

Integrated investment for improved regional competitiveness of Slovak Regions: Human Agency and Regional Innovation

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Abstract

As regions emerge as critical drivers of economic growth and development, understanding the dynamics of these economic agents becomes imperative for policymakers and stakeholders seeking to enhance regional prosperity. This research delves into the potential roles of existing economic agents/tools, including actors and agencies, for integrated investment proposals. The research is about how to plan integrated investments for improved regional competitiveness for Slovak self-governing regions by considering the soft factors for regional competitiveness with a special focus on underdeveloped regions including regions affected by attenuation of mining activities and negative related side effects.

Through a mixed-method approach, our investigation synthesizes relevant literature on regional innovation and competitiveness; we analyze the intricate interactions and alignments of actors and agencies, exploring how their dynamics contribute to the region's ability to attract and leverage investments for promoting innovation and competitiveness.

This research contributes to the ongoing dialogue on effective strategies for regional economic development and offers actionable recommendations for policymakers, businesses, and stakeholders to benefit from the potential. Ultimately, our investigation seeks to empower decision-makers with the knowledge needed to place-based/place-sensitive policies and initiatives that facilitate innovation, foster competitiveness, and drive regional success to new dimensions.

Keywords

regional competitiveness, integrated investments, human agency, regional innovation, Slovakia, mining regions



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Introduction

In an increasingly interconnected and dynamic global economy, regions have emerged as critical units of analysis in understanding economic growth, innovation, and competitiveness. Pursuing regional prosperity has become a focal point for policymakers, scholars, and businesses alike. The rise of regional economic development strategies has necessitated a comprehensive understanding of the intricate web of actors and agencies that contribute to the enhancement of innovation and competitiveness within a specific geographical area. Our research endeavours to explore the potential roles of existing economic agents/tools for Slovakia, comprising actors and agencies, economic tools to propel further investments in favour of regional innovation and competitiveness.

Regions are the crucial elements of innovation, where diverse actors interact, networks form, and knowledge is generated, diffused, and exploited. At the heart of these intricate processes are the economic agents that underpin the very fabric of regional ecosystems. Actors, ranging from firms and entrepreneurs to universities and research institutions, play pivotal roles as catalysts of innovation and drivers of competitiveness within their respective domains. As one, governmental agencies act as enablers, orchestrating policies, providing infrastructural support, and nurturing collaborative initiatives to foster an innovation-encouraging environment.

The essence of our research question lies in understanding how these economic agents interact, align, and coalesce primarily at the national level and how the up-level dynamics influence the region's capacity to attract and leverage investments for fostering innovation and competitiveness. Methodologically, this study will adopt a mixed-method approach, combining qualitative analyses to uncover the intricate interplay of national and supranational agencies and a descriptive approach to reflect the impact of resource allocation on regional innovation and competitiveness.

This article is structured as follows: firstly, we provide a thorough literature review, which synthesizes relevant theoretical frameworks and empirical studies on regional innovation and competitiveness, economic agents, and their interaction. Afterwards, we elucidate the conceptual framework of our research, examining the complexities of actors and agencies and their linkages to innovation and competitiveness. Next, we present our research methodology, detailing the data sources and descriptive techniques employed. Following this, we present the findings of our study, unveiling the roles played by Slovakia's economic agents/tools in fostering innovation and bolstering competitiveness. Finally, we conclude with a discussion of the implications of our research and propose actionable recommendations for policymakers, businesses, and regional stakeholders to capitalize on the potential identified in Slovakia.

Theoretical Background

This section presents a comprehensive overview of research and literature related to the topic at hand, encompassing both international and locally published research. The combined insights from international and local research contribute to exploring the subject, enriching our understanding and paving the way to discussions and analysis in the following chapters.

The current stage of the research on an international scale

This section explores the relationship between agency and regional development, with a specific focus on competitiveness and innovation at the regional level. It also provides valuable insights into the complex dynamics and capacities of the integration and integrated investments.

Agency and regional development

Regional development studies increasingly consider agency in understanding local and regional growth. Sotarauta and Grillitsch (2023) argue that the goals, aspirations, and skills of prominent individuals significantly impact regional development. Organizations provide individuals with the social positions they need. Research on human agency in regional development aims to understand the relationships and interactions between human behaviour and socially produced structures, emphasizing the need for human action to replicate and change systems.

Human agency can be defined as the capacity of individuals to engage in deliberate and purposeful actions which hold significance and intentionality, leading to both intended and unintended outcomes. On the other hand, change agency pertains to human efforts to instigate alterations or transformations with specific goals in mind (Grillitsch & Sotarauta, 2020).

