA3104 potassium fertilizers, and SA3105 fertilizers with two or more NPK in the formulation. Regarding SA3101, the import is concentrated, taking into account that the result of its Herfindanhl-Hirschmann Index (HHI) is higher than 0.18 in all years, the main supplier of the input is Brazil, covering up to 95% of the local market, the SA 3102,3103,3104,3105 imports are concentrated until 2014, with a result of its Herfindanhl-Hirschmann Index (HHI) greater than 0.18, thus Brazil was also considered as the largest supplier of inputs, then from 2015 to 2022, the market became moderately concentrated, resulting in HHI between 0.10 and 0.18, where the supplier countries, apart from Brazil, are Argentina, Canada, China, United States, Egypt, India, Russia.

341 Life at the Edge of the City Size Distribution

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Abstract

We consider historic and contemporary deviations from Gibrat's law for the growth of settlements. In mature economies, both very large and very small cities tend to grow slower than averaged sized cities. We explain this through changes in determinants of congestion and commuting behaviour for large cities; and through the presence of a minimum scale below which a settlement becomes uninhabited in the long run. We estimate a minimum viable size of settlements of X for the case of Germany.

342 Just Transition, Smart Specialization and Re-industrialization: Perspectives for Bulgaria

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Abstract

The concepts of "Just Transition," "Smart Specialization," and "Re-industrialization" are all important policy frameworks and strategies that can have a significant impact on the economic development and sustainability of a country like Bulgaria.

Bulgaria, like many other European countries, has a legacy of coal and heavy industry. As the world transitions to cleaner and more sustainable energy sources, Bulgaria faces the challenge of phasing out coal and other high-polluting industries. The policy is addressing three identified regions – Stara Zagora, Pernik, and Kystendil. A Just Transition approach would involve providing support for affected workers, retraining programs, and investments in new green industries to create jobs and economic opportunities, which is a new location theory task at the local level.

Smart Specialization is an EU-driven approach that focuses on identifying and developing a region's unique strengths and competitive advantages. It involves concentrating resources and efforts on specific areas where a region has the potential to excel.

For Bulgaria, Smart Specialization would involve identifying key sectors or industries where the country has a comparative advantage. This could include areas such as information technology, agriculture, tourism, and renewable energy. By investing in these sectors and fostering innovation, Bulgaria can enhance its competitiveness and drive economic growth, which is a new location theory task at the regional and national levels.

Re-industrialization refers to the revival or growth of industrial sectors within a country. It often involves modernizing existing industries or fostering the development of new ones to stimulate economic growth.

Bulgaria has a history of industrial production, and re-industrialization efforts could focus on upgrading and modernizing traditional industries while also supporting the growth of high-tech and innovative sectors. This can lead to job creation, increased exports, and economic diversification, which is a new location theory task at an international and global level.

A just transition should be at the heart of any effort to re-industrialize and promote smart specialization in Bulgaria. The phasing out of polluting industries is accompanied by a plan to provide alternative employment opportunities and support for affected workers and communities, which are classical location theory factors and conditions and are the main subjects of the research.

343 **Some Determinant Factors of Climate Adaptation Strategies – A Comparison of Two Hungarian and Cross-Border Representative Surveys**

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Abstract

The negative impact of climate change is inevitable in the future. However, the impacts are different in different geographies. Hence, people living in different geographies might have different approaches towards climate change, and their adaptive strategies are also different.

Research into the effects of climate change and adaptation options is not new. Questionnaires related to climate change are becoming increasingly frequent and not only provide a European overview but also focus on the regional and local level, revealing the perceptions, attitudes and strategies of either decision-makers or the population. Regional climate-related research usually works with administrative boundaries and research conclusions are made for administrative regions. These administrative regions do not necessarily cover a homogenous landscape (like flat agricultural areas, hilly forest areas or built-in areas) where the impacts, hence strategies might be homogenous.

Generally, attitudes reflect not only one's geographical but also socio-cultural embeddedness. Hence attitudes relating to climate change can also differ from culture to culture, even though these cultures are physically close to each other.

This paper presents the results of two large sample representative surveys from Hungary, from 2015 and 2022 aimed at revealing any change in pro-climate attitudes and climate-related behaviour. In the second (2022) survey regions are represented not by administrative boundaries but by homogenous landscapes. Therefore, this paper aims to prove that – besides other factors – the landscape is a determinant factor in how one perceives the impact of climate change and how she/he builds her/his adaptation strategy as well. Additionally, another survey – conducted in 2018 in rural areas of Baranya County (Hungary) and Osijek-Baranja County (Croatia) – can show the cultural differences between the two joint areas in cross-border situations. The comparative results can contribute to Ajzen's Theory of Planned Behaviour in the field of pro-climate behaviour, pinpointing that landscape and cultural embeddedness can influence the role of determinant factors of pro-climate intention and behaviour.

344 Roma Population on the Peripheries of Hungary – Spatial Pattern of Recent Ethnic Changes

János Péntzes

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Abstract

The spatial distribution of the Roma population significantly overlaps the location of peripheral areas in Hungary. Current investigation focuses on the changes in the ratio of Roma population in the Eastern half of the country, including Northern Hungary and the Great Hungarian Plain. Most recent estimated datasets collected from the local governments are analysed with special attention to the spatial distribution and its changes. The investigation draws the attention to the ongoing process of spatial concentration of Roma population primarily in the case of the most backward of settlements. However, different groups of social and economic indicators reflect ambiguous trends during the last decades, the situation of the most peripheral settlements is regarded as expressively and steadily depressing. Additional objective of the current analysis is to discover the most characteristic and long-term trends in the situation of settlements with the largest ratio of Roma population.

346 Beyond Economic Metrics: Assessing the Multi-Faceted Influences Shaping the Size of Urban Areas

Vladislav Marjanović, Jelena J. Stanković, Ivana Marjanović, Marina Stanojević, Dragana Radenković-Jocić

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Abstract

Urbanization, as a global phenomenon, epitomizes a substantial augmentation in the concentration of population within urban centers, concomitant with the expansive proliferation of urban territories and infrastructural development, coupled with a simultaneous escalation in per capita income. The United Nations, in its demographic assessments, underscores the pervasive nature of this trend, revealing that the global urban population exceeded 55% in 2020, with projections indicating a further ascent to 70% by the year 2050. A noteworthy revelation emanating from these projections is the anticipation that an overwhelming 96% of forthcoming urban expansion will unfold within the confines of developing nations. This statistic, as indicated by UN-Habitat, underscores the pivotal role these regions play in fostering sustainable economic growth—an imperative for international initiatives aimed at "building back better" and transitioning towards comprehensive sustainable development. Therefore, unravelling the intricacies that propel urbanization assumes paramount significance for global urban management and the formulation of judicious policies that transcend geographical boundaries. To meet this exigency, an immediate and concerted effort is necessitated to delve into the core determinants that propel the inexorable tide of urbanization. The contemporary global landscape finds itself at the epicenter of a transformative shift towards urbanization, with over half of the global populace now ensconced in urban habitats. This ongoing metamorphosis represents a colossal alteration of unprecedented proportions, exemplifying the scale of change experienced in recent times. Notably, the existing urban population stands at a magnitude twice that of a mere three decades ago. The rapid migration away from traditional sectors and rural hinterlands has precipitated a reshaping of the global labour force, steering individuals toward opportunities in burgeoning urban centers. This demographic shift, in turn, contributes significantly to the burgeoning size of cities worldwide. In light of these dynamics, this paper articulates its primary objective as the identification of pivotal factors influencing the dimensions of cities, with a particular focus on urban areas in Serbia. Employing a panel regression analysis methodology, the research scrutinizes a comprehensive sample comprising 24 Serbian cities over the twelve-year period spanning from 2011 to 2022. This paper serves to illuminate the intricate nature of urban area dimensions, challenging the conventional wisdom that economic performance is the sole impetus behind urban expansion. The authors assert that variables such as infrastructure, cultural amenities, education, and healthcare are increasingly gaining ascendancy as influential determinants in shaping the spatial dimensions of urban areas. By emphasizing the relevance of these supplementary dimensions, the authors proffer a nuanced perspective on the evolving dynamics governing the size of cities. This sophisticated approach acknowledges the multifaceted interplay of diverse factors driving urbanization, transcending the traditional economic-centric paradigm and providing a more comprehensive understanding of the forces propelling the relentless urban march. In essence, this research contributes to the evolving discourse on urbanization by offering an enriched perspective that encompasses the holistic spectrum of determinants steering the global shift towards urban living.

