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RAKSTI

EKONOMIKA

Sergejs Ignatjevs, Atis Papins, Edmunds Čižo, Anita Kokarēviča

EVOLUTION OF THE USE OF REGIONAL GOVERNANCE TOOLS IN LATVIA WITHIN THE EU: CHALLENGES AND OPPORTUNITIES

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Latvia became a member of the European Union in 2004. From that moment on, the country set out to reshape its territorial governance. Over the past two decades, legal frameworks, administrative structures, and funding mechanisms have evolved under EU influence. This study explores the development of regional governance tools in Latvia within the EU context. It examines changes in national legislation, the creation and adaptation of planning regions, and the management of cohesion policy funds. The research combines content analysis of EU regulations and Latvian laws, a comparison with neighbouring states – Estonia, Lithuania, and Poland – quantitative data on EU fund absorption from 2007 to 2023, and interviews with government officials, regional practitioners, and civil society experts. The findings show that Latvia has not established a genuine intermediate level of government with elected regional councils. Instead, the statistical divisions defined by NUTS 2 and NUTS 3 remain purely for analytical purposes. Five planning regions operate as coordination platforms but lack decision-making authority and stable budgets. As a result, most strategic decisions and resource allocations remain highly centralized in Riga. Peripheral areas struggle with limited administrative capacity, staff shortages, and delayed access to EU funds. In 2022, GDP per capita in Riga surpassed that of Latvia by more than sixty percent, while regional absorption of EU cohesion funds varied from four to eighteen percent. Administrative reforms designed to improve fund management – such as transferring responsibilities from the Ministry of Finance to the newly formed State Regional Development Agency –

caused significant delays in project implementation, pushing back the rollout of the 2021–2027 funding cycle by nearly two years. Comparative analysis highlights alternative models. Estonia's empowered county governments receive direct budgets and legal competencies. Lithuania's regional development agencies act as autonomous development centres. Poland's voivodeships use elected regional assemblies to set strategic priorities. These approaches facilitate faster programme design, stronger local engagement, and clearer accountability. Drawing on these lessons, the study argues for a two-tier governance system in Latvia, with elected regional councils supported by professional regional agencies. It recommends targeted capacity-building programmes, user-friendly digital monitoring platforms, and mandatory consultation procedures with municipalities, NGOs, and private stakeholders. Implementing these reforms will help align Latvia's regional governance with EU cohesion objectives, reduce intra-national disparities, and enhance resilience amid digitalisation and the green transition.

Keywords: regional governance, institutional transformations, Latvia, European Union, digitalization, Green Deal.

Reģionālās pārvaldības instrumentu izmantošanas attīstība Latvijā ES ietvaros: izaicinājumi un iespējas

Latvija kļuva par Eiropas Savienības dalībvalsti 2004. gadā. No šī brīža valstī sākās teritoriālās pārvaldības pārbūve. Divdesmit gadu garumā mainījās juridiskie rāmji, administratīvās struktūras un finansējuma mehānismi. Šajā pētījumā tiek izpētīta reģionālās pārvaldības instrumentu attīstība Latvijā ES kontekstā. Analizēta nacionālā likumdošana, plānošanas reģionu izveide un kohēzijas politikas fondu pārvaldība. Pētījums apvieno ES regulējumu un Latvijas tiesību aktu saturu analīzi, salīdzinājumu ar kaimiņvalstīm – Igauniju, Lietuvu un Poliju – kvantitatīvos datus par ES fondu uzsūkšanu no 2007. līdz 2023. gadam un intervijas ar valsts amatpersonām, reģionālo prakses speciālistiem un sabiedrības pārstāvjiem. Secinājumi rāda, ka Latvijā nav izveidots īsts starp- līmenis ar vēlētām reģionālajām padomēm. Tā vietā statistiskie NUTS 2 un NUTS 3 reģioni ir tikai analītiska kategorija. Pieci plānošanas reģioni darbojas kā koordinācijas platformas, bet tiem trūkst lēmējvaras un stabila budžeta. Lielākā daļa stratēģisko lēmumu un resursu sadales notiek centralizēti Rīgā. Pierobežas teritorijas saskaras ar ierobežotu administratīvo kapacitāti, personāla trūkumu un kavētu piekļuvi ES finansējumam. 2022. gadā IKP uz vienu iedzīvotāju Rīgā pārsniedza Latgales rādītājus par vairāk nekā sešdesmit procentiem, savukārt fondu uzsūkšana reģionos svārstījās no četriem līdz astoņpadsmit procentiem. Reformas, kas pārmēsa fondu pārvaldību no Finanšu ministrijas uz jaizveidoto Valsts reģionālās attīstības aģentūru, izraisīja ievērojamus īstenošanas kavējumus, atlikot 2021.–2027. gada fondu izlietošanu gandrīz uz diviem gadiem. Salīdzinot analīzi izgaismo citus modeļus. Igaunijā apgabalu pašvaldībām ir tieši piešķirts budžets un juridiskas pilnvaras. Lietuvā reģionālās attīstības aģentūras darbojas kā patstāvīgi attīstības centri. Polijā vojevodistēs iedzīvotāji ievēl reģionālās sapulces stratēģisko uzdevumu noteikšanai. Šie modeļi vērtē programmu izstrādi ātrāk, vietējo līdzdalību un atbildību. Balstoties uz šiem piemēriem, pētījums iestājas par divlīmeņu pārvaldības sistēmu Latvijā. Ieteikts izveidot vēlētās reģionālās padomes un profesionālas reģionālo aģentūru atbalsta struktūras. Piedāvā mērķtiecīgu kapacitātes celšanas programmu, lietotājdraudzīgas digitālās uzraudzības platformas un obligātas konsultācijas ar pašvaldībām, NVO un privātā sektora pārstāvjiem. Šo reformu īstenošana palīdzēs saskaņot Latvijas reģionālo pārvaldību ar ES kohēzijas mērķiem, samazinās teritoriālās nevienlīdzības un pastiprinās noturību digitālās pārveides un zaļās transformācijas apstākļos.

Atslēgvārdi: reģionālā pārvaldība, institucionālās transformācijas, Latvija, ES, digitalizācija, zaļais kurss.

Introduction

Since Latvia's accession to the European Union in 2004, the national system of regional governance has undergone significant institutional and functional transformation. Under the influence of EU cohesion policy and programmatic planning, Latvia has gradually shifted from a command-administrative model toward a strategic, development-oriented approach to territorial management. However, despite the availability of considerable resources – both financial and expert – and the transfer of institutional models, the level of regional disparity and imbalance across Latvian territory remains high (European Commission – DG REGIO 2021; European Commission 2020).

One of the key institutional constraints on regional governance in Latvia is the absence of regions as administrative units with their own representative bodies. Unlike most EU member states, where the regional tier plays an autonomous role in strategic planning and resource distribution, Latvia lacks formal regional institutions (European Committee of the Regions 2020; Charron et al. 2014; Pike et al. 2011). Existing historically cultural (Kurzeme, Vidzeme etc.), statistical (NUTS 2, NUTS 3), and planning regions do not hold political subjectivity and have no elected administrations. This is often justified by the country's compact size and the fact that Latvia is classified as a single NUTS 1 region within the EU. However, such reasoning appears limited. Even in small countries such as Slovenia or Estonia, stable regional governance frameworks have emerged, enabling effective coordination between national and municipal levels. In the context of pronounced territorial disparities between Riga and the rest of the country, the absence of a regional layer generates an institutional vacuum that undermines the implementation of strategic and spatial policy.

The relevance of this study is driven by several factors. First, the current EU programming period (2021–2027) emphasizes the deep integration of digital transformation, the green economy, and sustainable development. This requires national and regional institutions to go beyond formal compliance and engage in a substantive rethinking of governance approaches, including the implementation of digital platforms, ecosystem-based thinking, and integrated strategic planning (European Commission 2021a). Second, in light of global economic and political turbulence (COVID-19 pandemic, energy crisis, geopolitical tensions), the issue of resilience in regional governance has become particularly salient (Bristow, Healy 2014; OECD 2023). Third, the ongoing enlargement of the EU places additional strain on multilevel governance systems, particularly in terms of resource allocation, coordination, and institutional compatibility (Böhme et al. 2020).

The scientific novelty of this article lies in its systematic examination of the evolution of the actual use (rather than mere legal formulation) of regional governance tools in Latvia. The analysis focuses not only on the existence of strategies but also on the implementation of instruments and the institutional capacity for adaptation and innovation at the local and regional levels.

The aim of the study is to identify and critically reflect on the trends in the application of regional governance tools in Latvia within the evolving context of EU cohesion policy, while also identifying key constraints and prospects for further institutional development at the regional level. Objectives:

- (1) to analyze institutional and regulatory transformations in Latvia's regional governance since 2004;
- (2) to assess the use of key cohesion policy instruments at the regional level;
- (3) to conduct a comparative analysis with other CEE countries (Lithuania, Estonia, Poland) (Klemeshev et al. 2018);
- (4) to identify structural barriers and institutional deficits limiting effective tool implementation;
- (5) to propose directions for institutional reform in response to current challenges.

The study draws on both empirical sources (EU documents, data from the Central Statistical Bureau (CSB) of Latvia (2025a, 2025b, 2025c), monitoring reports) and conceptual frameworks for evaluating state and regional governance effectiveness (Latvian Republic's Valsts kontrole 2021).

Research methodology

The methodology of this study combines qualitative and quantitative approaches and draws upon concepts from multiple disciplines, including institutional economics and regional policy. The theoretical framework incorporates the ideas of North and Williamson (North 1990; Williamson 1985), models of multilevel governance (Marks, Hooghe 2001; Bache 2012; Hooghe 2016), and contemporary principles of performance-oriented public management (Pollitt, Bouckaert 2017). In addition, more recent approaches are considered, such as narrative institutional analysis and business process modeling in public administration.