Certainly, research on human agency diverges from the conventional micro-perspective commonly employed in economics and related regional studies. Unlike the assumption of homogeneous behaviour among actors in a particular context, studies on human agency focus on understanding the outcomes that emerge from a diverse range of intentional actions. Instead of aggregating similar actions, these studies delve into the complex interplay of various actions that may either reinforce or contradict one another (Karnøe and Garud, 2012). This

approach allows for a more deliberate examination of how human actions contribute to emergent and often multifaceted consequences.

The work by Grillitsch et al. (2021) adds to the literature on regional economic growth by enhancing the theoretical and analytical approach of human agency in structural change processes. They present a layered ontology of agency that elucidates the interconnections between the agency exerted by individuals, organizations, and social systems. This framework allows for a comprehensive exploration of how individual actions are influenced by organizations and systems (downward causation) and, in turn, how individual actions can also shape these entities (upward causation). The study identifies the Trinity of Change Agency (TCA), which consists of three essential types of change agency: innovative entrepreneurship, institutional entrepreneurship, and place-based leadership. Additionally, it emphasizes the significance of both firm-level and system-level agencies in regional change, indicating that fostering regional development requires not only the agency of firms but also that of actors within the regional support system for innovation and entrepreneurship. The key takeaway is that while human-made organizations and social systems possess agency, this agency cannot be reduced to the mere sum of individual actions. Institutional logic embedded in systems and organizational routines influences the exercise of power by individuals and the resultant effects of such actions. In essence, change agency is a causal power inherent to human beings, which is activated selectively in certain situations rather than being in effect all the time (Grillitsch et al., 2021).

Human agency framework in regional development, as shown in Fig. 1, refers to the pivotal directions of organizations and systems in shaping and driving the reproductive and change agency in a particular geographical area.

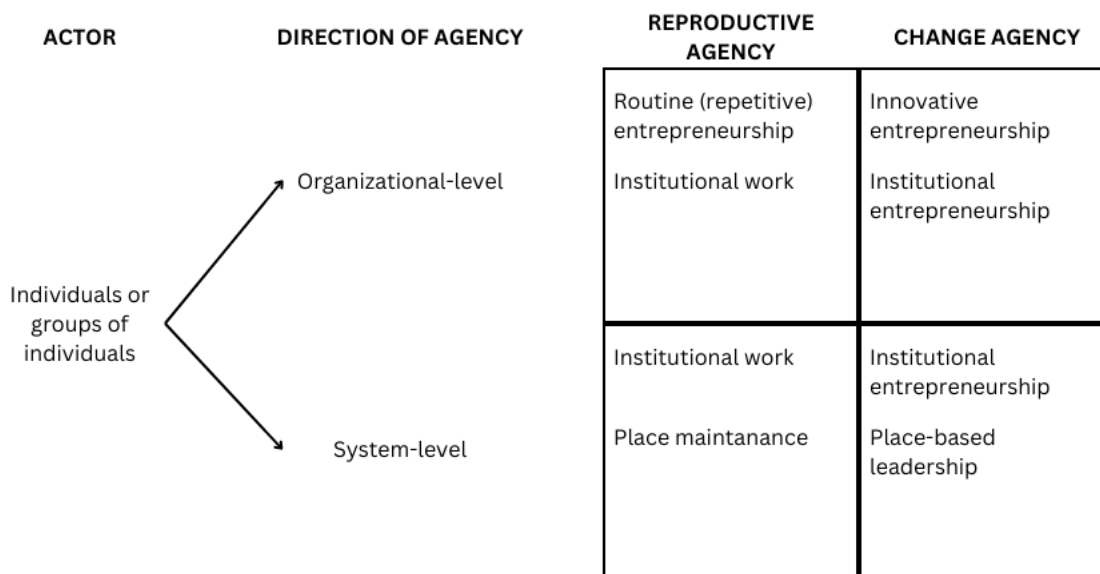


Fig. 1 – Human agency and regional development framework. Source: Blažek & Květoň (2022)

According to Blažek and Květoň (2022), "a substantial amount of work has yet to be done to properly conceptualize the role of non-local/non-regional actors and to unravel the modalities of interactions between them and regional actors and their impacts".

Sotarauta & Grillitsch (2023) put into perspective the emerging literature on agency and "how it has increased our understanding of what people do or fail to do for their regions". However, many scholars have faced challenges in providing novel conceptual lenses in a discipline more accustomed to studying structures. To better understand the place of agency in regional development, studies should investigate bottom-up causation, consequences of human actions on socially produced structures, and top-down causation, revealing how structures form patterns of agency. Hidden processes and mechanisms must be unrevealed to understand better the complex relationship between agencies and structures in regional development (Sotarauta & Grillitsch, 2023).