Keywords

Urbanization, Demographic Shift, Sustainable Urban Development, Panel Regression Analysis, City Dynamics.

349 Young People in the Post-Pandemic Labour Market: Response, Recovery and Resilience in European and Worldwide Regions

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Abstract

Young people have been hit hard by the broad social and labour market impact of the COVID crisis 19. Youth unemployment has increased substantially, education and work-based learning have been severely disrupted, and many young people suffer from financial insecurity, housing instability and mental distress. Worldwide governments have replied to this situation by adopting comprehensive policy measures for young people, ranging from labour market and income support measures to housing responses and mental health support. This paper aims to investigate the situation of young people in the labour market in different European and worldwide regions after the pandemic. What should we expect? The work will begin with a comparative analysis of what has happened and is happening in different countries based on data provided by official statistics. Then it will focus on one hand on the situation of Neets and the differences found between rural and urban areas, and, on the other hand, on policy responses to support young people. With a statistical approach, an attempt will be made to identify causes and possible solutions based on territorial intelligence.

350 Do Big Cities, Small Rural Areas or Suburbs Offer a Better Quality of Life? In Search of Well-Being with Territorial Intelligence

Simona Cafieri

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Abstract

For a long time, the wealth of cities drew the poor from the countryside, giving rise to a so-called rural exodus. Over the centuries, the division of space has become more complex, mainly due to urban expansion. The suburbs of cities expanded, in part due to the growth of suburban housing. The debate on the standard of living of the suburbs is not new. Disadvantaged suburbs are often presented as the areas where hardship accumulates: it is now far from the city, in suburban and rural areas, that poverty is to be found. However, according to official statistics, the peri-urban area, although far from reaching the living standards of affluent inner-city neighbourhoods, remains on average largely advantaged. This paper aims to examine the quality of life in cities, suburbs and rural areas.

This work presents long-term trends in socio-economic development in different regions in the world, focusing on the effects of the 2008 financial crisis and the consequences of the COVID-19 crisis and current wars.

The analysis is based on data from social surveys conducted by European and worldwide statistical institutes. It will examine the relationships between environment, life expectancy, education, employment and poverty in the urban and rural context. The paper concludes with a discussion of the role of skills and human capital, internet connectivity and innovation as enablers of regional development. With the help of ad-hoc statistical indicators, it will also reveal where people are more satisfied with their quality of life.

351 Regional Perspectives of Limits of Public Debt. A Tentative Theoretical and Empirical Approach

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Abstract

Public debt has increased dramatically over the past 5 years at the national and sub-national level. Whereas the topic of national debt is currently the subject of much debate in the economy and in society as a whole, less attention is given to sub-national levels. The paper will concentrate on this perspective using the case of two Austrian regions and municipalities.

Due to the institutional framework in Austria, which is characterized by federal guidelines, the federal budget is closely linked to the budget of the provinces and municipalities. Therefore, politicians and economists not only have to ask themselves the question of the debt limit at the federal level, but also expand the discourse to the regional and municipal level. We found that public debt is sustainable only up to the point where the costs of the debt can still be serviced, and the state, federal states, and municipalities remain solvent. However, this point is not tied to a specific number or percentage; it depends on the individual situation and the prevailing system, as well as the legal and institutional limits within a country.

The paper will give an overview of existing theoretical approaches to the limits of indebtedness and expand the applicability of these economic models to the sub-national level of regions and municipalities. It will present a model of these limits that can be applied to these levels. An empirical estimation for the cities of Graz/Styria and Klagenfurt/Carinthia will show the link between primary account and debt and give an estimation of the fiscal space for the future. In this context, the link is also drawn to the legal-institutional limits, which in Austria are particularly important at the regional level and should therefore not be missing in an analysis of the debt limit. Finally, an outlook on future developments is outlined, which is intended to show the challenges that not only the federal state but also its subordinate levels will be confronted with.

353 Territorial Cohesion in Less Developed Regions: Questioning the Effectiveness of Smart Specialisation Policies

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Abstract

Smart specialisation strategies are considered the cornerstones of the EU Cohesion Policy since 2014, representing a strategic shift in the European development intervention.

This presentation argues that the effectiveness of RIS3 is considerably undermined in Central and Eastern Europe by the action of a range of structural factors. This main line of argumentation will be addressed in a detailed empirical analysis of the following structural factors: innovation potential, R&D; education, poverty, international migration and governance.

One of the major conclusions of the presentation is that the structural differences among regional economies will prevent the EU Cohesion Policy from narrowing the development gap between regions.

354 Hoodome: The Hungarian Foodome

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Abstract

In Hungary – as in most regions of the world – the main public health problems are cardiovascular diseases, cancers, and obesity, which is becoming the number one public health problem due to its important role in the development of diabetes mellitus and cardiovascular diseases. These illnesses and their complications are responsible for the death of around 100,000 people every year in Hungary alone, placing a significant burden on society. The number of preventable deaths in Hungary is one of the highest in the EU: compared to the EU average, twice as many people die in Hungary as a result of preventable causes of mortality.

A significant part of these leading causes of death can be traced back to environmental and lifestyle factors. The pivotal health role of diet has been well supported for decades by nutrition-related research, which revealed the role of calories, sugar, fat, protein, vitamins and other biochemical factors in deficiency diseases, on basic metabolic pathways, and in many other chronic diseases. Our current understanding of the way biochemicals in food affect health is largely limited to a few hundred components that different food composition databases track in the food supply (EuroFIR: cca. 750 components listed, cca. 270 components tracked; USDA: cca. 200 components tracked). Yet, when it comes to the composition of food we consume, these food components represent only a tiny fraction of the ~70,000 distinct definable biochemicals reported by FooDB, which itself is expected to be only a fraction of the total composition of the food supply. This very incomplete knowledge of the complete biochemical composition of foods hinders the research community from discovering the mechanistic effects and ultimate roles of the thousands of untracked molecules in our health, whether through the microbiome, through their role in the body's metabolism, or through the various molecular regulatory mechanisms of human cells.

To solve this problem, joining the international project on food exposome (Foodome), a Hungarian pilot project (Hoodome) had been initiated, led by Maven Seven Network Research Inc., in collaboration with Syreon Research Institute, proposing a Big Data strategy for the creation and experimental validation of a high-resolution collection of the biochemical composition of foods. The aim of the Hoodome project is to create a unified database for Hungarian agricultural and food products. Once this has been built, the complete chemical composition of the most important food products in Hungary will be available, enabling the research and start-up communities to use the most modern database. This could change the direction of food and nutrition research as well as could set out the future development direction in the health and agricultural industry.

355 Sustainable Cultural Policy in Regional Government after the European Capital of Culture Project

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Abstract

European Capital of Culture projects are not only a title of international significance, but also a significant responsibility for the project promoters. In 2017, Kaunas City and Kaunas District, after winning the call for proposals, started preparing for the European Capital of Culture year - 2022. This is unique for two reasons: the project was carried out in cooperation between two municipalities; the municipality of Kaunas District is one of the largest ring municipalities in Lithuania. From today's point of view, Kaunas District Municipality can be considered as an active implementer of the regional cultural policy, which seeks to strengthen the municipality's identity through the synthesis of modern cultural solutions and traditions important for the local specificity, to position the municipality as an active player in Lithuanian and European cultural activities, and to activate cultural tourism through the instruments applied in the creative industries sector, whose systematic and productive activities can have a positive impact on various sectors of activity. Nevertheless, until the year of the European Capital of Culture title, the cultural policy environment of Kaunas District Municipality was not adapted to the sustainable development of the cultural sector (e.g. there was no approved cultural strategy). During the year of the European Capital of Culture title, a significant increase in cultural activity and diversity of cultural expressions was recorded in Kaunas district, and not only local and foreign artists, cultural operators, social partners, but also the local community were involved in the implementation of the project activities. Despite the aforementioned increase in cultural activity in 2022, the authors of the study believe that it is important to assess the impact of the project on local cultural policy in the long term, i.e. to identify how the project has influenced the development of the local cultural policy, and to point out what new instruments and concepts of cultural policy have been introduced after the European Capital of Culture project.