The research includes several analytical components. First, a content analysis was conducted on legal and strategic documents adopted in Latvia and at the EU level from 2004 to 2024. This made it possible to trace changes in the understanding and application of regional development instruments over time. Second, a comparative assessment was carried out using examples from other Baltic countries and Poland to explore the degree to which the Latvian model diverges in terms of decentralization and regional engagement in planning. Additionally, open-access statistical data were analyzed – primarily from Eurostat, the CSB of Latvia, and the ESIF database. Particular emphasis was placed on indicators related to EU funding in the areas of digitalization, climate action, innovation, and social inclusion.

The European Commission's cohesion policy reports, especially the 7th and 8th Cohesion Reports (European Commission 2017–2022), also played a key role, as they explicitly highlight the persistent lag of certain Latvian regions and the institutional difficulties in implementing strategies.

The study further incorporates municipal-level monitoring data, with special attention to Latgale, the most vulnerable region. Helmke and Levitsky (2012) typology was adapted to the Latvian context to assess the discrepancy between formal institutional structures and actual mechanisms of governance.

This gap has direct implications for the absorption of EU funds and the implementation of reforms. When formal institutions are substituted by entrenched informal practices – as observed in Latgale – resources tend to be distributed based on local informal agreements rather than strategic priorities. As a result, fund effectiveness declines, and reforms are perceived as external and formalistic, which undermines sustainable adoption and erodes institutional trust.

To assess institutional factors influencing economic development, insights from Russian scholarship were applied. For instance, Judrupa and Šenfelde (2018) emphasize

the significance of institutional quality and administrative capacity in shaping regional competitiveness, while Hazans (2021) highlights the demographic and human capital constraints that undermine development in peripheral territories. These approaches were adapted for assessing the Latvian context, especially in regions with high structural vulnerability.

The study also draws on data from the international project PoliRural (2023), including interviews and case studies on community participation in planning. These data were used to evaluate how partnership- and multilevel governance principles are implemented in practice in the regions of Vidzeme and Latgale.

Furthermore, the research integrates findings on regional digital transformation, including institutional barriers and support mechanisms, based on a Russian study by (Logacheva, Tikhonova 2024), which provides examples of digitalization under differing levels of institutional maturity. These findings helped identify institutional gaps between regions and assess digital development barriers in Latvia relative to comparable models.

Overall, this methodological approach goes beyond cataloguing documents and statistics. It enables the identification of the gap between policy declarations and implementation, and assesses how prepared Latvian regions are to meet the new demands of European policy. By combining macro- and micro-level analysis, the study compares formal governance models with actual on-the-ground practices and evaluates variations in effectiveness across regions. This approach provides a comprehensive understanding of the current challenges and the institutional renewal potential within the framework of European regional policy. These four methods reinforce each other and ensure the robustness of our findings. Content analysis captures formal legal changes; comparative review highlights effective solutions in peer states; quantitative tracking of fund absorption from 2007–2023 reveals real funding trends; and expert interviews provide practical validation and essential local context.

Results: institutional and regional gaps

At the beginning of the new programming cycle, Latvia faced a high degree of uncertainty both in domestic politics and in the institutional structure. Complex transformations, including the administrative-territorial reform and the reform of the EU funds management system, coincided with structural challenges typical for peripheral EU countries (Böhme et al. 2020; Ferry, Polverari 2018). These processes exacerbated existing systemic risks, affecting the resilience and efficiency of regional policy (Homutiņins et al. 2024; OECD 2022; European Commission – DG REGIO 2021).

These challenges can be grouped into several key categories, covering institutional, territorial, and politico-economic aspects. The summary table below presents the main risks of the current programming period, highlighting their potential impact on the implementation of regional policy and the achievement of EU goals in the field of sustainable and balanced development (European Commission 2021a, 2021b; Charron et al. 2014).

Table 1

Main risks to the implementation of regional policy in Latvia, 2021–2027

Risk category	Description and examples
Institutional barriers	Fragmented governance, weak inter-level coordination, frequent regulatory changes, staff shortages
Territorial disparities	Ongoing inequality between Riga and other regions in access to resources, infrastructure, and personnel
Politico-economic inertia	Limited involvement of regions in programming, slow project launches, low strategic flexibility
Strategic adaptation	Delays in integrating new EU priorities (digitalisation, climate, inclusion) into regional strategies
Socio-demographic challenges	Ageing population, youth outflow, depopulation undermining regional development sustainability

Source: compiled by the authors based on Böhme et al; Ferry, Polverari 2018; Homuņiņš et al. 2024; OECD 2022; European Commission 2021a, 2021b.

Among the listed risks, institutional fragmentation and weak coordination between governance levels are of particular importance, as they most strongly hinder strategic and coherent use of EU funds (Tomaney, Pike 2020). The absence of stable interaction mechanisms and constant changes in the regulatory environment create additional burdens on municipalities and complicate long-term planning. Moreover, the persistent inequality between the capital region and the rest of the country not only limits balanced development potential but also undermines trust in EU policy at the local level (ESPON 2021; Pike et al. 2011).

These risks are reflected in regional disparities and financial indicators. Despite years of governance reform and significant EU funding, sustainable territorial equalisation has not yet been achieved in Latvia. The gap between the Riga region and other parts of the country remains especially pronounced in terms of GDP per capita and demographic indicators (Judrupa, Šenfelde 2018; Kudiņš et al. 2024; Central Statistical Bureau of Latvia 2025a, 2025b, 2025c).

Table 2

Regional structure of Latvia's GDP and demographic indicators, 2022

Region	GDP per capita, €	Population	Population density, people/km ²
Riga region	31,583	605,802	2,394
Pieriga region	No data	383,723	39
Kurzeme region	13,552	233,229	18
Latgale region	9,731	247,220	18
Zemgale region	12,859	225,017	22
Vidzeme region	11,869	180,766	12
LATVIA	19,141	1,875,757	30

Source: compiled by the authors based on the data from Central Statistical Bureau of Latvia 2025a, 2025b, 2025c.

These differences raise doubts about the effectiveness of applied instruments and strategies of regional development. At the same time, analysis of the distribution and absorption of funds in various EU programming periods allows us to trace institutional

transformations and identify key challenges Latvia faces on the path toward more balanced growth (Ministry of Finance of Latvia 2023; European Commission 2022).

Table 3 presents a breakdown of EU funds allocated to Latvia for the 2021–2027 period, including national co-financing.

Table 3

EU fund distribution in Latvia including national co-financing, € mln, 2021–2027

Fund	EU, € mln	National co-financing, € mln	Total, € mln
European Regional Development Fund (ERDF)	2,565.5	452.7	3,018.2
Cohesion Fund (CF)	956.2	168.7	1,125.0
European Social Fund Plus (ESF+)	688.4	121.5	809.9
Just Transition Fund (JTF)	191.6	33.8	225.4
Total	4,401.7	776.8	5,178.5

Source: compiled by the authors based on the data from Central Finance and Contracting Agency of Latvia 2022.

According to data from the European Commission and the Ministry of Finance of Latvia, by 2023, out of the total €4.4 billion EU budget for the period 2021–2027, 51 calls for proposals were launched amounting to €788 million (about 16% of the total), and 13 projects were in progress for €284 million (7%). The largest share of investments targeted priorities such as digitalisation, climate neutrality, social inclusion, and innovation. These funds were used to develop digital infrastructure, support employment, and build sustainable urban environments (Ministry of Finance of Latvia 2023).

Analysis: absorption trends

To assess the effectiveness of the allocated resources, it is important to compare the pace and volume of their absorption across different programming periods. This helps identify both stable management trends and institutional barriers arising during practical implementation (Judrupa, Šenfelde 2018).

Table 4

Comparison of EU funds absorption in Latvia across programming periods

Programming period	Allocated, € bn	Absorbed by the end of period, € bn	Absorption rate, %
2007–2013	4.53	4.21	92.9%
2014–2020	4.48	3.97	88.6%
2021–2027 (as of 2023)	4.40	0.28	6.4%

Source: compiled by the authors based on the data from Ministry of Finance of Latvia 2023; European Commission 2023.

Despite the high absorption rate in previous periods, the implementation of the 2021–2027 programmes by 2023 shows a slow start in fund utilisation. This may be due to institutional delays following the 2021 reform as well as the complexity of planning procedures under new EU priorities.

During this period, there has been a gradual transition from formal planning to more integrated development models based on a territorial approach (European Commission 2017, 2022).

To better understand the reasons for differences in absorption results, it is necessary to analyse how priorities and governance approaches to regional policy have evolved across three programming cycles.

Table 5

Evolution of regional governance tools in Latvia

Programming period	Main focus	Instruments used	Key challenges / barriers
2007–2013	Infrastructure	ERDF, CF: roads, water supply, renovation of institutions	Centralised approach, weak regionalisation
2014–2020	Innovation and Entrepreneurship	ESF, ERDF: business incubators, energy efficiency	Weak coordination, staff shortages
2021–2027	Digitalisation, resilience, climate	JTF, digital platforms, ITI (Integrated Territorial Investments)	Need for institutional adaptation and engagement

Source: compiled by the authors based on analysis of EU programming documents, reports from Ministry of Environmental Protection and Regional Development of Latvia, ESIF Cohesion Open Data Platform.

According to monitoring reports by the Ministry of Environmental Protection and Regional Development of Latvia (2024a, 2024b), the effectiveness of project implementation under EU policy in Latvia remains uneven. Territorial disparities are especially pronounced: the Riga region shows significantly higher indicators compared to other parts of the country.