As Blažek and Květoň (2022) highlight, the role of human agency in regional development becomes even more apparent when examining change agencies operating at the regional level. These change agencies, as exemplified by Blažek and Květoň in Fig. 2, serve as tangible illustrations of how individuals, organizations, and

communities actively shape the developmental trajectory of a region. Their work provides a valuable list of regional actors, which, while not exhaustive, serves as an essential foundation for further empirical investigations into the multifaceted roles and dynamics of these actors in regional development processes.

Example of actor	Organizational -level agency	System-level agency
Company	Introduction of a new technology	Engagement in policy debates fora with various stakeholders
University	Introduction of new career rules for academics	Opening of a new study programme to address regional needs
Regional intermediaries (innovation centers, science parts, development agencies etc.)	New internal organizational structure	Provision of services to various companies (start-ups, mature companies) and/or talent attraction programmes to enhance the regional innovation system
Regional self-government	Introduction of a new internal structure or administrative procedures	Effort of regional representatives to provide vision for the region and/or to enhance consensus, trust and collaborative culture among regional actors

Note: While in the case of some actors the prevailing type of agency can be foreseen, in the case of other actors the prevailing type of agency remains an empirical question (e.g. in the case of research and development centers or universities)

Fig. 2 – Regional actors of organizational and system-level agency. Source: Blažek and Květoň (2022)

Integration and Integrated investments

Integration means connectedness and interconnectedness; that is, management in the context of its main tools follows all dimensions of integration as a basic assumption of a system approach. However, at the same time, it also reflects the problematic and material connection in the structure of approaches and implementation tools in their mutual connection. It is also an approach to solving the most challenging contemporary issues that cannot be addressed by a single jurisdiction or from a single perspective (Ran and Nedovic-Budic, 2016). This is crucial in solving the complex challenges that society is currently facing and for which the sectoral approach to the solution is largely insufficient. Integration also implies coordination of strategy-making in order to avoid conflicting policies and to foster a generation of win-win situations (Vigar, 2009).

Integration and integrated policies are linked with viewing spatial planning as more than just a land-use-focused regulatory activity (Vigar, 2009) since it is moving more towards planning, being seen as a way of integrating policies across sectoral, organizational and territorial boundaries (Kidd, 2007; Buser & Farthing, 2011). Perceiving planning, according to Davidoff and Reiner (1962), is a rational and systematic process of guiding public and private actions and influencing the future by identifying and analyzing alternatives and outcomes; planning provides tools for supporting vertical and horizontal policy integration.

In terms of health-related spatial planning, Kidd (2007) asserted that integration can be viewed through three dimensions: (1) territorial, (2) sectoral, and (3) organizational. Expanding on this concept using developments in spatial planning, Vigar (2009) emphasized that integration entails interactions among these dimensions. In the context of governance enhanced by spatial considerations, Sutanta et al. (2010) developed a framework that underscores the importance of data and a platform for achieving integration. In relation to horizontal integration, the European Spatial Development Perspective (CEC, 1999), a leading European spatial document since its adoption in 1999, seeks to encourage better cooperation of various European Union's sectoral policies with significant territorial impacts, and sectoral policies of member states, their regions and cities (Wong, 2002). We perceive that from a broader perspective, integration has several dimensions:

1. Problem integration

The principle of problem integration is based on the knowledge that most of the changes necessary to achieve the desired outcome have the character of complex changes. The basic goal of problem integration is,

therefore, to achieve synergistic effects between different activities and measures (across sectors). It is all the more important that implementing a certain sectoral measure is associated with the danger of a negative effect that may occur if other sectoral measures are not implemented simultaneously. For example, investments in transport infrastructure can support the growth in the number of jobs in the region by improving its accessibility for the business sector and thus also its attractiveness for investments. On the other hand, they can cause an outflow of young, qualified labour, who, due to better accessibility, leave the region for better working conditions. Therefore, it is particularly important that multiple levels of problem integration, their hierarchization and interconnection are set in the governance system.

2. Territorial integration

The principle of territorial and spatial integration is based on the knowledge that specific measures to achieve the desired change are implemented in one territory together with a number of other activities that are carried out independently, either in the context of the issues they target or in terms of who is implementing the measure. Territorial integration is, therefore, also the basis for the problematic intersectoral coordination of measures/activities. Its goal is to connect the implemented and influencing measures in such a way that they respect their givens, value their potential and create synergistic effects contributing to the inhabitants' quality of life.