The aim of the study is to assess the impact of Kaunas - European Capital of Culture 2022 on regional cultural policy and its sustainability in Kaunas district;

The object of the study is the concepts and theoretical models of regional cultural policy implementation in Kaunas district, Lithuania;

Method: case study;

Methodological approaches: analysis of scientific literature and cultural discourse, qualitative and quantitative data.

The following strategic documents were analysed for the study: Kaunas District Municipality Strategy 2022-2027, Kaunas District Municipality Strategic Development Plan 2022-2027, Kaunas District Municipality Council decisions discussed in the Committee on Culture, Sports and Education 2022-2023, the Lithuanian Municipal Culture Index Survey, the strategic documents of the Public Institution "Kaunas 2022" and the results of sociological surveys, the draft Law on the Framework of Lithuanian Cultural Policy, the Law on Local Self-Government of the Republic of Lithuania, the New European Bauhaus.

356 The Energy Transition and Economic Growth: An Empirical Analysis of the EKC in Tunisia

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Abstract

Environmental problems such as climate change, ozone depletion, air, water, and soil pollution, hazardous and plastic waste, marine pollution, and other environmental issues undermine sustainable development and pose threats to human health and safety. The Environmental Kuznet Curve emerged as an attempt to model the relationship between economic development and environmental impact.

The EKC is a hypothesis proposed by Simon Kuznets in 1955, who envisaged a correlation between the reduction in income inequality and the level of GDP per capita based on the same inverted U-shaped curve. According to this theory, rising incomes lead to a deterioration in environmental quality, but after a certain level of wealth, economic growth would also lead to an improvement in environmental quality. It should be noted that the validity of the Kuznets environmental curve has been debated and criticised (see, for example, Stern, 2004). Although some studies confirm this hypothesis, others show that it does not apply to all countries in the world. The lack of conclusive evidence for the EKC hypothesis and the existing mixed empirical evidence thus prompted us to re-examine the link between environmental degradation, approximated by CO₂ emissions, and economic growth.

The aim of this study is therefore to examine the link between environmental degradation and economic growth while considering the energy transition and institutional quality in the context of a developing country, Tunisia. Tunisia is one of the few countries in the MENA region to have shown significant interest since the mid-1980s in using renewable energy and reducing environmental degradation.

To this end, we used the staggered-lag autoregressive model to assess the long-term relationships and dynamics of key variables. Our data spans from 2000 to 2019. Our results suggest that there is a positive relationship between energy transition and economic growth in the long run, and therefore Kuznets' thesis remains valid for the case of Tunisia.

358 Smart Ports as a Tool for Strengthening Cities' Resilience

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Abstract

For several decades, thinking has been moving towards questioning growth patterns and towards a concept of economic development that is less polluting and can generate more added value. The concept of sustainable development appeared with the publication of the report "Halte to growth?" in 1972 by the Club of Rome. Among the new forms of sustainable economic development appears the notion of the blue economy. A concept was initiated for the first time by the Belgian entrepreneur "Gunter Pauli" who included maritime-related activities in a circular economy in order to implement a new economic model that produces less waste and emissions and which generates more jobs and wealth, without costing more than traditional economic models. The Blue Economy refers to all sectors and industries linked to oceans, seas and coasts. It directly contributes to the achievement of most sustainable development goals such as: SDG11 "Sustainable cities and communities"; objective n°13 "Measures relating to the fight against climate change"; and essentially objective n°14 "Aquatic Life". It is an approach essentially aimed at optimizing the exploitation of marine and coastal resources in order to support economic growth, job creation and strengthening economic resilience. However, the concept of resilience originated outside of economics. Initially, the term appeared in ecological sciences and has since spread to other fields such as engineering, psychology and economics. Indeed, the definition of resilience has received considerable attention in the economic literature. It refers to the capacity of a region to prevent, resist and recover quickly from any major disruption to the economy caused by significant events.

In recent years, the notion of resilience has broadened to stimulate reflection with regard to commercial maritime ports and port cities in order to ensure their sustainability. Indeed, financial crises, pandemics, new risks linked to safety, security and climate change... highlight the role of technological developments at the level of commercial maritime ports in the development and strengthening of economic resilience. .

Historically, commercial maritime ports have played a crucial role in the process of developing international trade, opening up major regions of the world and coping with economic crises. They have been affected by political situations, economic development, climate change and especially technological changes. Indeed, the use of new information technologies in ports has enabled these structures to evolve towards a new concept: "Smart Port", which makes it possible to design space management models and rationalize the flow of goods. goods in order to receive a maximum number of ships while minimizing waiting times in the harbor, stays of ships and goods and subsequently reducing the cost of port passage and improving services.

361 Characteristics and Mechanisms of Landscape Localization Evolution in South Jiangsu Small Towns from the Perspective of Rural-Urban-Wild Interaction – Taking Wujiang District, Suzhou as an Example

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Abstract

Landscape site-specific design is the external representation and internal attribute formed in the process of human activities adapting to the local natural environment. As a transitional zone linking urban and rural areas, small towns exhibit fragility, disorder, and passivity in the game process of urban-rural binary development. The unique ecological pattern and landscape features of local areas are impacted. Uncovering the local characteristics of landscape in small towns, analysing its evolution and driving mechanisms, serves as a crucial basis for optimizing landscape planning methods and promoting the integrated development of urban and rural areas. Taking, as an example, Wujiang District in Suzhou, which is representative of small town development, this study adopts the perspective of the coupling interaction among urban, rural, and wild areas. Using methods such as ArcGIS spatial analysis and historical map retrospection, the research analyses the changes in urban-rural-wild patterns and spatial evolution characteristics in different historical periods. It summarizes and refines the differences, evolution, and stability of the landscape locality in small towns. Furthermore, it explores the driving mechanisms of the evolution of landscape places from the aspects of wild area constraints, industrial transitions, and urban-rural linkages. The aim is to provide theoretical support and scientific pathways for the transformation, reparation, protection, legacy and suitable planning of landscape areas in small towns under the context of rapid urbanization and modern socio-economic development.

362 Subsidiarity, Planning, Climate Change through the Example of the Danube-Tisza River

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Abstract

The Homokhátság (Sand Ridge) is located in the part of Hungary between the Danube and Tisza rivers. The water supply of the region has been a serious problem for the people living here for centuries. The surface of the ridge is on average 50-60 meters higher than the water surface of the two rivers. Due to the dry, continental climate, there is no significant amount of precipitation in the area. In the past three centuries, the struggle to stop the running sand has continued with the planting of forest strips and orchards. However, today's economic, social and environmental changes have challenged and eroded the balance of people, the economy and the environment established in the past centuries. Nowadays, the most important task is to create new frameworks for complex water and landscape management.

The complexity of the task can best be seen by various scientific researchers, public administration and political decision-makers.

The purpose of the research is to examine how environmental protection problems, connections, and political goals appear under the conditions of subsidiarity at the various administrative levels.

The research methodology is a comparative analysis of European, national, county and local environmental protection programs.

363 Development Visions for the Cultural and Creative Sector in Budapest in the Period 2008-2030

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Abstract

Creative spaces and cultural organisations, including public cultural institutions, are the key players and drivers of not only the social but the economic life in the Hungarian capital. The research seeks to answer the question of how the cultural and creative sector is reflected in the strategic plans of the Budapest Metropolitan Municipality and its 23 districts, and how it parallels national and EU guidelines. In addition to the realisation of the creative spaces in the capital, the plans of cultural institutions and organisations, their interfaces and financing schemes, the study aims to shed light on how the results of these plans are manifested in the operation of the specifically Hungarian public cultural spaces, institutions and "houses of culture". In addition to presenting the concept of creativity, its various levels and forms, the research also looks at the institutionalisation of creativity in Hungary, the cultural and public education structure and map of Budapest, and the position of the Hungarian capital in the European Union's definition of a cultural and creative city. The research presents the cultural and creative industries-related visions of the Hungarian capital and its twenty-three districts for the period 2008-2030. In addition to the obligatory spatial development strategies, it also examines individual long-term plans for the economic and cultural fields, comparing them with the EU guidelines and the national strategy. It shows how the capital and its districts are taking on board the spirit and findings of the plans and encouraging them to preserve and maintain the tangible and intangible cultural heritage and to implement cultural and creative projects. It demonstrates how the municipalities of Budapest and its twenty-three districts have different approaches to the cultural and creative sector. Cultural developments are mainly targeted at urban development, urban regeneration, heritage conservation, institutions and their infrastructure, as a soft element in Greenfield regeneration or as a beneficiary of brownfield investments. Cultural developments are mainly targeted at urban development, urban regeneration, heritage conservation, institutions and their infrastructure, as a soft element in Greenfield regeneration or as a beneficiary of brownfield investments. Furthermore, higher education, research, development and innovation, which are essential for economic recovery, the cultural and creative industries can also improve the living conditions of the population, increase employment and make the city more liveable.