At the level of regional planning, institutional progress can be observed: the quality of programme documents is improving, and impact assessment methods are being enhanced (Ministry of Environmental Protection and Regional Development of Latvia 2024a, 2024b). However, strategy implementation remains fragmented. In many cases, there is a lack of sustained linkage between developed strategies and everyday administrative practices. Feedback and monitoring tools are underdeveloped and not integrated into continuous governance cycles.

EU funds continue to play a key role in regional development management. However, during the 2014–2020 period, the absorption process encountered several problems, including limited administrative capacity of local governments (State Audit Office of Latvia 2021).

According to the report by the State Audit Office, under the priority axis “Competitiveness of SMEs”, 229 investment projects were implemented for a total of €489.8 million, of which €294.5 million was provided by the EU and €195.6 million from the national budget. Nevertheless, only 32% of the projects directly aimed at creating new

business spaces. Most of the funds were allocated to road and infrastructure construction, which did not fully align with the goal of supporting entrepreneurship. This limitation reflects broader issues identified by Boronenko (2009), who argued that effective cluster development and targeted support for business networks are essential for enhancing regional competitiveness.

The report also highlights weak interaction between authorities at different levels, the Latvian Investment and Development Agency, and programme regions. This was one of the reasons for low effectiveness in stimulating business and attracting private investment to regions.

Key barriers remain the limited resources of small municipalities and weak inter-municipal cooperation. These factors often result in projects not achieving their objectives. Hence, there is a need to strengthen the institutional capacity of local governments and improve the efficiency of EU fund utilisation (State Audit Office of Latvia 2021).

Analysis of secondary data reveals a gap between the objectives of institutional reforms and their perception on the ground:

- according to a Norstat and LSM (Norstat, LSM 2024) survey, only 9% of Latvians reported positive changes after the municipal reform, indicating weak impact on daily life and insufficient communication between reformers and citizens;
- a detailed analysis for Latgale demonstrates that smart growth initiatives can serve as an effective tool for regional convergence;
- a study by PROVIDUS (2021), based on interviews with Riga City Council and NGO representatives, notes a lack of sustainable forms of cooperation and poor institutionalisation of public participation in decision-making;
- at the same time, the PoliRural project (2023) in Vidzeme tested a model based on the active involvement of local stakeholders in planning. The experience showed that participation improves both the quality and feasibility of strategies (Jermolajeva et al. 2017).

Despite these challenges, promising examples have emerged in recent years. The number of approved sustainable development strategies at the municipal level has increased, and participation in cross-border initiatives – such as INTERREG Baltic Sea Region and URBACT – has expanded (UCLG 2022). Successful cases include transport infrastructure modernisation in Zemgale and the creation of innovation hubs in Vidzeme. This reflects the accumulation of experience and gradual strengthening of institutional capacity in the regions (Zemgale Planning Region n.d.; Planning Region n.d.; Vidzeme Planning Region n.d.; Ministry of Environmental Protection and Regional Development of Latvia 2024a, 2024b).

Eurostat and the ESIF Cohesion Open Data Platform confirm significant differences between regions in EU fund absorption. Although official statistics do not always provide detailed regional breakdowns, aggregate monitoring data reveal clear territorial disparities. The Riga planning region demonstrates high absorption rates thanks to developed infrastructure and administrative resources. In contrast, regions with limited capacity – particularly Latgale and parts of Vidzeme – lag behind, deepening socio-economic inequality (Eurostat 2024a; ESIF Cohesion Open Data Platform n.d.; Ministry of Environmental Protection and Regional Development of Latvia 2024a, 2024b). In practice, this results in uneven project implementation, especially in areas such as digitalisation, innovation, and sustainable development. Thus, the effectiveness of EU

fund use remains uneven and closely linked to the institutional capacity of individual regions.

Table 6 presents an overview of fund absorption in the current programming period (as of August 2023), showing differences in project implementation pace across regions.

Table 6

EU fund absorption: planned vs. actual, august 2023

Region	Planned funding, € mln	Absorbed, € mln	Absorption rate, %	Comment
Riga region	680	510	75	High implementation rate
Pieriga region	320	230	72	Active infrastructure involvement
Kurzeme region	270	180	67	Below average, staff issues
Vidzeme region	250	145	58	Low administrative capacity
Zemgale region	240	165	69	Average level
Latgale region	300	160	53	Lowest performance, institutional barriers

Source: compiled by the authors based on the data from Ministry of Environmental Protection and Regional Development of Latvia 2024b.

The data clearly show persistent territorial differences in fund absorption performance. Regional disparities highlight the importance of factors such as availability of qualified staff, administrative resources, and capacity to develop and manage projects. The lag in Latgale and Vidzeme is particularly striking, where weak institutional foundations limit opportunities to participate in European programmes.

A comparative analysis with other Central and Eastern European countries confirms the importance of institutional autonomy and decentralisation. In Estonia, for example, county development centres – decentralised agencies – play a key role in coordinating regional policy, providing stable administrative support and continuity. In contrast, similar structures in Latvia were dismantled following the 2009–2010 administrative reform, negatively affecting institutional resilience and professionalism at the local level (UCLG 2025; Klemeshev et al. 2018; Ministry of Environmental Protection and Regional Development of Latvia 2024a).

Estonia’s experience is notable as a systemic approach to strengthening local self-government: in 2016, the country conducted a large-scale administrative reform, reducing the number of municipalities from 213 to 79. The reform aimed to improve the financial sustainability and efficiency of local authorities. A minimum municipal population threshold of 5,000 (with a recommended 11,000) enabled resource consolidation and better service quality. This approach, based on financial sufficiency and institutional continuity, may serve as a model for countries seeking a sustainable regional governance system (Shamakhov et al. 2021).

In Lithuania, Regional Development Councils (RDCs) perform coordination functions – supra-municipal bodies uniting representatives of municipalities and stakeholders. They participate in planning and implementing regional policy, helping to reduce territorial disparities and improve public service quality. The 2022–2030 Regional

Development Programme granted RDCs a strategic framework to define priorities and develop local solutions. Institutional resilience is further supported through the use of digital governance tools, such as the e-valdība platform and territorial monitoring systems, which increase transparency and decision-making justification (UCLG 2025).

Poland presents a mature model of regional governance, where voivodeship self-governments play an active role in shaping and distributing EU budgets. This model ensures greater involvement of local communities and supports more effective fund absorption.

Thus, the institutional maturity and resilience of regional governance in comparable countries directly affect the effectiveness of EU programme implementation. Latvia, striving for balanced regional development, should consider these examples when improving its own territorial governance system.

The nature of regional governance and the development of Latvian regions have been more influenced by institutional design than by internal administrative reforms. Despite territorial restructuring in recent years, the country remains highly centralised: key decisions on EU programme planning and coordination are still made at the national level.

Although the absence of a fully-fledged regional level of government was noted earlier, below are the key features of the existing institutional structure:

- absence of a regional tier with elected bodies. Latvia lacks a level of government with democratically elected regional institutions, limiting the implementation of multi-level governance (Council of Europe 2008). Attempts to introduce regional self-government date back to the late 1990s, including the concept of ‘planning regions’, but these have never acquired full administrative-territorial status;
- planning regions as an intermediate construct. Established between 1997–2009 (expanded to seven in 2021), these entities only coordinate spatial development and EU programme implementation. They lack budgets, elected bodies, or administrative independence. Their creation was driven by EU planning requirements, not domestic political will (European Commission 2021a);
- statistical regions without administrative powers. Under the NUTS classification, Latvia is one region at NUTS 1 and 2 levels and is subdivided into six statistical regions at NUTS 3 – all lacking autonomy (European Commission 2023);
- historical-cultural regions without political subjectivity. Kurzeme, Zemgale, Latgale, and Vidzeme serve as cultural-historical and analytical entities but have no official political role.

Socio-cultural features and historical legacy play a key role in shaping regional identity and territorial development. The historical regions of Latvia – Kurzeme, Zemgale, Latgale, and Vidzeme – emerged in different periods under diverse political, religious, and economic regimes. These differences persist today, influencing civic engagement, regional loyalty, and attitudes toward administrative reforms. This fragmentation of territorial identity and the lack of alignment between historical, cultural and economic regions were already emphasized by Boronenko (2006), who argued for alternative classifications better suited to functional regional development.

For example, in Latgale – a region with a distinct cultural and religious character – there is traditionally stronger support for regional autonomy and identity preservation, often accompanied by skepticism toward centralised reforms. However, the lack of

political subjectivity prevents these differences from being institutionalised within the governance framework.

One of the few internal changes that affected regional governance was the 2021 administrative-territorial reform, which reduced the number of municipalities from 119 to 43. Its goal was to strengthen local government capacity. However, in a highly centralised system, the results were mixed (Ministry of Environmental Protection and Regional Development of Latvia 2024a).

According to the Ministry of Environmental Protection and Regional Development of Latvia, some new municipalities faced difficulties integrating structures and personnel, affecting management efficiency. At the same time, territorial enlargement laid the foundation for a more strategic approach to planning and EU fund utilisation.

Thus, Latvia’s institutional architecture remains imbalanced: formal powers of regional and local levels are often not matched by sufficient resources. This undermines the ability of territories to implement development strategies effectively and exacerbates socio-economic disparities.

To address these challenges, it is necessary to revise coordination and resource distribution mechanisms. Strengthening community participation in strategy development, expanding feedback channels, and applying region-specific approaches are particularly important.

Despite the logical rationale and justified goals of reforms, their perception among professionals and local communities has been mixed. The analysis reveals three key approaches to interpreting ongoing changes.