3. Resource integration

The principle of resource integration is based on the notion that the carrier of development activities represents a whole range of development actors representing both the public and private sectors. Therefore, it is essential that the development strategy integrates the changes carried out by various actors and forms the basis for the integration of their capacities. This principle also refers to the integration of financial resources within the public sector from the EU resources through the state budget, the budgets of municipalities and other public entities and private sector resources to ensure maximum efficiency and expediency of use, to activate resources respecting the principle of payment to users of benefits, wider use of returnable forms of financing, purposeful use of grant financing where the benefits are non-financial and are of public interest (for example, to fulfil social policy). The goal of resource integration is the effective use of the capacities of various actors in the development processes for the implementation of the common goals of the strategy, including their human and financial capacities, increasing the commitment of actors to achieve the desired changes from which they themselves benefit effectively, more efficient use of public funds and optimization of the structure of used public funds (e.g. grants, revolving funds, investment and non-investment funds).

The concept that, in the sense of this type of strategy, becomes the basis of public sector strategies in developed countries is the concept of the "triple helix" - a triangle of interactions between public administration and civil society, the science, research and development sector and the business sector (Figure 3, based on Finka (2020)). It emphasizes that development strategies aimed at the development of local governments place the quality of life of their residents at the centre of this triangle to ensure that different types of innovations are implemented - from technical and technological to social, institutional and organizational, behavioural and environmental.

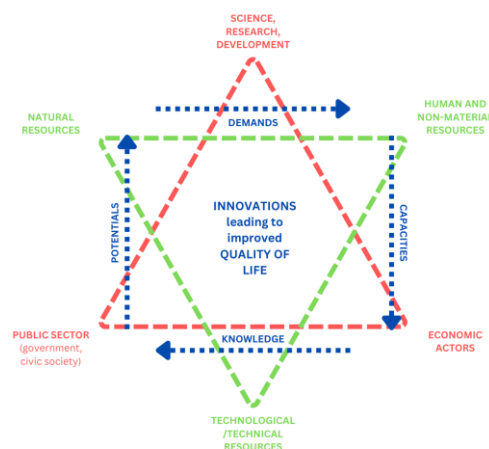


Fig. 3 – Triple Helix - a triangle of interactions. Source: Finka (2020)

4. Hierarchical integration

Actors representing different hierarchical levels, from national through regional to local, participate in the implementation of the desired changes, while individual activities/measures are implemented at the level where it is most efficient, together with measures implemented at other levels. The principle of subsidiarity also has an important coordination and subordination dimension. The goal of hierarchical integration is to link individual levels of development entities, including levels of state administration and local self-government, within the framework of individual problem-based integrated development programs based on the principle of subsidiarity.

5. Temporal integration

The implementation of the development strategy means implementing several system changes – innovations and other management interventions, very often in various functional subsystems (e.g. technical infrastructure, education system, energy, services). The effects and effectiveness of the introduced innovations usually depend on their synergistic interaction, but their implementation requires different time and timing. Moreover, innovations are usually implemented in subsystems with different development dynamics (innovation cycle) and response dynamics, i.e. the time between the implementation of the intervention and its expected and unexpected effect, positive or negative. Moreover, this effect can be directly conditioned by the implementation or non-implementation of another intervention/innovation. Therefore, time integration is particularly important in strategic management.

The current stage of the research on a local scale

This section provides a comprehensive overview of the diverse research conducted on relevant topics concerning the Slovak Republic. The research explored in this section covers various aspects of the country's economic growth, labour market development, innovation capacity, and regional competitiveness. Additionally, it delves into the dynamics of human agency and change agency in the context of regional development within Slovakia. This section aims to offer valuable insights into the multifaceted factors that influence the nation's existing situation and progress by examining a range of studies.

Scholars have recognized the significance of understanding the specific dynamics at play within the Slovak and Eastern European contexts to devise targeted strategies for regional economic growth and development. This journal has served as a platform for several seminal contributions that shed light on the intricacies of the region's innovation ecosystem. Previous publications have explored topics such as FDI impact on growth (Simionescu et al., 2017), the biggest obstacles to competitiveness for Slovakia (Malega et al., 2019) and labour market dynamics (Koisova et al., 2018). By building upon this journal's existing body of knowledge, this research aims to advance our understanding of the current stage of regional innovation and competitiveness in Slovakia, identifying opportunities and challenges that can inform future policies and initiatives.