Keywords

Cultural and creative sector, cultural and creative industries, urban development, territorial planning, territorial policy.

364 The Role of Chance, Luck, Uncertainty, Risks, Asymmetric Information, Imperfect Information in Regional Development

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Abstract

Nowadays, theories of regional economic growth have described the role and contribution of many production factors - labour, capital, natural resources - and many economic processes - innovations, flows, economic policy - in the economic development of regions. The different theories describe very well the impact mechanisms of production factors, innovations, export expansion, demand creation and supply expansion in the development of regions.

The database of the lecture is provided by the case studies of several countries and their regions in Balázs Forman's book "Globalization and Modernization". The presentation is a regional economic synthesis of the book's case studies and empirical research.

When analysing the development of regions, we test sigma and beta convergence.

We assume that during the SWOT analyses prepared before the formulation of the development programs of the regions, it will be possible to identify and eliminate all the limitations that hinder the growth of the regions.

We also assume that the development of the regions is based on the positive expectations of those involved. Here we distinguish between the cases when all the stakeholders look forward to the developments with positive anticipation and when only a part of the stakeholders.

We are investigating where and when the point comes in the development of different regions and metropolitan agglomerations, when the optimistic vision and positive expectations will have the opposite effect. When does the inflection point of developments occur? Under what conditions does the development of the regions first lead to the formation of the bubble economy and then to the possible collapse?

But imperfect information also contributes to the fact that backward regions are permanently deprived of the chances of development and catching up. For example, there are no companies, people, or other organizations in that region that can track the changes in the world.

Can these very diverse topics be formulated in a unified theoretical framework and in a formalized mathematical language?

We will try.

367 The Role of Human Capital and Digitalization in Building Regional Economic Resilience

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Abstract

There is a growing consensus that the EU is confronted with an ongoing series of major challenges, which include the Great Recession, followed by Brexit, the 'migration crisis,' the COVID-19 pandemic, and the war in Ukraine. In a highly interconnected world, where the impact of shocks can spill-over over great distances, the concern for strengthening resilience has come naturally, capturing more and more of the interest of policymakers. A particular attention has been dedicated to human capital, which is perceived as an important regional growth driver by endogenous growth models (Lucas, 1988; Romer, 1986). Previous studies have already shown that regions with a higher level of human capital have fared better in the event of shocks (Giannakis & Bruggeman, 2017; Kitsos & Bishop, 2018). Furthermore, there is evidence of labour market resilience when looking at the employment of workers with high levels of education (Simoes, Andrade, & Duarte, 2022).

Against this backdrop, the current study aims to assess the regional economic resilience of the EU regional economies in the aftermath of the Great Recession and the COVID-19 related downturn and test if human capital is among the transversal features that help regions perform better. Our approach extends the existing resilience literature in several ways. First, it accounts for the timing of regional business cycles, as referencing to the national/EU business cycles for all the regions when assessing economic resilience may significantly bias the results, as shown by (Duran & Fratesi, 2023). Second, the resilience metric we use is adapted from Sensier and Devine (2023) and evaluates the performance of both labour market and economic output, while including different resilience stages. Third, digitalization is assessed as a transmission mechanism for enhancing the human capital spillover effects at the regional level.

368 Unraveling the Role of Universities in Shaping Regional Innovation: Insights from European Patent Data

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Abstract

Regional innovation production has long been a focal point for researchers, with a consensus that it underlies the long-term economic growth of regions. Innovation in regions stems from the activities of various institutions, primarily firms and universities. While the majority of innovations occur within firms, universities are increasingly active in commercializing their research outcomes and collaborating intensively on innovation activities with companies. This study explores the contribution of universities to regional innovation in Europe by utilizing a comprehensive database of university-owned and university-invented patents identified within the OECD RegPat database. The analysis focuses on the evolution of academic patenting in European regions and its geographic dimensions. In the second part, the article employs a knowledge production function to assess the significance of university research and development expenditures and knowledge stocks in regional patent production. The modeling is based on patent application data in European regions from 2008 to 2016. This research aims to provide insights into the role of universities in shaping regional innovation landscapes and addresses challenges in assessing their impact across European regions.

369 Application and promotion of new zero carbon smart buildings in Cold Regions —Taking the Work R-CELLS of the Third China International Solar Decathlon Competition as an Example

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Abstract

The construction of zero-carbon buildings in severe cold regions is an important part of the implementation of China's commitment at the United Nations General Assembly to achieve the goal of achieving carbon neutrality by 2060. The development of new zero-carbon smart buildings through interdisciplinary and integration is the development direction of buildings in severe cold areas. Taking the competition work R-CELLS of the Tianjin University Team of the third Solar Decathlon China as an example, the project covers an area of 400 m² (including outdoor platform and landscape), the building area of 146 m² (except heating equipment room), and the roof area of 260 m². It aims to achieve "A Lifetime Healthy and Sustainable Home" with "positive energy, full recycling and zero emissions". With the goal of "sustainable development, smart connection, and human healthy ", R-CELLS has achieved good economic, environmental and social benefits. The characteristics of the building are intelligent design and construction, comprehensive utilization of renewable energy, intelligent control system, and resilient energy management system, which realizes the good effect that the renewable energy output of the building base is greater than the energy consumption in the same period during more than 50% of the year, and is a prototype of the building with zero energy consumption and zero carbon emissions suitable for the severe cold regions of northern China. This paper introduces the scientific design of the building at different stages, the key technologies of energy and intelligent control, and the multi-angle publicity and promotion, so as to provide a reference for the scientific research and application promotion of new zero-carbon smart buildings in severe cold areas.

372 Revolutionizing Hospitality Operations: Harnessing the Power of Artificial Intelligence

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Abstract

Addressing contemporary challenges within the hospitality sector, such as catering to the demands of Generation Z, coping with labour shortages, and navigating the ongoing pandemic crisis, underscores the imperative for the digital transformation of restaurants. The advent of artificial intelligence (AI) solutions has emerged as a pivotal factor in elevating the efficiency of restaurant management systems. These AI-based solutions play a crucial role in cost control, heightened productivity, and enhanced customer satisfaction. Through a systematic analysis of existing literature, our study presents a comprehensive overview of potential applications of AI in restaurant management. Utilizing specific keywords, initially, 1263 results were identified from the Web of Science and Scopus academic databases. Subsequently, 22 studies published between 2019 and 2023 were selected for an in-depth textual analysis. The identified focus areas in these studies encompass guest service, marketing, as well as food and beverage preparation. The research findings offer practical recommendations for restaurant operators, aiming to optimize resource management, elevate guest experiences, and curtail labour costs, all contributing to increased revenues.