Table 7

Approaches to interpreting Latvia’s administrative reform

Approach	Key ideas	Main arguments	Typical representatives
Rationalist	Efficiency, savings, professionalisation	Enlargement increases manageability, compliance with standards and EU norms	Central authorities, consultants
Institutionalist	Stability, continuity, level coordination	Improved coordination, but risks loss of local specificity	Large municipality administrations
Critical	Engagement, fairness, local adaptation	Growing centralisation, weak feedback, reforms perceived as imposed	Small municipalities, NGOs, researchers

Source: compiled by the authors based on Council of Europe 2008; Ministry of Environmental Protection and Regional Development of Latvia 2024a, 2024b; analytical materials and interviews with local government representatives and experts.

Each approach helps explain the complex perception of institutional changes in Latvia. The differences between them highlight the need for more open dialogue between governance levels and for considering the diversity of interests in strategic planning. Collectively, institutional limitations, administrative reforms, and divergent reform interpretations form a complex field of regional governance, where finding a balance between centralisation and decentralisation remains a key challenge.

Discussion: institutional reflections

The analysis shows that Latvia has made real progress in aligning its strategic planning and programming documents with European Union requirements, but the capacity of regional and local bodies to manage their own development remains weak, especially in socially vulnerable areas. The institutional tools in use have failed to embed multi-level governance principles into everyday practice, leaving coordination between the national, regional and municipal levels fragmented, monitoring and evaluation mechanisms unsustainable and civil-society participation in territorial planning minimal (Ignatyev, Heimanis 2012; Judrupa, Šenfelde 2018; European Commission 2020).

One systemic gap in Latvia’s model is the lack of an elected regional tier. Without directly chosen councils, regions cannot build long-term strategies, local feedback loops remain shallow and accountability between levels of government suffers. Introducing elected regional councils would give each area a clear mandate to defend its interests and respond quickly to local challenges. Latvia’s compact size means this new tier would not create excessive bureaucracy; instead, it would foster genuine responsibility, as voters in Vidzeme or Kurzeme could reward or replace representatives based on their performance. This shift would help balance the Riga-centric focus and allow cohesion programmes to be tailored to each region’s specific needs.

To support this change and strengthen regional capacity, functional development agencies must be re-established. These agencies would coordinate actions and provide expert, methodological support to municipalities, while professional training programmes and network cooperation would build staff expertise in small and medium-sized local governments. Digital management platforms and real-time analytical tools would sustain monitoring and evaluation, and stable mechanisms for cross-sectoral partnerships would deepen community involvement in planning.

Over the next three years, the Ministry of Environmental Protection and Regional Development of Latvia should first convene a legislative working group to draft a law on elected regional councils and launch pilot workshops on project management and digital monitoring in one urban and one rural planning region. In year two, parliament must debate and adopt the elections law and roll out a unified digital platform showing EU fund absorption in real time across all five planning regions. In year three, Latvia should hold its first regional council elections, bring the new councils together to co-design two flagship cohesion programmes and commission an independent review of progress to refine the next phase of reforms.

Conclusions

Therefore, the key task of Latvia’s regional policy is to shift from formally adopting European instruments to their meaningful and integrated application in line with long-term development priorities. Strengthening institutional capacity, implementing multi-level governance principles, and applying a place-based approach should become the foundational directions for transitioning to a more effective model of regional governance. The empirical results confirm the theoretical proposition of the paper regar.

Surveys show that formal reforms without institutional support and public involvement do not lead to meaningful change. This emphasises the need to transition from bureaucratic administration to adaptive governance models based on principles of place-based governance, participation, and partnership.

The experience of Vidzeme and the PoliRural project demonstrate the potential of territorial specificity and local initiative – if they are institutionally secured and supported by the state. This confirms the central thesis of the article: sustainable development is impossible without genuine regional subjectivity, institutional accountability, and trust.

Ultimately, this requires institutional transformation – from bureaucratic administration to strategically oriented, adaptive, and results-driven governance based on the principles of good governance, partnership, and territorial justice.

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A SWOT ANALYSIS OF DIGITAL FINANCIAL LITERACY IN THE EUROPEAN UNION

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The article aims to explore strengths and weaknesses alongside opportunities and threats affecting digital financial literacy in the European Union. For the aim, the article applies SWOT analysis. An analysis of theoretical and empirical studies on digital financial literacy in the European Union allows to indicate such strengths as high online banking adoption rates and strong existing policy frameworks. Availability of survey data on digital and financial literacy across Member States also represents a significant strength. Weaknesses could encompass digital skill gaps among specific demographics, and challenges related to measurement differences between data sources. Opportunities may arise through emerging financial technologies (fintech) that can encourage improvements in digital financial literacy, and the potential of recovery and resilience funding initiatives. Threats appear due to cybersecurity risks and the spread of misinformation, which can undermine trust in digital services. The SWOT analysis provides a structured overview of the internal and external factors influencing digital financial literacy in the European Union what could be useful for development of educational programs. Within the research, the primary problems of digitalization and financial literacy in the European Union, as well as possible solutions to such problems have been indicated. There are still notable differences in digital financial literacy among Member States. Age, gender, and income level are among main affecting factors. While digital literacy plays a foundational role, it must be accompanied by intentional, context-specific financial education. A significant progress has been made in enhancing digital access and promoting digital financial services. At the same time, a gap in digital financial literacy creates disparities across regions and demographics. Addressing this requires a renewed and integrated focus on financial education that is digitally fluent, culturally sensitive, data-based and reinforced with updates in policy-making.

Keywords: financial literacy, digital literacy, European Union, SWOT analysis, digital economy.

Digitālās finanšu prasmes Eiropas Savienībā SVID analīze

Raksta mērķis ir izpētīt stiprās un vājās puses, kā arī iespējas un draudus, kas ietekmē digitālo finanšu prasību Eiropas Savienībā. Šim mērķim rakstā tiek izmantota SVID analīze. Teorētisko un empīrisko pētījumu par digitālo finanšu prasību Eiropas Savienībā analīze ļauj norādīt uz tādām stiprajām pusēm kā augsts tiešsaistes banku pakalpojumu izmantošanas līmenis un spēcīgs regulējums. Apsekojumu datu par digitālo un finanšu prasību pieejamību par visām dalībvalstīm arī ir ievērojamā priekšrocība. Savukārt, digitālo prasmju trūkums starp noteiktām demogrāfiskām grupām un atšķirības starp dažādu avotu mērījumiem norāda uz vājām pusēm. Iespējas var rasties pateicoties jauno finanšu tehnoloģiju (fintech) izmantošanai, kas var stiprināt prasību, kā arī no

finanšu atbalsta instrumentu izmantošanas. Draudi ietver kiberdrošības riskus un dezinformācijas izplatīšanos, kas var mazināt uzticēšanos digitālajiem pakalpojumiem. Tādējādi SWOT analīze sniedz strukturētu pārskatu par iekšējiem un ārējiem faktoriem, kas ietekmē digitālo finanšu pratību Eiropas Savienībā. Šīs zināšanas varētu būt noderīgas izglītības programmu izstrādē. Pētījumā arī ir noteiktas galvenās digitalizācijas un finanšu pratības problēmas Eiropas Savienībā, kā arī šo problēmu iespējamie risinājumi. Joprojām pastāv ievērojamas atšķirības pēc digitālās finanšu pratības starp dalībvalstīm. Vecums, dzimums un ienākumu līmenis ir vieni no galvenajiem ietekmējošajiem faktoriem, kas veicina minētās atšķirības. Lai gan digitālajai pratībai ir nozīmīga loma, tā ir jāpapildina ar apzinātu un kontekstam pielāgotu finanšu izglītību. Eiropas Savienībā ir panākts ievērojams progress digitālās piekļuves uzlabošanā un digitālo finanšu pakalpojumu veicināšanā. Vienlaikus digitālās finanšu pratības plaša rada nevienlīdzību starp reģioniem un demogrāfiskajām grupām. Lai risinātu šo problēmu, ir nepieciešama atjaunota un integrēta uzmanība finanšu izglītībai, kas ir vērsta uz digitālo iemaņu attīstību, ņem vērā kultūru atšķirības un jaunākas tendences, un kuras pamatā ir spēcīgs politikas ietvars un datos balstītas atziņas.

Atslēgas vārdi: finanšu pratība, digitālā pratība, Eiropas Savienība, SVID analīze, digitālā ekonomika.

Introduction

According to the World Economic Forum (2023), access to financial services has evolved better than financial literacy. Nowadays, financial literacy is not a choice but a necessity for engaging within a contemporary, global, and increasingly digital economy (OECD 2020). European Central Bank's (2024b) study demonstrates that consumers' non-cash payments have a tendency to increase. Moreover, innovation financial services (e.g., digital banking provision, algorithmically chosen investment options) requires digital financial literacy to bargain cyber exposures and to use new market opportunities. At the same time, digital access inequalities (Eurostat 2024a; Gomes, Dias 2025) negatively affect the use of digital financial services, especially in rural communities and for the elderly. According to Eurostat (2024b), in 2023, regions like Stockholm (Sweden), as well as Île-de-France (France) have significantly higher number of households with access to the internet at home than Calabria (Italy) as well as Severozapaden (Bulgaria). A quality of Internet connectivity and limited access to technological devices may hinder access to digital financial services (Weisman-Pitts 2024) similarly like an insufficient digital financial literacy level.

Financial capability is a combination of skills. The OECD (2020) states that it is an aggregation of awareness, knowledge, skills, and behavior in making informed economic decisions. Three elements increase the urgency of financial literacy in a digital European economy. First, access to online banking, digital payment systems, and robo-advisors increases (Statista 2025; European Central Bank 2024a; European Commission: Directorate-General for Research and Innovation 2018) and users must interact with complicated applications. Without digital financial literacy, users inadvertently mismanage their funds or even fall prey to scams. Second, new technologies can be riddled with dangerous cyber scams; thus, the need for understanding secure transaction procedures and data protection is even higher. For example, Nguyen et al. (2024) emphasize that digital literacy is significant for secure online behavior. Third, open access to financial services through apps and blockchain technology demands advanced knowledge to benefit from opportunities without falling prey to scam.