Findings from Simionescu et al. (2017) research, including the period of 2003 to 2016, show that the V4 countries (Czech Republic, Slovak Republic, Hungary, Poland) and Romania may face significant social and political challenges due to a prolonged slowdown in their growth dynamics. This could hinder their ability to catch up with the developed countries in the European Union, leading to potential adverse effects on their economies. To overcome this, these nations need to identify solutions for achieving sustainable growth and enhancing their international competitiveness. The primary findings indicate that Foreign Direct Investment (FDI) positively impacts economic growth in all the countries studied except for the Slovak Republic.

Correlations with GDP growth were observed (Simionescu et al., 2017):

1. Expenditure on Research and Development (R&D) negatively correlated with Slovakia's economic growth.
2. Foreign Direct Investment (FDI) positively impacted economic growth in all countries except the Slovak Republic.

The growth and development of the job market in the Slovak Republic are closely tied to the economies of foreign business partners, confirming the findings related to the specific impact of Foreign Direct Investment (FDI) in the country. The business sector in Slovakia is highly responsive to economic downturns abroad, as evidenced by the recent economic crisis, which resulted in reduced employment opportunities and a sluggish rise in salaries (Simionescu et al., 2017).

Fig. 4, referenced from Malega et al. (2019), offers a comprehensive insight into the major hurdles obstructing competitiveness within the Slovak Republic. By visually representing these obstacles, the figure serves as a valuable tool for interested parties in understanding the critical factors influencing the nation's economic and business scenery. Their research provides a structured framework that helps identify and prioritize these challenges, encompassing a spectrum of issues ranging from the low-quality education system to inefficient labour market constraints.

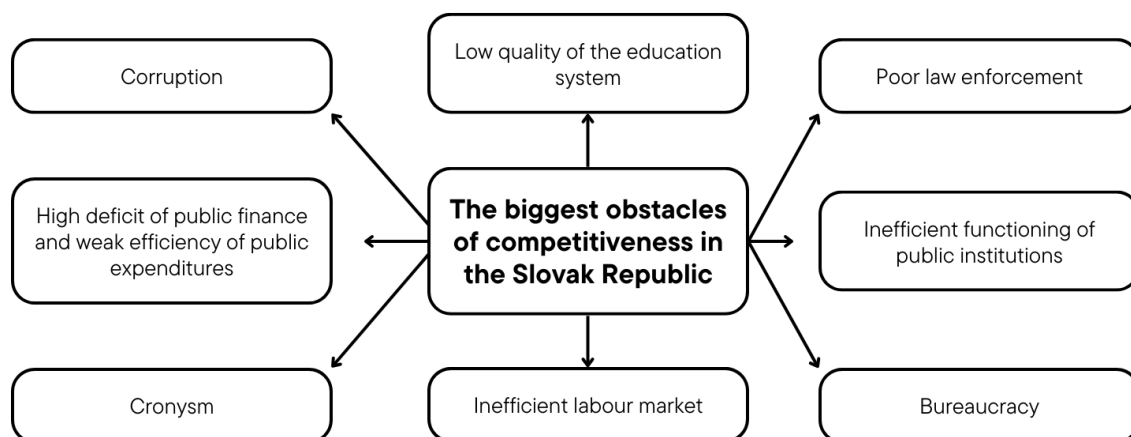


Fig. 4 – Obstacles that decrease the competitiveness level in Slovak Republic Source: Malega et al. (2019)

Slovakia faces a notable drawback concerning its limited innovation capacity, which stems from the quality of its scientific and research establishments, inadequate government collaboration with companies, and relatively low investment in research and development activities (Malega et al., 2019).

Slovakia's labour market evolution was primarily influenced by various shifts that took place during the economic transformation, the country's entry into the European Union, and the subsequent global economic crisis (Koisova et al., 2018).

Research objective, methodology and data

State of the art of the Slovak Republic's science and technology and innovation policies

In this case study, we are using the data collected from European and Slovak national databases that were elaborated for the preparation of the Recovery and Resilience Plan for the Slovak Republic and National Strategy of Research, Development and Innovations 2030 (Office of Government of the Slovak Republic, 2023). This document was prepared as a part of the post-COVID-19 pandemic measure aimed at revealing the strengths and weaknesses, as well as opportunities and threats of the Slovak Republic in the area of research and innovations. Compared to the rest of the V4 countries, not mentioning the rest of the European Union, the Slovak Republic is below average in the majority of indicators, and we argue that one of the key grounds for this is the lack of integrated and integrative policies and policy-making that is leading to inefficiency of public policy making and public spending.