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374 Transforming Ways of Life in the Changing Suburbs – Case of Budapest

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Abstract

In recent years, numerous new socioeconomic and political factors and momentous events have rearranged and bent the frameworks within which suburban societies live and act in Hungary. New economic activity and employment hubs emerged in the waves of polycentric development, whereas other communities experienced negative tendencies with disintegrating societies and a lack of functions. Subcenters in some select suburban areas have become regional economic powerhouses with an immense demand for the workforce, services, and amenities. The COVID pandemic between 2020 and 2022 caused a new wave of migration from dense urban areas that created social tension in many cities and towns, with infrastructure unable to keep up with increasing demand. Uncertainties related to the war in Ukraine and economic hardships have also contributed to the change in scenery. Overall, local societies have had to adapt to the new challenges by adjusting their lifestyle patterns. The presentation will give an account of changes on various sides of lifestyles, such as commuting patterns, employment status, shopping, and free-time activities, including the strength of personal ties and trust towards institutions and the community. The comparative analysis will be carried out using two large-scale representative quantitative surveys carried out in 2018 and 2023 with in-depth qualitative interviews supplementing in a town belonging to the most salient subcenters in the inner agglomeration belt in Hungary. The results will be contrasted with those of other studies dealing with socioeconomic spatial realignment in metropolitan areas of late. The results will also shed light on the main reasons for the new and severe tensions in the inner-metropolitan areas recently experienced in Hungary, along with their policy implications and challenges for local municipalities.

380 The role of Rural Development in Development Policy

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Abstract

The importance of the Rural Development Policy has been increasing both in Hungary and in the European Union since the Millennium. In June 2021, the European Commission adopted the Rural Development Action Plan, which set out a vision for stronger, connected, resilient and prosperous rural areas and communities by 2040. By establishing the Rural Pact, the Commission intends to mobilize a wide range of EU, national, regional and local actors with rural development solutions that have not been applied so far. In Hungary, in the 2021-2027 Programming Period, Rural Development is the only area of development policy where the level of national co-financing for EU subsidies increases significantly compared to the previous one. In our presentation we review the changing role of Rural Development in time and space, the main changes in the objectives, instruments and financing background in order to ensure that the EU and national rural development funds that will become available in the next programming period can further promote the development of rural areas.

381 Disruptive Impacts Of Artificial Intelligence (AI) on the Dynamics of Tourism Related Mobility

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Abstract

An increasing number of AI-driven solutions are emerging that are subverting society's access to information, influencing individuals' choices and thus certain patterns of spatial use. Although the role of AI-based solutions in everyday activities is a major research topic in informatics and an emerging field in marketing sciences, the anthropogeographic analysis of the potential and adverse impacts of the technology is still a relatively new approach, especially in the Central and Eastern European region. The research aims to explore the opportunities and threats of AI-based solutions that can greatly shape tourism-driven macro- and micro-mobility patterns, thereby triggering socio-geographical changes that can also impact the current sectoral problems (over-tourism, ecological footprint of consumption, labour supply). In this context, the presentation highlights the most important challenges related to AI disruptions in the context of tourism-related mobility. Our research shed light on the emergence of highly automated vehicles in tourism and AI-based applications for tourists that affect decision-making.

382 Only the Staff know what the Guest Wants? Hotel Management Issues with Artificial Intelligence

László Kökény

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Abstract

Artificial intelligence has become a focus of research in the last year. Not only because of its novelty and potential, but also because of the challenges it poses in addressing its application. The tourism industry has previously been called a pioneering digital sector and it seems that the use of AI could rapidly spread among tourism service providers. The question is how to manage the relationship between technology and humans in tourism, which has one of the highest rates of human interaction-based services. There is also the question of how tourists' data will remain secure as the sector becomes more technology-dependent. This presentation will seek to answer these questions by presenting a number of national and international examples and summarising the literature on the subject.

383 **Multidimensional Evaluation of the Agricultural Knowledge and Innovation System (AKIS)**

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Abstract

The Agricultural Knowledge and Innovation System (AKIS) ensures the strengthening of links and interactions between agricultural organizations and/or persons, and subsystems (research, extension, support system, education), to foster knowledge, information flows, and innovation. The concept has evolved in the literature and has also found its place in agricultural policy by becoming part of the Common Agricultural Policy. Within the CAP, support for the EIP operational groups, knowledge transfer, and advisory measures have ensured the contribution to the development of AKIS in the Member States. However, the AKIS goes beyond the support measures provided by the CAP, as several other government measures and incentives are also supporting its development.

Each EU Member State has developed its own AKIS, adapted to its circumstances, actors, and needs, and embedded in national legislation, institutions, and culture. Studies comparing AKIS across Member States have mostly attempted to collect and analyse the specificities of each Member State, mainly along with the results of indicators available through primary data collection. However, these studies are less suitable for comparing AKIS in the Member States.

There are a number of initiatives and indicator systems that have been developed to measure innovation performance. The OECD, the EU (known as the EU Scoreboard), and the World Intellectual Property Organisation (WIPO) have innovation performance measurement systems. These systems are less suitable for measuring innovation performance in the agricultural economy, as they focus on the innovation activity of the countries.

This study used the methodology of composite index construction to create the so-called AKIS index which combines a set of indicators along the dimensions specific to the AKIS, able to show the performance of the AKIS and the differences between the Member States. The AKIS index systematizes Eurostat data as well as CAP outcome, output, and impact indicators and allows the measurement and comparability of the AKIS performance of Member States.

386 Green Dependence on the Brink? Critical Metals of the European Union's Clean Transition

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Abstract

The breakout of the Russian-Ukrainian war at 24 February 2022 brought the agenda of the energy security in the forefront once again. As an almost immediate response to the situation the European Union had come up first with the Versailles Declaration, then presented its grand idea called REPowerEU including the ambitious strategy aims to abandon the Russian gas import and accelerate the European green transition - a fundamental long objective already founded by the European Green Deal earlier.

Since then during the last two years we witnessed fundamental changes in the EU's energy mix representing this aforementioned strategy. As a general outcome of this ambitious undertaking the import of Russian natural gas had decreased significantly, while at the same time liquified natural gas import was peaking an unprecedented high mostly arriving from the US.

Meanwhile, decoupling Russian fossil fuels is only a part of the grand plan, while the other side of the coin, the green transition does not directly linked to it. Renewable energy is an essential part of this transition relying on different green technologies. However, these technologies based on different elements as crucial part of their production. Some of them have marked as 'critical' and 'strategic' by the EU highlighting their economic importance just like possible supply risks. Considering from one hand the unique shape of the global market of these -mostly metals- elements; strong geographical concentration of raw materials, overpowered supply-chain actors like China, and from the other hand the EU's production of these critical materials which is except a few cases are one digit or barely existing in term of global scale, one can draw the potential geopolitical consequences.

Does the EU running from one arm of the dependency to the other exchanging its fossil fuels to a green one? How could the EU mitigate the potential geopolitical challenges and what are going to be the economic, political and environmental consequences of these steps?

In order to gain answers to these questions the EU's dependency rate going to be measured right after its overall supply-chain regarding these materials will have mapped. In case of being able to analyse potential steps and outcomes for the EU, official documents like EU's Study on Critical Raw Materials and Critical Raw Material Act are screened. Other policies and scenario related documents going to be processed too involving different disciplines. Main conclusion is underway, since the research has not finished yet.

387 Social Perception of the Process of Demographic Shrinkage in One of Hungary's Underdeveloped, Inner Peripheral Rural Regions – Case Study Greater Cumania

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Abstract

Forty years ago, in 1984 in Rotterdam, the world's leading urban planners realised that urbanists would have to face a new phenomenon: demographic shrinkage had begun in some (large) cities of the developed world. With the regime changes of 1989/90, these problems also surfaced on the (semi-)periphery of post-socialist Europe, and the development trajectories of these regions and their settlements were fundamentally changed. The clearly perceptible demographic changes (population decline, ageing society, ethnic restructuring) and their complex socio-economic-environmental effects on settlements and regions also pose significant development problems and challenges in large parts of Hungary. In our research, we examined six demographically declining and shrinking settlements of Greater Cumania, a traditional Hungarian cultural region, which is considered to be an inner peripheral rural area. The methodology used is very diverse: we applied loss mapping, a complex method of analysis for the multi-layered exploration of territorial characteristics, among the local prominent persons invited (mayors, deputy mayors, notaries, minority representatives, chief architects, heads of NGOs, school directors, cultural organisers, local clergy, GPs, entrepreneurs). The respondents assessed the cultural characteristics of their towns, local government management, production and service culture, in order to get a more comprehensive picture of the general situation and characteristics of the six shrinking small towns. Respondents rated the potential of their municipality on a five-point Likert scale (0, 2, 4, 6, 8) (increasing scores indicate increasing dissatisfaction). The results were coded and recorded in SPSS software and analysed using this software and MS Office Excel. The Kruskal-Wallis method was used to explore the functional range differences of the loss-of-function mapping. QGIS software was used for map representation. Relevant national and municipal statistics were used, municipal development documents were analysed, and the methodology of “lived geography” was applied to truly explore the deep layers. The analysis of the loss maps of the six municipalities shows that, on average, the prominent respondents of the municipalities surveyed rated their losses as slightly less severe than medium. The statistical test carried out showed that, although their natural and demographic conditions are similar, they have followed a markedly different development path, with different ways of emerging from their peripheral existence and their resilience to challenges, their flexibility. In the light of the analyses, it can be concluded that the source of the problem cluster is basically the quality of the local society: the average educational level of the population of Greater Hungary is lower than the national one, the level of education is lower than the national one, the level of cultural demands is very low, not to mention the willingness to entrepreneurship, innovation attitude, motivation to learn. Generally speaking, in the six settlements of Greater Cumania it can be concluded that the necessary infrastructure is available, local governments often outperform in development (in the past decades relying almost exclusively on EU and state co-financing and tenders), but local society does not have sufficient financial and moral capital to maintain the settlements.