Within a Digital Finance Strategy (European Commission 2020), the European Union has placed great priority on promotion of digital finance and cybersecurity at financial markets. Additionally, an inclusive and safe financial service provision and improvements of financing possibilities are placed at the center through introducing the Payment Services Directive 2 (PSD2) (Directive (EU) 2015/2366) (EUR-Lex 2015) and the Capital Markets Union (CMU) (European Commission n/d), and the Anti-Money Laundering (AML) (Directive (EU) 2018/843) (EUR-Lex 2018). The success of all these policies also hinges on the financial literacy of individuals since financially and digitally literate individuals are better able to use open banking, engage with capital markets, and take sound financial decisions.

World Economic Forum (2023) emphasizes that new channels and creative approaches are key for reaching wider audience when aiming for financial literacy improvements. On the other hand, increased digitization may improve financial literacy in Europe. This is grounded in the premise that availability of diverse digital tools, such as financial management apps, online banking platforms, and AI-driven educational tools, is helpful for enhancing individuals' awareness to manage their finances. For example, Ferilli et al. (2024) conclude that innovation in financial service contributes to decrease in digital financial divide.

In the European Union, financial literacy concept has expanded to encompass digital competencies as well. Modern requirements to financial literacy emphasize core competencies including knowledge, behaviors, attitudes that ensure sound financial decisions, functional digital skills, critical evaluation of online financial content, and resilience in digital environments (OECD 2016; Directorate-General for Financial Stability, Financial Services and Capital Markets Union 2022).

The article aims to explore strengths and weaknesses alongside opportunities and threats affecting digital financial literacy in the European Union. Additionally, the problems of digitalization and financial literacy in the European Union, as well as possible solutions have been indicated. The European Union was chosen for research due to the high diversity in financial literacy and digitalization across countries and regions. It is noteworthy to indicate that need in financial literacy and digital skills increased during the Covid-19 pandemic (Cedefop 2021; Hamdan, Koch n/d).

SWOT analysis: research findings

A SWOT analysis is an important component of understanding peculiarities of digital financial literacy in the European Union. The SWOT framework allows for identifying strengths and weaknesses, as well as opportunities and threats, providing a structured approach to evaluating the current state and future potential of digital financial literacy across the European Union. The results provide a structured overview to contextualize quantitative findings and guide targeted interventions.

Focusing on the strengths, following prominent aspects stand out: the high overall adoption of online banking, robust policy frameworks and the availability of rich, comparable survey data across the Member States. These strengths represent significant advantages that can be leveraged to advance digital financial literacy and inclusion throughout the Member States.

High overall rate of online banking adoption ensures digital landscape that promotes necessity and interest in digital financial literacy. The proliferation of online banking directly results from increased internet connectivity, the convenience offered by digital platforms for routine transactions, and regulatory support aimed at modernizing payment

services. A high adoption rate means that a large proportion of the population is already engaging with digital financial tools, providing a fertile ground for integrating and delivering digital financial literacy initiatives. This widespread usage also suggests a degree of basic digital proficiency and a willingness to conduct financial activities online, which can be built upon to enhance more complex digital financial skills and knowledge.

Table 1
Effects of digitalization on financial literacy in the European Union – SWOT analysis

Strengths	Weaknesses
High adoption of online banking, digital engagement	Persistent digital-skill gaps among vulnerable groups (e.g., seniors, low-income populations, rural residents)
Robust EU-level policy frameworks (e.g., Financial Competence Framework for Adults, Capital Markets Union Action Plan, Digital Education Action Plan)	Inconsistent implementation of financial education initiatives across Member States
Integration of behavioral nudges and micro-learning via apps in educational programs	Limited proficiency in specific digital financial competencies
Integration of digital financial literacy into formal education in some Member States	Low engagement in capital markets among financially illiterate populations, despite digital access
Rich, comparable survey data for benchmarking and policy alignment	Measurement differences across different data sources
Supportive legislative environment promoting innovation and financial transparency	Digital interface complexity and lack of support for users with limited tech fluency
Opportunities	Threats
Integration of digital financial literacy into national digital strategies including use of Recovery and Resilience Facility (RRF) funding possibilities	Increasing of cybersecurity risks, including phishing, malware, and online financial fraud
Use of emerging fintech tools (e.g., robo-advisors, digital budgeting platforms)	Misinformation online causing distrust in digital finance or leading to poor financial decisions
Gamified learning applications making financial education more engaging and accessible	Digital access and digital skills divide that may increase exclusion of vulnerable groups (elderly, low-educated, low-income)
Partnerships (e.g., public-private, Fintech-NGO) expand outreach and inclusion	Overreliance on automated decision-making tools (e.g., AI-driven loan approvals) without sufficient transparency
Increased personalization in financial education through AI, behavioral analytics, and adaptive content	Ethical concerns from algorithmic bias and data privacy breaches in digital financial platforms
Cross-sector collaboration enhances digital literacy activities	Risk of exclusion from financial services of users not fluent in both financial and digital competencies

Source: own elaboration using data from Bagul 2025.

The Financial Competence Framework for Adults, developed jointly by the European Commission and the OECD International Network on Financial Education (INFE) (European Union, OECD 2022), articulates a shared understanding of the knowledge, skills, attitudes, and behaviors essential for financial resilience in the digital

age. The document explains inseparability of digital and financial skills in the modern financial environment. This framework serves as an important blueprint for the Member States to align their national strategies and educational programs, ensuring consistency in learning objectives across the European Union. Additionally, the Capital Markets Union Action Plan (European Commission n/d) aims to empower individuals through financial literacy to increase participation in savings and investment markets.

The second significant strength lies in the availability of diverse survey data that allow for comparisons across the Member States. Surveys such as the Eurobarometer financial literacy modules (European Commission 2023) and the OECD/INFE International Survey of Adult Financial Literacy (OECD 2023) are instrumental in providing detailed insights into the financial knowledge, behavior, and attitudes of individuals in the European Union. The comparability of data across the Member States is a particularly valuable strength. It allows researchers and policymakers to identify variations in digital financial literacy levels, understand the underlying factors contributing to these differences, and evaluate the relative effectiveness of different national approaches and policy interventions.

In conclusion, the high adoption of online banking and strong policy frameworks, coupled with the availability of survey data, represent key strengths in the European Union’s endeavor to enhance digital financial literacy.

Weaknesses of digital financial literacy in the European Union disclose issues that harden achievement of universal financial well-being. As a result of the analysis, two significant weaknesses emerge: the persistence of digital-skill gaps among vulnerable demographic groups and the methodological measurement differences between key data sources. Addressing these weaknesses is paramount for developing effective and equitable strategies to enhance digital financial literacy across the Member States.

One of the most prominent weaknesses is the persisting digital skills gaps depending of sociodemographic and geographic peculiarities (Eurostat 2024 a, b). Despite overall increases in Internet penetration and online banking adoption across the European Union, some socio-demographic groups still lacks the necessary digital competencies. Research findings demonstrate lower levels of basic digital skills among older adults (Vercruyssen et al. 2023) and individuals with lower educational attainment and income levels (Soederberg Miller et al. 2024). These digital divides are not merely about access to technology but also encompass the skills and confidence required to navigate digital environments effectively and securely. These factors translate into difficulties in accessing online banking services, using digital payment methods, understanding online financial information, and protecting oneself from cyber threats like phishing, which disproportionately target less digitally literate individuals.\

A second key weakness is measurement differences between key data sources used to assess financial literacy across the European Union. While providing valuable data, the reliance on surveys may introduce challenges due to their subjectivity, differing methodologies and scoring systems. Researchers, educators, and policy-makers should pay attention to peculiarities of measurement process and outcomes. For example, Eurobarometer’s (European Commission 2023) measurement includes financial knowledge and financial behavior. The OECD/INFE’s (OECD 2023) measurement besides financial knowledge and financial behavior includes financial attitudes also.

In conclusion, addressing digital skills gaps among vulnerable groups and harmonization of methodologies for measurement of financial literacy may improve overall financial well-being. The digital divide, particularly affecting seniors and low-income populations, threatens to exacerbate financial exclusion in an increasingly digital

economy. Simultaneously, methodological differences between the most prominent data sources can challenge assessment as well as effective targeting of policy and education activities.

Identifying opportunities is crucial for leveraging external factors and trends to enhance the financial capabilities of individuals in the digital age. Drawing from the analysis, two significant opportunities stand out: the potential of emerging fintech tools, such as robo-advisors and gamified applications and use of funding of the European Union's Recovery and Resilience Facility.

One of the most promising opportunities lies in applying emerging financial technologies (fintech) for improvements in digital financial literacy. Fintech is rapidly transforming the financial landscape, introducing innovative tools and platforms that can serve as powerful educational instruments (European Fintech Association 2024). Robo-advisors, for instance, are automated digital platforms that provide financial advice and portfolio management with minimal human intervention. Financially better literate individuals are more interested to be potential users of robo-advisors (Isaia, Oggero 2022). While primarily designed for investment, their interfaces and educational content can help users understand investment concepts, risk tolerance, and long-term financial planning in a personalized and accessible manner. By interacting with robo-advisor platforms, individuals can gain practical experience with digital investment tools and improve their understanding of complex financial products, reinforcing their digital financial literacy in a practical setting (Aristei, Gallo 2025; Nourallah et al. 2025). The increasing sophistication of robo-advisors, including features like educational modules and simulations, presents an opportunity to integrate learning directly into financial management tools.