The second source of data is the analytical synthesis of relevant data provided by the Partnership Agreement of the Slovak Republic 2021 – 2027 (Ministry of Investments, Regional Development and Informatization of the Slovak Republic, 2022), which is the main implementation document of the European Cohesion Policy in the period 2021 – 2027. Further, in this part, we analyze the objectives to be reached by 2030 through the lenses of integrated spatial planning.

Science, technology and innovations in the Slovak Republic – current state as of 2023

There is a strong lagging behind in funding for science, technology and innovations (STI) compared to the rest of the EU. This is true not just in relation to the EU average and compared to the leaders in STI but also in comparison to the neighbouring countries in Central Europe. In 2020, 0.92% of GDP accounted for science and research, compared to 2.32% in the EU27 (Eurostat, 2023). In 2021, moreover, the Slovak Republic fell down to the category of 'emerging innovators' according to the European Innovation Scoreboard (EC, 2021). Additionally, the National Strategy for Research, Development and Innovations explicitly states that the legal, organizational and procedural environment is set up insufficiently, and the GDP ratio of science and research needs to be increased.

The level of cooperation between the public and the private sector is low, and there is a decreasing share of Slovak enterprises with innovation capacity, which dropped from 35.6% in 2010 to 30.5% in 2018.

In terms of education and training, there is a mismatch between offered and required skills, a high proportion of secondary (58%) and university (47%) graduates working in professions that do not correspond to their fields of study, as well as a critical mismatch for professions relevant to the needs of Research and Innovation Strategies for Smart Specialization (RIS3) domains (OECD, 2020). Additional characteristics mention the changing production methods and resulting changes in the demand for skills caused by digitalization and automation (34% of jobs at risk of automation and 31% of jobs expecting change), the need to adapt and expand higher, secondary and further education options for the development of skills relevant to the RIS3

domains. Lastly, there is non-existent education focused on advanced and specific digital skills needed to fulfil the objectives of the RIS3 domains.

In digitalization, the ranking of Slovakia in the evaluation of the Digital Economy and Society Index by the European Commission (DESI 2020, DESI 2021) in both years is low – 22nd position. There is an emerging need to create conditions for the gradual digital transformation of all sectors of the economy and society, in particular, the transformation to Industry 4.0). The synchronization of public administration processes with the possibilities of a digital society is insufficient; the Slovak Republic should focus on the creation of conditions for the support of "pro futuro" goal-oriented dynamic regulations, simplification of business processes and creation of modern regulations adapted to the digital age, including de-bureaucratization of processes serving to entrepreneurs and citizens. Moreover, there is a demand for stimulating the green and digital transformation of the Slovak economy in order to eliminate its growing dependence on narrow specialization (especially the automotive and engineering industries at the moment) with high volatility in times of crisis and the impact on increasing unemployment.

Regarding the infrastructure, there is an absence of needs-defined, operationally sustainable and shared STI infrastructure reflecting regional and supra-regional needs, including its optimization to achieve the transformational goals of RIS3, concentration of resources and possibilities of use in accordance with the needs of economic practice to ensure a carbon-neutral and circular economy. Access to technological innovations is limited; there is a lack of process innovations and ineffective transfer of R&D results into practice in all RIS3 domains. The participation in the European Research Area is low – the Slovak Republic belongs to the least successful countries in EU framework programs. The interconnection of various areas of use of intelligent solutions is weak or absent, and there is an unused potential for "smart" technologies aiming to improve the functionality and long-term sustainability of urban infrastructure and increase the standard of living of residents of cities and regions through the development of Smart Cities and Smart Regions concepts. The research and innovation capacities in the fields of energy are insufficient, and their involvement in international cooperation (e.g. within The European Strategic Energy Technology Plan (EC, 2023)) is weak in connection with expected structural and technological changes caused by problems in the availability of primary energy sources. The quality of researchers is below-average compared to the average of the EU and other V4 countries; there is a low proportion of doctoral students, research and administrative staff of universities in academic mobilities, and less motivating conditions in research and development.