390 Operational Logics of Municipalities - The Case of Downtown Revitalisation in Hungary

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Abstract

The lively main streets of many Hungarian cities have become deserted in recent decades, while shopping centers on the outskirts of the cities have taken over the functions of these symbolic spaces. What can municipalities do to turn their main streets into lively, service-rich places again? The research is primarily based on 96 semi-structured interviews with experts in Hungarian and English, which was conducted between 2018 and 2023. The management of premises by Hungarian municipal governments is the most significant untapped potential and also the most neglected urban development tool as the majority of Hungarian municipal governments do not use municipal premises management as a means of urban development. Four operational logics of Hungarian municipalities can be distinguished: political, administrative, strategic and financial. On the basis of the representation of local government operational logics, the analysed Hungarian city governments can be classified into four clusters based on their operation in their local management: visionary strategists, managing entrepreneurs, managing operators and off-the-beaten-trackers. Main finding of the research is that the success of Hungarian local government property management is significantly limited by the dominance of the administrative operational logic, however the success of Hungarian local government property management is significantly supported by several legal and non-legal instruments independent from financial status.

392 Unequal Power Relations within European Research Collabouration Networks - An Uneven Development Perspective

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Abstract

The Framework Programmes for Research and Technological Development of the European Union have stimulated the establishment of research collabourations for decades to enhance synergies of European academic knowledge production and to support its own policy goals. Although increasing resources and the thematic expanse of the past programme periods have indeed created fruitful cooperation between different partners across Europe, they also contributed to the reproduction of European inequalities in the field of knowledge.

Hence, the goal of this paper is to analyse inequalities in the European scientific field and knowledge production based on information on Horizon 2020 and Horizon Europe research and innovation collabourations. While this can be investigated from different viewpoints (forms of cooperation, productivity etc.), the main emphasis of this research is to analyse different participation attributes of institutions participating in H2020 and Horizon Europe initiatives and their spatial distribution patterns, with special regard to positions of Central and Eastern European countries. These geographies of research collabourations are investigated by an uneven development perspective with the assumption that inequalities of knowledge production in such initiatives are an immanent part of the system, formed by the unequal power relation between academic actors with different socio-economic and geopolitical positions in the European scientific arena.

Statistical and GIS-based analyses presented in the paper are based on geographical location data of institutions participating in H2020 and Horizon Europe research and innovation actions from 2014 to 2024 and information on attributes related to project and institutional characteristics, financial contributions and their roles in collabourations. These types of data on institutional location and project attributes can be retrieved from CORDIS database, which provides information on projects implemented within Framework Programmes of the EU.

The results of the paper contribute to the evidence-based knowledge of spatial characteristics of research collabourations within Europe. Detailed findings on the presumed concentration of analysed attributes within Western countries, the unequal positions within networks between older and new member states and measures on the level of integration of CEE countries into collabouration networks not only could arouse the interest of the scientific community but could also provide important feedback from a policy point of view.

The paper is supported by the János Bolyai Research Scholarship of the Hungarian Academy of Sciences, and it also presents the results of 'Marginalised Space Experience in the Context of Uneven Geographical Development' research project (project no. 138713) under implementation with the support provided by the Ministry of Innovation and Technology of Hungary from the National Research, Development and Innovation Fund, financed under the K_21 funding scheme.

395 Questions of Social Sustainability in an Inner Peripheral Rural Hungarian Region in the Light of Talent Geography Research

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Abstract

Talent geography research has a relatively long history in Hungary, but the number of studies on the subject is still relatively small in the post-change period (since 1990). Most of the research published so far includes national-level analyses, which also reflect differences at lower territorial levels, but few works have so far been published that have specifically analysed the talent geography of a Hungarian small area/region.

As a prelude to the present study (in 2021), written enquiries were made to the heads of departments and institutes of some thirty Hungarian-language higher education institutions (only universities, no colleges) in Hungary and four Hungarian-language institutions beyond the borders of Hungary (this amounted to a total of some 200 written enquiries), which resulted in the collection of data on their former and current staff (talent) with outstanding life achievements. In addition, a Hungarian sample of around 3,000 people from the Carpathian Basin was compiled from scientific and academic websites, textbooks and journals.

The special topicality of this article is that in 2023, two Hungarian scientists were awarded the Nobel Prize, the most famous scientific award: one of them, biochemist and research biologist Katalin Karikó grew up and completed her primary and secondary education in Kisújszállás, a small town in the Greater Cumania region (another town in Greater Cumania, Karcag, is the birthplace of biochemist Ferenc Herskó, who was awarded the Nobel Prize in 2004).

In the present research, the authors have examined the settlements and talents of Greater Cumania and their interrelationships: the study provides a talent geography analysis of the life paths of persons with outstanding life achievements associated with traditional Greater Cumania. In total, the authors have carried out geographic aspect studies on twenty-two individuals in terms of place of birth, primary, secondary (and tertiary) education, career stages and place of death.

In the case of the settlements of Greater Cumania, it is also observed – as in other small districts – that after leaving secondary school, people with outstanding abilities continue their lives in settlements with better learning conditions. Most of them do not return ‘home’ (in the case of Greater Cumania, none of the persons surveyed), because they cannot find a job that matches their skills and ambitions after graduation. It is reasonable to conclude that the efforts of the peripheral inner Greater Cumanian small towns to improve their situation may even be counterproductive, as it is probably difficult to resolve the contradiction that their efforts to uplift their own society in the medium and longer term actually make the successful metropolitan centres richer. The research has shown that the natives of Greater Cumania had to leave their homeland, and many of them the country, to become successful scientists, artists or sportsmen – and that this is not only a moral but also a socio-economic loss for the region and the individual settlements, which further weakens local societies and significantly reduces their chances of catching up and development.

396 The Impact of Széchenyi István University on the Economic and Social Development of the Transdanubian Region

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Abstract

In my writing and presentation related to the conference, I seek answers to fundamental questions regarding the responsibilities of a 21st-century university as expected by external regulators and voluntarily assumed by itself, as well as how the success and achievements of a university can, and should, be measured. I also explore how the outcomes of institutions can influence the social and economic development of the region where the higher education institution is incubated.

Despite significant changes in perceived and actual tasks expected from higher education institutions over the centuries, two fundamental conditions remain unchanged a university can only function as such if students choose its programmes when selecting institutions, making the attraction and retention of applicants an eternal task and objective for every university. It is not only a general truth for higher education institutions that financial-economic sustainability is primarily necessary for successful operation. Based on the above, the question narrows down to what is expected from universities, besides important educational activities for students and ensuring financial sustainability, how the impact of institutions on regional social and economic aspects can be measured, and whether it is expected that the impact of institutions should be measurable nationally and globally. It is important to note that adequate financial resources and assets are not a guarantee of success but rather a necessary, albeit not sufficient, precondition, requiring goal-oriented institutional strategy, disciplined execution, and committed employees.