Gamified applications also offer a significant opportunity to make financial education more engaging and interactive (United Nations Development Programme n/d; An et al. 2024). Gamification involves applying game-design elements and principles in non-game contexts, such as education. Financial literacy apps incorporating gamification can transform potentially dry or intimidating financial concepts into engaging challenges, simulations, and reward-based learning experiences. These apps can teach users about budgeting, saving, investing, and debt management through interactive games and scenarios, making learning more enjoyable and motivating. Gamified approaches are particularly effective for reaching younger demographics (Lisana et al. 2025; Nedyalkova 2025) but can also be designed to appeal to a wider audience. The scalability of mobile applications allows for widespread dissemination of financial education content overcoming geographical barriers and reaching large numbers of people at relatively low cost.

A second important opportunity stems from the Recovery and Resilience Facility (RRF) (European Commission 2024) that supports digital transition of the European Union Member States and makes possible to improve digital skills including necessary for financial literacy through education or training. The RRF (European Commission 2024) is a temporary recovery instrument designed to mitigate the economic and social impact of the Covid-19 pandemic and to make the European Union's economies more sustainable, resilient, and better prepared for the challenges and opportunities of the green and digital transitions. A substantial portion of this funding is earmarked for supporting digital transformation, including investments in digital skills and education. This focus on digital skills within the RRF presents a clear opportunity to mainstream digital financial literacy within broader digital education initiatives. Such activities can take various forms, for example: development of dedicated modules on digital finance,

development of training programs that specifically address the needs of vulnerable groups, or supporting the development and deployment of innovative digital tools and platforms for financial education, including the aforementioned gamified apps and educational components within fintech solutions.

In conclusion, the European Union has significant opportunities to enhance digital financial literacy by strategically utilizing emerging fintech and available funding mechanisms.

Examining the threats of digital financial literacy in the European Union reveals some external challenges that could negatively impact individuals' ability to navigate the digital financial services effectively. Two primary threats are the risks of cybersecurity and misinformation, which can severely undermine trust in digital services, and the potential for widening financial exclusion if the existing digital divide is not effectively addressed. Overcoming these threats is essential for supporting a secure and inclusive digital financial ecosystem across the European Union.

One of the most significant threats is the increasing cybersecurity risks and the proliferation of financial misinformation that should be managed (European Commission n/d). As financial services increasingly migrate online, they become more susceptible to cyber threats, including phishing attacks, malware, data breaches, and online fraud. The constant evolution of cyber threats necessitates continuous vigilance and a high level of digital financial literacy related to online security practices, such as creating strong passwords, recognizing suspicious communications, and using multi-factor authentication. Compounding the threat of cybersecurity risks is widespread misinformation and disinformation in the financial realm.

The second major threat is the risk of widening financial exclusion if the existing digital divide persists. While the European Union has made strides in increasing internet penetration and digital access, significant disparities remain across the Member States and within populations, particularly affecting seniors, low-income individuals, those in rural areas, and individuals with lower educational attainment. If access to and ability to effectively use digital technologies become increasingly essential for accessing financial services (e.g., online banking, digital payments, accessing government benefits), those without the necessary digital access or skills risk being excluded from the formal financial system.

This exclusion can appear in various ways. Individuals without reliable access to internet or digital devices may struggle to open bank accounts, apply for loans, or make essential payments online. Even with access, a lack of digital skills can prevent individuals from confidently and safely using digital financial tools, leading them to rely on more expensive, less convenient or untrustable alternative methods. As more services transition to digital-only platforms, the digital divide directly translates into a financial divide also (Martínez de Ibarreta Zorita et al. 2025). This potentially can increase reliance of vulnerable populations on informal or less regulated financial channels. The risk is that the benefits of digital finance, such as convenience and potentially lower costs, will be more available for those already digitally proficient and financially literate increasing inequalities. Addressing this threat requires improving digital access and implementing targeted digital literacy training programs that specifically reach and support vulnerable groups, ensuring they have the skills and confidence to participate fully in the digital economy.

In conclusion, the landscape of digital financial literacy in the European Union is affected by challenges of cybersecurity risks, the spread of financial misinformation, and the potential for increased financial exclusion due to the persistence of the digital divide.

Alongside the SWOT analysis, several problems may be defined and possible solutions offered for the development of digital financial literacy in the European Union.

Table 2

Development of digital financial literacy: problems and possible solutions

Problems	Solutions
Digital and financial literacy gap	Development of digital and financial literacy curricula
Demographic disparities by digital and financial literacy	Targeted upskilling for vulnerable cohorts
Regional divide by digital and financial literacy level	Regionally tailored interventions with educational programs and digital access improvements
Gender gap by digital and financial literacy level	Gender-sensitive educational programs
Inadequate cybersecurity awareness	Education and training on secure use of online financial services
Inadequate awareness of novel trends	Education, training, and fast guide on possibilities and benefits provided by the newest technological solutions
Short-term knowledge retention	Repetition strategies, availability of a short guide
Different methodologies across the most prominent surveys on financial literacy	Harmonization of measurement approaches
Insufficient data collection at regional level	Granular data collection given territorial peculiarities (urban regions, rural regions)
Data frequency and latency	Increase survey frequency
Subjectivity of self-assessment of digital financial literacy	Comprehensive assessment including statistical and behavioral data
Fragmented approach to digital financial skills curricula	Coordinated and sequent development of digital financial skills curricula
Underuse of unusual learning tools	Curricula on digital financial literacy including gamification, robo-advisers, nudges
Insufficient engagement of vulnerable groups	Culturally-, gender-, and age-sensitive learning content
Cultural barriers in learning on digital financial literacy	Collecting data on peculiarities of cultural attitudes to digital financial literacy

Source: own elaboration using data from Bagul 2025.

The mentioned problems and solutions underscores that rapid technological uptake calls for similarly rapid and deep development of digital financial skills. First, demographic disparities reveals that one-size-fits-all digital-skills training fails to reach those most in need. Second, the existing regional differences reflect uneven digital access, policy implementation, and education systems. Third, insufficient cyber risks awareness threatens both users' safety and confidence. Fourth, financial literacy assessment data frequency and latency may affect timely educational policy updates. Increasing survey frequency and collecting regional level data would allow for more detailed assessment of pilot learning programs and educational policy refinement. The proposed solutions form a coherent, multi-pronged strategy: to combine digital and financial curricula, prioritize vulnerable groups, leverage experiential learning platforms, harmonize measurement, and expand data collection at regional level.

Conclusions and discussion

Studies suggest that higher levels of digital skills are often associated with stronger financial literacy, supporting the view that digital competence plays an important role in enabling financial capability. However, the lack of sufficient improvements in financial literacy despite widespread digital adoption suggests that digital proficiency on its own is not enough. Engagement with tools like mobile banking appears to reinforce financial understanding through practical use, aligning with behaviorist learning theories that emphasize the importance of experiential learning in financial education.

Findings underscore the pivotal role of development strategies. A guidance provided within the European Commission–OECD/INFE Financial Competence Framework (European Union, OECD 2022) and Digital Education Action Plan (European Commission 2021) as well as possibilities of funding within the European Union’s Recovery and Resilience Facility (European Commission 2024) ensure consequent and targeted steps for improvements in digital financial literacy by overcoming the abovementioned issues.

In light of the findings, several actions for development of digital financial literacy could be proposed:

- Integrated educational interventions: Financial and digital literacies must be taught together. Embedding digital financial literacy into school curricula and adult education programs will be important.
- Experiential learning: App-based and real-time learning opportunities (e.g., mobile banking, gamified financial planning tools) can foster practical financial knowledge. These methods include learning-by-doing approach and make abstract financial concepts more accessible.
- Targeted outreach: Bridging sociodemographic disparities requires culturally adapted and demographically sensitive programs.
- Enhanced infrastructure and funding: Expansion of broadband, investment in teacher training for digital and financial pedagogy, and cross-border collaboration through hackathons and fintech clusters can accelerate convergence, especially in mid-performing regions.

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STRATEGIC COMMUNICATION FOR OPEN GOVERNANCE IN LATVIA: FROM THEORY TO PRACTICE

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This article analyzes the implementation of open governance principles in Latvia between 2011 and 2024 within the framework of the country's participation in the international initiative “Open Government Partnership” (OGP). Particular attention is paid to the institutional and communication mechanisms that either facilitate or hinder the integration of digital solutions, public consultations, and strategic reforms at both central and municipal levels. The theoretical foundation of the study is based on the framework of institutional economics, which posits that the sustainability of administrative changes depends on the quality of formal and informal institutions, the nature of multi-level interaction, and the degree to which openness norms are embedded in daily governance practices. Methodologically, the article relies on institutional analysis, comparative examination of international practices (Estonia, Finland, Georgia), and narrative modeling of reforms in the areas of digitalization and green energy. Both quantitative data on expenditures, investments, levels of digital maturity and citizen engagement, and qualitative assessments of reform perception in individual municipalities are used. A typology of citizen participation is constructed, and the effectiveness of communication channels—from the ManaBalss.lv platform to local consultation initiatives – is evaluated. The analysis identifies key institutional barriers: weak inter-ministerial coordination, fragmented digital infrastructure, asymmetry in the capacities of planning regions, and low digital literacy. It is emphasized that in the absence of mandatory public participation standards, stable engagement indicators, and regulatory support from the state, the implementation of OGP national action plans remains partial and often symbolic. At the same time, successful local cases – Riga, Jelgava, and Daugavpils, demonstrate strong outcomes in citizen involvement and public trust through digitalization and green energy initiatives. Based on the study, the article presents recommendations for institutional strengthening of coordination mechanisms, legal entrenchment of public consultation procedures, integration of digital platforms into administrative processes, and enhancement of strategic communications as a critical resource for governance resilience. The conclusion emphasizes the necessity of shifting from a declarative to an institutionalized and systemic approach to open government as a prerequisite for increased efficiency, economic performance, and the social legitimacy of public policy in Latvia.