Tab. 1 – Summary of the European Structural and Investment Funds (ESIF). Source: own research based on the Reports on Implementation of European Structural and Investment Funds in the Programming period 2014 – 2020 (The Office of the Government of Slovak Republic 2023)

ESIF	Open calls	Contracted funds	Spending
2nd Period 2022	€ 23,494,437,457	€ 16,150,189,310	€ 10,875,521,012
1st Period 2022	€ 22,636,940,206	€ 15,171,644,042	€ 9,790,562,881
2nd Period 2021	€ 21,939,837,745	€ 14,407,345,906	€ 8,728,700,890
1st Period 2021	€ 20,024,359,536	€ 13,111,258,951	€ 7,282,637,650
2nd Period 2020	€ 19,071,851,735	€ 12,387,903,342	€ 6,434,445,265
1st Period 2020	€ 18,167,649,271	€ 11,422,671,024	€ 5,201,799,548
2nd Period 2019	€ 16,938,785,994	€ 10,504,784,260	€ 4,711,454,632

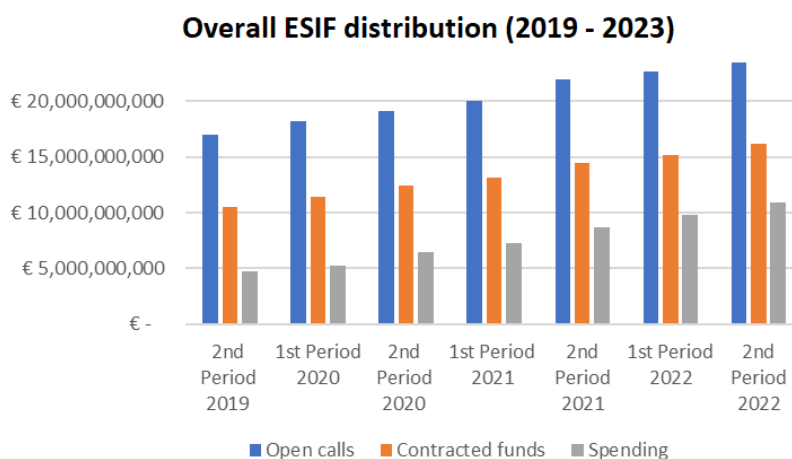


Fig. 5 – Overall ESIF distribution. Source: own research

Strategy proposed to remedy the revealed deficiencies

National Strategy of Research, Development and Innovations 2030 sets the following three goals to be achieved until 2030: (1) the Slovak Republic will progress 10 positions higher in the European Innovation Scoreboard; (2) the private spending for research and development will raise up to 1.2% GDP (currently 0.5%); and (3) the Slovak Republic will spend 2% GDP on research and development. In order to achieve these ambitious goals, the strategy was defined in a way that should significantly contribute to these goals.

Objective 1.1 is titled 'Coordination of activities and competencies' and includes the following goals to be reached by 2030:

- o Consolidated management - Grant and service support for research, development and innovation will be consolidated into one agency (by the end of 2025).
- o Predictable interdepartmental financing - 100% of public spending on research, development and innovation support will be included in the interministerial budget program.
- o Connection in regions - The share of SMEs introducing process innovations will reach 40%.

Objective 1.2 is titled 'Simplification of processes' and includes the following goals to be reached by 2030:

- o 'A researcher and innovator, not an accountant' - "Time to grant" will always be a maximum of 7 months, of which the time to a decision is a maximum of 5 months; The recipient's costs for project administration will not exceed 10% of the grant funds.
- o Removing obstacles - The share of SMEs introducing product innovations will reach 40%.
- o Linking knowledge - The number of PCT patent applications per EUR 1 billion of GDP will increase to 1.5; The volume of research and development expenditure in the public sector financed from private sector resources will reach 0.05% of GDP.
- o Open data - In the European Open Data Maturity index, Slovakia will advance from the "beginner" category to the "trend setter" category.

Objective 1.3 is titled 'Adequate funding' and includes the following goals to be reached by 2030:

- o Increased research and development budget - Public spending on research and development from the state budget will reach 0.67% of GDP.
- o Reforms of institutional financing - The share of Slovak publications that are among the 10% most cited will reach 8%; the number of international joint publications per 1 million population reaches 1,900 per year; number of joint public-private publications per 1 million population reaches 200 per year.
- o Competitive financing reforms – The share of Slovak publications that are among the 10% most cited will reach 8%; the number of international joint publications per 1 million population reaches 1,900 per year; the number of joint public-private publications per 1 million population reaches 200 per year; private spending on research and development will reach 1.2% of GDP.
- o Quality infrastructure - The share of Slovak publications that are among the 10% most cited will reach 8%; the number of international joint publications per 1 million population reaches 1,900 per year; number of joint public-private publications per 1 million population reaches 200 per year; private spending on research and development will reach 1.2% of GDP; the volume of research and development expenditure in the public sector financed from private sector resources will reach 0.05% of GDP.
- o Financing of companies - Private spending on research and development will reach 1.2% of GDP; expenditure on venture capital will reach 0.15% of GDP; innovation expenses (excluding research and development expenses) will reach 1.5% of sales.
- o Financing from the European Union - Resources for investments in research and development coming from the European Commission or other international organizations will reach 0.15% of GDP.
- o Public procurement of innovations - 7% of investments from the total budget for public procurement will be used for the purchase of innovative solutions.