In my presentation and writing, I elaborate on how Széchenyi István University in Győr interprets these questions and provides answers to them. I delve into the possibilities of measuring the effectiveness of educational, scientific, and third mission activities, how domestic and international students choose higher education institutions based on different criteria, what the commonalities and differences are, and how a globally competitive institution can meet the requirements of both sets of criteria. I outline the operational framework ensuring the financial-economic sustainability of Széchenyi István University, the content of our positions in global rankings, the main motivations for compliance with rankings, and why the relationship between a higher education institution and the city hosting it is exceptionally important in terms of the global visibility of higher education institutions, and I also discuss national standards used by evaluators to measure the relationship between higher education institutions and the cities hosting them, and whether this can be adapted to the Hungarian context.

397 Spiky Metropolitan Landscapes: An Urbanometric Analysis of Growing Agglomerations

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Abstract

The spatial configuration of urban systems has garnered significant interest from various disciplines, including urban planners, economists, and ecologists, due to its interconnectedness with various aspects of sustainable development. Research on urban form suggests a departure from the conventional model of a gradually declining density gradient from the city center, giving way to a "spiky" urban landscape characterized by a heterogeneous polycentric pattern. This study aims to examine the recently emerging spiky structure of an urban agglomeration, providing insights into the potential prospects of cities. We adopt a new quantitative modeling approach inspired by spatial econometrics and coined here 'urbanometrics'. By utilizing and testing spatial dependence urbanometric models, we seek to elucidate the factors driving these changes, with a specific focus on pluriform urban sprawl in the Mediterranean region, specifically the Izmir city-region. The findings indicate that since the early 2000s, the Izmir city-region has experienced simultaneous decentralization and the emergence of multiple centers, with sharp differences. Furthermore, the results demonstrate that the expansion of highway infrastructure, population growth, and available convertible land contribute to urban sprawl and the emergence of a "spiky" urban landscape.

398 **An Update on the Economic Impact Analysis for the Development Projects of March Joint Powers Authority in Southern California**

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Abstract

Economic impact analysis (EIA) is frequently conducted to assess the potential effects of policies, plans, and projects. Yet, the effects of many economic impact studies lack validation, posing challenges in accurately evaluating the true effects of these initiatives. In 2016, an EIA study was completed to estimate the regional economic impacts of airport development projects in the March Joint Powers Authority (March JPA) located in Riverside County of Southern California. The March JPA has been planning and implementing new uses for currently vacant lands, reuse of existing facilities, and joint use of the airfield facilities. The 2016 EIA study reported the impacts of development projects in 2016 and also projected the economic impacts of a full-build out scenario by 2030. It's intriguing to note that the March JPA development projects are still progressing according to the estimates from the 2016 EIA study, particularly considering the challenges posed by the COVID periods. This study updates the Southern California Planning Model (SCPM), building upon an earlier version utilized in the 2016 EIA study. The newly updated SCAPM is employed to trace the regional economic impacts of the present March JPA's development activities at a high level of sectoral and spatial disaggregation. Comparing the modeling results from 2016 to 2023 reveals a significant increase in the economic impacts of the March JPA, with employment multiplying sixfold and production multiplying eightfold. The updated long-term projections for employment and production growth also align with the previous forecasts made in 2016. These findings serve as a robust example of the efficacy of spatial planning models in Economic Impact Assessment (EIA). They also demonstrate how EIA can facilitate collaboration between the March JPA and local communities, enabling more efficient execution of development projects and equitable cost-sharing.

399 Towards a “Large Model” for Predicting Regional Industrial Growth from the Perspective of Industry Relatedness

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Abstract

Industrial relatedness (and related with it, economic complexity) has offered a compelling perspective for understanding the evolution of national and regional economy, which is proven to be predictive for economic growth, innovation, and industrial upgrading. However, existing research in this stream of literature mainly adopt a dimensionality reduction approach, which aims to summarize the relationship between industries and the sophistication of economies with a single number. Despite the sophistication in the construct of these metrics, this approach runs the risk of over-compressing a significant amount of information on the interaction between industries and the detailed structure of an economy. To compensate, this research aims to pursue a divergent approach in explaining and forecasting the growth of regional economy, by constructing a 'large model' that leverages the full information on the intricate structure and dynamics of the studied regions. The study employs a newly-available large data set comprising all Chinese enterprise registry information with 3-digit level industrial classification (420 classes) between 2010 and 2023, covering all 337 Chinese city-regions. This data set is processed with a summary data set of the Third National Economic Census to construct a machine learning model that predicts the size of an industry in a city-region based on the number and size of the registered enterprises. These procedures generate a further panel data set on the annual size of the 420 industries in each of the 337 Chinese city-regions over the study period. Besides, the study also collates the data on the natural and human resources of the city-regions from the China City Statistical Yearbook, as well as industrial policies from provincial governments' 12th, 13th and 14th Five Year Plans. Building upon these data sets, machine learning methods are employed to develop forecasting models for the growth of each industry in a city-region based on the conditions of other industries in the city-region, the natural and human resources, and the government's supportiveness in the previous year. Such models are possible thanks to the size of the samples (337 city-regions × 13 years). Dedicated forecasting models are created for each industry, collectively forming an extensive model set comprising hundreds of thousands of parameters. The study then calculates the importance of the input features and evaluates how the existence of an industry would contribute to the growth of another industry, which can be interpreted as a dynamic view of industrial relatedness.

400 Examining the Impact of EU Funding in the Mezőkövesd District in 2014-2020, with a Special Focus on Job Creation and Economic Development

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Abstract

The county of Borsod-Abaúj-Zemplén has been characterised by lower economic development than the national average in the last development period for a number of reasons. The capacities previously producing for the Comecon market proved to be outdated and uncompetitive in the new market conditions after the regime change. Foreign working capital has been concentrated in western areas, which are geographically close to western markets and infrastructure networks, while investment has tended to avoid the peripheral eastern regions. Despite the economic growth in the 2010s, the region remains lagging behind and at a competitive disadvantage compared to more developed regions.

The emergence of EU funding is generally considered to generate a growth surplus where the funds are used. This is because EU regional policy aims to promote economic growth, job creation and an improved quality of life through investment, i.e. to reduce economic and territorial disparities, increase employment and reduce social disparities.

As the 2014-2020 EU cycle draws to a close, our study examines the extent to which the Community-Level Policy has been able to meet community expectations in terms of its objectives, the extent to which the related performance indicators have been met and the impact on Borsod-Abaúj-Zemplén county and the settlements of the county's territorial unit under study.

Keywords

Aid, public involvement, investment, enterprise, municipality, impact.

401 Rethinking Tunisia's Transition to Sustainability in Connection with the New Territorial Division

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Abstract

Tunisia experienced relatively high economic growth rates (around 5%) before the January 11, 2011 revolution. Despite this performance, regional disparities persisted and were the cause of the popular uprising of 2011. The demand for wealth redistribution among regions was one of the main demands of the Tunisian revolution. In 2011, the Tunisian Institute of Competitiveness and Quantitative Studies (ITCEQ) initiated the development of a Regional Development Synthetic Indicator (IDR) to address this need. The IDR was implemented in July 2012 and has been regularly used as a means of monitoring and evaluating the state of regional development in the country. Since then, despite multiple political and socio-economic changes in the country and worldwide, the calculation formula for this indicator has not been revised. In 2023, a new regional distribution was adopted by Tunisian public authorities. The question arises as to whether this indicator is still suitable for the new regional context and for a real transition of the country to sustainability.

The idea of this work is to review this indicator by relating it to the achievement of Sustainable Development Goals (SDGs) at the regional level and to monitor regional dynamics through the indicator found. Based on proxy variables of SDGs, a regionalized database was developed. After exploration, a synthetic index of regional development derived from data factorization and classification was constructed, normalized, and compared to the commonly used indicator. Our results show that despite the deployment of several differentiated strategies for regional development, classic poles of unemployment, poverty, and underdevelopment persist. The level of regional development has shown a slight smoothing of the peaks associated with it while remaining within the same "bandwidth." Mapping of the regions confirms the classic IDR and highlights the urgency of integrating the environmental component.