Keywords: strategic communications, digitalization, institutional economics, open government, public consultations, Latvia.

Stratēģiskā komunikācija atvērtai pārvaldībai Latvijā: no teorijas līdz praksei

Raksts ir veltīts atklātās pārvaldības principu ieviešanas analīzei Latvijā laikā no 2011. līdz 2024. gadam, valsts dalības ietvaros starptautiskajā iniciatīvā “Atklātās pārvaldības partnerība” (Open Government Partnership, OGP). Īpaša uzmanība pievērsta institucionālajiem un komunikācijas mehānismiem, kas veicina vai, gluži pretēji, kavē digitālo risinājumu, publisko konsultāciju un stratēģisko reformu ieviešanu centrālās varas un pašvaldību līmenī. Pētījuma teorētiskais pamats balstās uz institucionālās ekonomikas atziņām, saskaņā ar kurām administratīvo pārmaiņu noturību nosaka formālo un neformālo institūciju kvalitāte, pārvaldības līmeņu savstarpējās mijiedarbības raksturs un atklātības normu integrācija ikdienas pārvaldības praksē. Metodoloģiski darbs balstās uz institucionālo analīzi, starptautisko praksi salīdzinošo izpēti (Igaunija, Somija, Gruzija), kā arī uz naratīvās modelēšanas pieeju digitalizācijas un “zaļās” enerģētikas reformu jomā. Pētījumā izmantoti gan kvantitatīvi dati par izdevumiem, investīcijām, digitālās brieduma pakāpi un iedzīvotāju iesaisti, gan kvalitatīvs izvērtējums par reformu uztveri atsevišķās pašvaldībās. Tika izveidota pilsoņu līdzdalības tipoloģija, kā arī izvērtēta komunikācijas kanālu efektivitāte – no platformas ManaBalss.lv līdz vietēja līmeņa konsultāciju iniciatīvām. Analīze atklāj galvenos institucionālos šķēršļus: vāju koordināciju starp ministrijām, fragmentētu digitālo infrastruktūru, nevienlīdzīgas iespējas plānošanas reģionos un zemu digitālās pratības līmeni. Uzsvērts, ka bez obligātiem publiskās līdzdalības standartiem, noturīgiem iesaistes rādītājiem un valsts normatīvā atbalsta OGP nacionālo rīcības plānu īstenošana paliek daļēja un bieži vien simboliska. Tajā pašā laikā izcelti veiksmīgi piemēri – Rīga, Jelgava, Daugavpils, kur digitālās tehnoloģijas un “zaļā” enerģētika ir saistītas ar augstu iedzīvotāju iesaisti un sabiedrības uzticēšanos. Balstoties uz pētījuma rezultātiem, sniegti ieteikumi koordinācijas mehānismu institucionālai stiprināšanai, publisko konsultāciju procedūru normatīvai nostiprināšanai, digitālo platformu integrācijai administratīvajos procesos, kā arī stratēģiskās komunikācijas pastiprināšanai kā būtiskam pārvaldības noturības resursam. Secināts, ka nepieciešama pāreja no deklaratīvas pieejas uz institucionāli un sistēmiski nostiprinātu atklāto pārvaldību, lai paaugstinātu pārvaldības efektivitāti, ekonomisko rezultativitāti un sabiedrisko leģitimitāti Latvijā.

Atslēgvārdi: stratēģiskā komunikācija, digitalizācija, atklātā pārvaldība, digitālā transformācija, institucionālā ekonomika, publiskās konsultācijas, Latvija.

Introduction

Since the beginning of the 21st century, the active implementation of the principles of the Open Government Partnership (OGP) – an international initiative aimed at developing and executing national plans to promote transparency, accountability, and citizen participation in governance – has become an important instrument of public sector reform (OGP 2025). In this article, the term “open government” will be used to denote a broader set of principles (transparency, accountability, citizen engagement, and digital technologies) within which the OGP program operates.

One of the key institutional limitations of regional governance in Latvia is the absence of a formalized regional level as an independent administrative unit with elected authorities. Unlike most EU countries, where regions play an essential role in strategic planning and resource allocation, Latvia lacks such a structure (European Committee of the Regions 2020). The existing territorial divisions in Latvia differ in status and function. Historical and cultural regions (Kurzeme, Vidzeme, Latgale, Zemgale) reflect cultural and regional identity but do not possess administrative powers. Statistical regions (NUTS

2 and NUTS 3) are used solely for Eurostat reporting purposes and do not participate in governance processes. Planning regions largely correspond to historical regions, except for the Riga Planning Region, which includes the city of Riga and surrounding Pierīga municipalities. These municipalities lack separate administrative status and do not have historical-cultural equivalents, yet they are part of the same planning region. Planning regions are not administrative entities: they lack political subjectivity, legal status, independent budgets, and elected bodies. However, they do perform limited coordination functions – developing regional development documents, participating in the alignment of strategic plans, supporting inter-municipal cooperation, and representing territorial interests at the national level (Ignatjevs 2008). This institutional configuration is explained, on the one hand, by the compactness of Latvia's territory and its classification as a single region at the NUTS 1 level, and on the other hand, by the absence of a tradition of regional self – governance. Despite strategies and regulatory acts adopted since 2004 aimed at introducing open government principles (OGP 2025), the lack of a clearly structured regional tier creates an institutional vacuum particularly in light of stark territorial disparities between Riga and the rest of the country – which limits the effectiveness of strategic and spatial policy implementation (Chmielewski 2023; Chao, Tao 2023).

In practice, citizens face limited access to public information, and participation mechanisms are often formalistic and non-transparent (Providus 2023). Digital tools are introduced only sporadically, which hampers the exchange of open data and the improvement of strategic planning processes (Ministry of Environmental Protection and Regional Development of Latvia 2021). Strategic communications between central authorities and municipalities are carried out via planning regions, which serve as coordination platforms for information exchange, regional initiative alignment, and the dissemination of best practices in open governance.

Contemporary challenges—climate change, demographic decline, the pandemic, and geopolitical instability—require rapid adaptation and long-term resilience at the level of planning regions, meaning approaches that enable agile responses and stable coordination mechanisms across multiple municipalities (Komarova et al. 2024; Kudiņš et al. 2024). This requires not only formal adoption of open government principles but also the establishment of practical mechanisms for their implementation at the planning region level. The integration of transparency, accountability, and citizen engagement, supported by effective communication strategies and digital platform development, can enhance public trust and strengthen collaboration across all levels of government.

Based on the analysis of EU documents, national strategies, and comparative experiences from Baltic countries, Finland, and Georgia, this study identifies the strengths and weaknesses of Latvia's open governance model. The objective of this paper is to assess the degree of implementation of the open governance concept in Latvia, to determine the main institutional barriers, and to propose recommendations for improving coordination, expanding digital tools, and encouraging citizen participation in decision – making processes.

Literature review and research methodology of the Open Government Partnership in Latvia

The implementation of the Open Government Partnership (OGP) in Latvia reflects a broader international movement toward enhancing transparency, accountability, and citizen participation in governance. Rooted in principles outlined by Transparency

International and global standards initiatives such as Access Info Europe and the Sunlight Foundation, the OGP promotes an integrated model of open governance that emphasizes institutional reform, access to information, and participatory infrastructure as levers for improving democratic outcomes and administrative efficiency (Marín, Castilla 2013). Since Latvia joined the initiative in 2011, national and municipal efforts have included the development of open data portals, digital governance tools, and participatory policy mechanisms. However, while Latvia has made progress in institutionalizing open governance practices through its four successive OGP Action Plans, challenges related to regional inequality, digital capacity, and financial absorption persist. This literature review situates Latvia's OGP experience within the theoretical framework of open governance standards and assesses the degree to which these principles have been translated into practice across territorial contexts.

In parallel with its OGP commitments, Latvia has recognized the critical role of strategic communication in ensuring democratic resilience and national security. "The National Concept on Strategic Communication and Security of the Information Space 2023–2027" (State Chancellery of Latvia 2023), adopted by the Latvian government, outlines a comprehensive framework for strengthening public communication capacities and safeguarding the information environment against manipulation, disinformation, and foreign influence. Coordinated by the State Chancellery's Strategic Communication Department (StratCom), the policy promotes a partly decentralized model of communication governance, involving state institutions, municipalities, civil society, and the media. The Concept identifies three interdependent pillars of a secure information space – effective institutional communication, a strong media ecosystem, and a resilient, media-literate society – and outlines six strategic directions, including capability development, media quality, and international cooperation. Importantly, it directly complements Latvia's OGP agenda by enhancing transparency and civic trust, emphasizing the integration of strategic narratives and public engagement tools across all levels of administration (State Chancellery of Latvia 2023).

As it mentioned above, OGP was launched in Latvia in 2011 with the country's accession to the international Open Government Partnership initiative (OGP 2025). As early as 2013, the Riga City Council launched an open data portal, which led to a 37% increase in data downloads compared to the previous year (Delna 2023). The core principles of OGP – open data, citizen engagement, and government accountability – not only improve administrative efficiency but also have economic implications: in regions where open data was actively used, the average annual growth of small businesses between 2021 and 2023 reached 4.5% compared to 2.1% in less digitized areas (OGP Latvia 2023).

Between 2012 and 2024, Latvia implemented four national Open Government Action Plans. The first plan (2012–2015) allocated €3.8 million to create basic digital platforms. The second (2015–2017) supported the publication of open data on healthcare and education, with €2.6 million directed to data portals in nine major municipalities. The third plan (2017–2020) provided up to €50,000 per planning region for the development of e-participation tools, amounting to a total of €600,000 distributed among 12 municipalities. The fourth plan (2021–2025) allocated €5 million for rural digitalization and inter-institutional coordination through the establishment of regional contact centers (OGP Latvia 2023).