Results and discussion - Integrated investments as a tool of multilevel integration

Integrated investment strategies are a key tool of multidimensional (resource, temporal, territorial, problem integration) and multilevel (national, regional, local level) integration within the development strategies of public entities. A large number of OECD and EU member states already widely apply integrated investment strategies and integrated investment packages as their implementation tool and have established mechanisms to coordinate public investments across sectors. More than two-thirds of them have developed an integrated national investment strategy with a territorial dimension. In Slovakia, this is represented by the document Vision and Development Strategy of Slovakia until 2030 and the National Investment Plan (NIP). Lack of coordination

between sectors is among the top six challenges identified by EU Member State municipalities, with almost 80% of them declaring it a major challenge.

The document "Territorial Cohesion Post 2020: Integrated Territorial Development for Better Policies", elaborated by the ESPON organization during the Bulgarian Presidency of the European Council in 2018, lists as the main tasks for cohesion policies an orientation towards integrated territorial investments based on mitigating the fragmentation of forces and capacities, on cooperation across the borders of administrative-territorial units, for a more effective system of joint management of the development and integration of sectoral policies and initiatives for better dealing with challenges and problems, positive and negative externalities of their implementation and concentration on the problem of disintegration and rising costs for all.

Integrated investment and development packages are not a new tool, even within the EU structural funds. The Regulation on Common Provisions (CPR – Common Provision Regulation) of the European Commission created a similar territorial development instrument - Integrated Territorial Investments (ITI, Article 36), which is intended to help implement the new cohesion policy in urban and functional areas. According to its recommendations, it should be used as a basis for integrated strategic management of the development of regions, municipalities, cities and their parts. Integrated territorial investment has thematic and territorial dimensions, which consist of the coordination of various sectoral policies in a specific area with specific features. In the conditions of the Slovak Republic, in terms of the Vision and Development Strategy of Slovakia 2030, these areas with specific features are mainly represented by different types of strategic-planning regions, which is also in accordance with the document of the European Commission "Scenarios for integrated territorial investment" already in 2015, which defines the integration based on: (1) a gradient to a strong centre (metropolitan regions), (2) the specificity of the conditions and needs for joint solutions of development challenges (sub-regions), (3) specific dominant development problem (e.g. conversion), and (4) the needs of cross-border cooperation (e.g. twin cities).

Integrated investment and development packages represent the implementation of 4 levels of integration:

- o strategic level: strengthening the synergy between different strategic frameworks by combining many investment priorities, measures and activities, thereby implementing a comprehensive multi-sectoral strategy for the given territory;
- o the level of funding sources: a combination of different funding sources supporting the facilitation of coordinated investments in territories and optimizing the use of individual sources;
- o territorial level: support for the integration of strategies based on the specifics and specific needs of municipalities/cities and regions built on a bottom-up approach; and
- o implementation level: based on integrated activities in the territory, i.e. the combination of various investments, activities and measures within the approach based on multiple resources with the aim of enabling the implementation of a more complex and comprehensive set of interconnected integrated projects and excluding negative and support positive effects and synergies of individual activities.

The integration of funding sources at the territorial level largely depends on the management mechanisms and selected implementation mechanisms, but increasingly also on the integration of private sector investors as socio-economic partners in the creation and implementation of the development strategy.

Private investments are often key to the economic development of a municipality/region. They cooperate with public investments, the implementation of which also benefits private investors. Therefore, it is natural that the partnership of the public and private sectors must also be the basis for financing integrated investment and development packages. These packages must, additionally, ensure the territorial integration of private and public development plans. Financing for the implementation of the entire set of activities, programs and projects implemented by various development actors (specifically, those listed in the "implementation plan") to achieve the goals integrated into the development strategies can then be secured from various public and private sources used in different modes of financing (e.g. grants, revolving funds).

Conclusions

In conclusion, this research aims to shed light on the vital roles actors and agencies play deeply embedded in the Slovak Republic's innovation ecosystem and how their interactions can pave the way to further investments, thereby contributing to enhanced regional innovation and competitiveness, especially within underdeveloped regions including regions affected by attenuation of mining activities and negative related side effects. By examining the economic agents of regional development, this study seeks to contribute to the ongoing dialogue on effective strategies for promoting sustainable and inclusive growth in an ever-evolving global economic landscape.

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