402 The Impact of Socially Responsible Consumption on Nostalgic Perception: The Case of Local Food Products

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Abstract

Consumers' nostalgia plays a considerable role in their choice of local food products, which are perceived as socially responsible, committed, favouring local products and rejecting the industrialisation of the food market. The theoretical findings of our research can be summarised as follows:

- Consumer nostalgia has the ability to influence consumer behaviour on an emotional level (Davis, 1979) and on a cognitive level (Holbrook and Schindler, 1994).
- Nostalgic perception, which is a mental reading of the environment at a given moment and which may be real, physical, observable and captured by all our senses, has attracted the attention of marketing researchers (Havlena and Holak, 1991; Kessous, 2009). Research on nostalgic perception diverges on the characteristics of the emotion that is nostalgia aroused by this reading, which are just as multiple and depend on the approach of each author (Gharbi, 2011).
- The propensity for nostalgia as a personality trait could influence nostalgic responses (Holbrook and Schindler, 1991).

In terms of empirical findings, we note first of all that Fort and Fort (2006) argued that consumer nostalgia plays a considerable role in the choice of terroir products and that little research has explored the triggers of nostalgic perception (Bartier 2014/ Rana 2020). Our aim is to show that socially responsible consumption can play an activating role in the perception of nostalgia, given the moderating role of the propensity for nostalgia in the consumption of local food products. For the empirical study, we chose to work on local food products because of the values they represent for consumers. Indeed, terroir products convey a regional identity and, for consumers, are emblematic of a heritage, a past, and therefore an identity that they are proud to claim. This can be explained by a number of factors (Merle and Piotrowski, 2012), such as reducing health risks, rediscovering the real taste of food, consuming responsibly and developing social ties.

Methodology of empirical research:

Finding aids: Questionnaire

Sampling method: Convenience sampling

Sample size: 210 individuals

Data analysis methodology:

Positivist approach with a hypothetico-deductive approach

Purification of measurement scales: PCA on SPSS 23

Estimation of the conceptual model on AMOS 23

- Global model: Chi square, GFI, AGFI, RMR, RMSEA, TLI, CFI, normalised χ^2 , BIC/saturated BIC

- Measurement model (AFC): Internal consistency reliability; Convergent validity; Discriminant validity

- Multi-group analysis

The results of the survey of 210 respondents showed that the volume of consumption, the purchase of shared products and small-scale retailing all play a role in activating nostalgic perceptions. The propensity for nostalgia as a personality trait influences nostalgic responses.

Keywords

Nostalgia; nostalgic perception; CSR; local food products; propensity for nostalgia.

403 Sustainability and Environmental Aspects of the Increased Adhesive Joint Strength of a Surface Treated Metals and Polymers

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Abstract

This study focuses on the sustainability and environmental benefits achieved through the enhanced adhesive joint strength of surface-treated metals and polymers. By adopting specific surface treatment technologies, including laser and cold plasma treatments, we significantly increase the adhesive joint strength between metals and polymers. This improvement in adhesive efficiency enables a reduction in the quantity of adhesive material required, leading to both economic savings and a decrease in environmental impact. The research systematically examines the effects of microtopography modifications on the adhesive joint strength and explores the potential for adhesive material savings. Experimental results demonstrate that targeted surface treatments can lead to a notable increase in joint strength, thereby permitting the use of lesser adhesive quantities without compromising the joint's integrity. This approach not only contributes to material efficiency but also aligns with the principles of sustainable manufacturing and green chemistry by minimizing waste and reducing the environmental footprint of adhesion processes. The findings offer valuable insights for industries seeking to enhance the sustainability of their bonding applications, particularly in sectors such as automotive, aerospace, and electronics, where high-strength, durable adhesive joints are essential. The sustainability and environmental benefits of increasing the adhesive joint strength through surface treatment of metals and polymers can be achieved and understood through several key findings:

Reduced Adhesive Quantity: Specific surface treatments, particularly the turned, sandblasted, and plasma-treated surface, significantly increase the adhesive joint strength. This elevated strength implies that less adhesive material is required to achieve or maintain the desired bond strength, leading to material savings. Less adhesive use translates directly to reduced environmental impact, as it minimizes the production and disposal of adhesive materials.

Waste Reduction: The surface treatments enhance the wettability and adhesive properties of the materials, which not only improves bond strength but also potentially reduces waste during the manufacturing process. Better adhesive properties mean fewer errors and retries, resulting in less waste generated and a lower environmental footprint.

Longevity and Durability: Enhanced adhesive joint strength contributes to the longevity and durability of the bonded components. This means that products may have a longer lifespan and require less frequent replacement, reducing the demand for raw materials and energy for manufacturing new products, and decreasing the volume of waste sent to landfills.

Chemical Savings: The surface treatments modify the chemical composition and physical properties of the materials' surfaces, leading to improved adhesive properties without the need for additional chemical additives or bonding agents. This can lead to a reduction in the use of potentially harmful chemicals, aligning with the principles of green chemistry.

Keywords

Adhesives, metals, savings, surface treatment.

404 IDM-Based Modelling and Validation of Roundabouts Based on Real Measurement Results

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Abstract

The primary goal of our research is city-level traffic optimization. As a first step, we aim to develop optimization algorithms for a specific roundabout. These algorithms will be developed in a simulation environment.

To facilitate this, we have created a model in the CARLA simulation environment that functions equivalently to the above-mentioned roundabout. In order to construct this model, we determined the real roundabout's parameters using manual traffic counting methods.

406 Estimation of the "Critical Time Gap" in a Roundabout Using Microsimulation and Video Based Traffic Measurement

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Abstract

In this study we determine the critical (time) gap on an entry lane of a roundabout subjected to traffic over its capacity limit. First, we identify the flow of traffic and the average speed of the roundabout based on video recordings. Then we reconstruct the traffic situation within the roundabout using our own microsimulator based on an Intelligent Driver Model. By gradually adjusting/altering the value of the critical gap in the simulation, we specify the threshold at which the actual output capacity of the overloaded lane is reproduced by the simulator. The presented method and the obtained results show that the crucial traffic parameters of roundabouts can be successfully determined via video-based traffic measurements and a traffic microsimulator.

407 Improving Intrusion Detection: Picking the Best Features for Behaviour-Based Systems

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Abstract

In today's digital age, safeguarding business IT systems from cyber-attacks is considered essential. Intrusion Detection Systems (IDSs) play a crucial role in this regard. Among them, Behaviour-based IDSs (BIDSs) hold significance due to their ability to promptly detect anomalies in network traffic, a pivotal factor in thwarting attacks. BIDSs operate through two main stages: training and detection. To construct a robust detector, the system is exposed to both normal and attack data during the training phase. Feature selection and data simplification are integral components of this process, aimed at aiding the system in effectively distinguishing between benign and malicious activities.

In this study, various methods were employed to select features and simplify data using a well-known sample dataset containing traffic records for five attack types as well as benign traffic. The focus was on developing binary classifiers, which can distinguish between attack and normal traffic situations. Therefore, five different datasets were used, each of them containing data corresponding to only one threat and normal traffic. Feature scores were determined for each case separately with different methods, and for the case of each dataset, they were normalized and aggregated to determine the most effective approach to enhancing BIDS performance. Two different approaches were tried for determining the optimal feature score values that allow the definition of a feature score threshold above which the features can be labeled as relevant ones. This approach resulted in significant dimensionality reduction for each investigated attack type.

408 Mechanical Properties of Recycled Polypropylene Nanocomposites in Function of Time and Temperature

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Abstract

In this study, the effects of multi-walled carbon nanotube (MWCNT) content and recycling on the mechanical properties and time and temperature dependent mechanical properties of polypropylene homopolymer (PP) were investigated. The nanocomposites and their recycles were prepared using twin-screw extruders with 0.3, 0.5 and 1 m/m% MWCNT content and test specimens were injection molded.

The results of the mechanical test showed that the PPH/MWCNT reciklatelets exhibited an increase in elastic modulus of ~4% at 0.3 m/m%, ~9% at 0.5 m/m% and ~11% at 1 m/m% reinforcement, compared to the unfilled PPH base material. A negligible increase was observed in the stress values associated with the neck formation a significant decrease was observed in the tensile elongation values

Based on the dynamic mechanical results, it was found that the incorporation of MWCNTs improves the storage modulus values over the whole measurement range.

From the creep to failure results, it was found that due to the favorable mechanical properties of MWCNTs and their effect on stiffness, the creep tendency of composites and their reciklazation was significantly reduced.