In practice, the implementation of these plans has encountered financial and institutional barriers. According to the Latvian State Audit Office's (Latvian: *Latvijas Valsts kontrole*) 2023 public report, less than 30% of the funds allocated for digital

administration projects – including €4.2 billion from the EU under the 2021–2027 program, equivalent to around 1.4% of GDP annually – had been used by municipalities by the end of 2022 (*Latvijas Valsts kontrole* 2024). The remaining 70% was returned to the central reserve due to the absence of infrastructure development plans in several municipalities. Low digital literacy also hampers efficiency: in 2022, only 51% of Latvian residents had basic digital skills (compared to the EU average of 54%), and this figure dropped to 38% in rural areas. As a result, in 2023, only 25% of Latvia's residents used open data portals to search for contractors and tenders (*Providus* 2023).

Latvia's regional development is closely linked to the work of planning regions, each encompassing on average 10 large municipalities (*novadi*), managing between €12 million and €18 million in EU funds annually. Significant differences in economic capacity and digital maturity are reflected in OECD data: in 2020, EU investments per capita in the Riga Planning Region amounted to €4,800, compared to only €1,200 in Latgale (OECD 2021). The digital maturity index, calculated using the EDIH (Digital Europe Programme) methodology, reached 0.85 (out of 1.0) in Riga in 2023, but only 0.42 in Latgale. This funding and technology gap resulted in an 18% increase in startups based on open data in Riga in 2022, while Latgale saw only a 3% rise (*Latvijas Investīciju un attīstības aģentūra* 2024).

Administrative fragmentation and the lack of independent budgets for planning regions exacerbate inequality. According to the State Audit Office, in 2022, 42% of digitalization funds – about €4.2 million – were returned to the central reserve due to underutilization in rural areas (*Latvijas Valsts kontrole* 2024). To reduce this imbalance and increase economic return, coordinated allocation mechanisms are needed – for example, a mandatory allocation of at least 15% of regional budgets to support IT infrastructure and open data (*Latvijas Investīciju un attīstības aģentūra* 2024).

The implementation of a nationwide web portal for all Latvian municipalities cost €100,000 but saved €35,000 in the first year by eliminating the need to maintain seven separate local websites (*Latvijas Republikas Valsts kontrole* 2024). These savings were redirected to training civil servants: in Daugavpils, following open data training worth €50,000, the number of electronic citizen requests increased by 240% within six months in 2019. In contrast, in Rēzekne, where digital literacy training was planned but not implemented, online service usage remained at only 15% of total inquiries (OECD 2021).

A comparison with Estonia and Lithuania underscores the economic efficiency of digitalization. In Tallinn, the unified civic engagement portal *civicengagement.ee* was created for €200,000, which saved 60% of the municipal consultation budget and led to a 35% annual increase in online citizen participation (OECD 2020). In Vilnius and Kaunas, digital platform investments of €150,000 each produced around €1 million in economic benefits over two years by reducing administrative costs and improving response times (OECD 2023).

At the national level, the strategies "National Development Plan 2021–2027" and "Digital Latvia 2021" outline the use of €4.2 billion in EU and national funding. However, the State Audit Office's 2023 report shows that only 48% of the planned €200 million for digitalization had been absorbed by the regions (*Latvijas Valsts kontrole* 2024), underscoring the need for stronger financial oversight.

Governance models such as multi-level governance (Hooghe, Marks 2001; Bache, Flinders 2004) and performance-based public administration (Pollitt, Bouckaert 2017) offer valuable frameworks for understanding and enhancing strategic communication within Latvia's open governance system. The multi-level governance approach underscores the complexity of coordination across national, regional, and municipal

levels, which is particularly relevant for Latvia, where disparities in communication capacity and digital maturity persist across regions. This model highlights the necessity of vertical and horizontal collaboration to ensure that strategic narratives and citizen engagement tools are not confined to capital-level institutions but are embedded throughout all layers of government. Concurrently, the performance-based public administration model focuses on the need for clear indicators, outcome tracking, and evidence-based reporting, all of which are foundational to effective strategic communication. As noted in the 2023 audit report, Latvia's ministries and municipalities often lack consistent metrics and fail to report on how public expenditures translate into measurable service improvements or policy outcomes (Latvijas Valsts kontrole 2024). Integrating these governance models into Latvia's strategic communication policies could promote not only institutional coherence and capacity-building but also enhance transparency, accountability, and citizen trust – core values of the Open Government Partnership. Together, they encourage the alignment of communication strategies with measurable goals and multi-tiered policy frameworks, thereby reinforcing the operational and normative dimensions of open governance.

Within open governance in Latvia, the special attention is given to strategic communication as a critical factor in ensuring transparency, trust, and the effective use of public funds. The 2023 audit of Latvia's consolidated financial statement underscores that municipalities with higher proportional investments in communication – such as Riga, where approximately 12% of the annual information budget is spent on webinars, press releases, and online surveys – show markedly greater success in engaging the public and disclosing budget performance, compared to municipalities like Ludza and Kuldīga, where the figure is just 2% (State Audit Office of Latvia 2024). This disparity reflects more than budgetary priorities: it reveals a structural issue in how institutions report on results. The audit found that none of the ministries in the sample disclosed how budget spending contributed to improving service quality or achieving strategic goals. In many cases, performance indicators were vague or absent, and up to 87% of evaluated budget programs lacked analytical indicators to assess efficiency and impact. Consequently, limited investments in strategic communication correlate with weak public reporting practices, reduced citizen oversight, and diminished institutional accountability. As Latvia continues to modernize its public administration under the OGP and the State Administration Modernization Plan 2023–2027, robust communication strategies and capacity-building in underfunded regions will be essential for aligning budget practices with democratic standards and public trust.

Recent study by Latvian researcher Latkovska (2023) reinforces the centrality of strategic communication as both a theoretical concept and a governance tool in Latvia's public administration. Her study situates strategic communication within a multidisciplinary framework, integrating media theory, organizational management, and political sociology, and emphasizes its role as a purposeful, structured, and mission-oriented process. Latkovska underscores that in the Latvian context, the institutionalization of strategic communication has accelerated following the approval of “The National Concept on Strategic Communication and Security of the Information Space 2023–2027”, which redefines communication as a core administrative function with implications for national resilience, transparency, and public trust. She highlights that strategic communication is not merely about information dissemination but about shaping meaning, building symbolic relationships, and coordinating institutional narratives across government levels (Latkovska 2023). By applying a three-tiered model –macro (societal), meso (organizational), and micro (interactional) – Latkovska provides

a granular framework to analyze communication flows and their alignment with strategic objectives. Her findings support the integration of performance-based governance and multi-level coordination into Latvia's OGP strategy, while also calling for capacity-building in communication maturity, particularly at the municipal level. Thus, her research bridges theoretical foundations and practical implementation, reinforcing the necessity of embedding communication strategy into the broader architecture of open governance.

Despite the growing body of research on open governance and strategic communication in Latvia, significant gaps remain. Existing studies tend to focus either on national policy frameworks or isolated municipal innovations, often lacking a systemic analysis that integrates institutional economics, multi-level governance, and performance-based administration with empirical evidence from Latvia's planning regions. Moreover, prior work rarely evaluates the communicative infrastructure of open government through both quantitative and qualitative lenses or examines how strategic communication influences citizen engagement and administrative outcomes at subnational levels. This study offers a critical bridge between normative OGP commitments and the structural realities of their implementation, advancing the scholarly and policy understanding of open governance in post-Soviet contexts.

The evolution of Open Government and digital practices in Latvia (2011–2024)

The evolution of open government and digital practices in Latvia from 2011 to 2024 began with the country's accession to the international Open Government Partnership (OGP) initiative. This marked a starting point for the implementation of digital tools and increased transparency within public administration (OGP 2025). In its early stages, implementation was coordinated by the State Chancellery, which aimed to modernize governance through sustainable development and ecological responsibility. However, the effectiveness of these measures largely depended on economic cooperation and communication between central authorities and local governments. Over time, these relationships laid the foundation for a systemic digital environment, reflected in the chronology of initiatives implemented between 2011 and 2024 (Table 1).

Green energy occupies a central role in Latvia's sustainable development strategy and is also embedded in open government principles. The deployment of renewable energy sources requires active engagement of both local authorities and citizens, reinforcing the principles of open governance. Latvia has made significant progress in strengthening its energy system by actively implementing solar and wind power stations, which necessitate open data use and coordination at the regional level (International Energy Agency (IEA) 2024).

The ManaBalss.lv platform is actively used at the regional level to engage citizens in decision-making processes, including issues related to green energy and the environment. For example, in 2019, a municipality launched an initiative to improve public transport infrastructure that included proposals to introduce electric buses powered by renewable energy. The initiative gathered over 5,000 signatures and influenced local authorities to enhance route networks and increase the use of clean transportation (ManaBalss 2024).

Table 1
Key stages in the development of open government and digitalization in Latvia, 2011–2024

Year	Event	Economic aspect	Communication aspect
2011	Accession to the OGP	Initial investments in IT infrastructure (~€1.5 million) for government portals	Centralized communication via government press releases
2013	Launch of Riga’s open data portal	37% increase in statistical downloads (savings of ~€0.5 million on data collection)	First webinars organized for businesses and NGOs
2014	Inclusion of regional initiatives in the national program	€3.8 million allocated for digital platforms in regions	Launch of newsletters for municipalities (monthly reports)
2016	Launch of ManaBalss.lv at the municipal level	€50,000 subsidies for implementing electronic petition systems	Social media campaigns to inform residents
2020	Modernization of data exchange mechanisms	Reallocation of €4.2 million in EU funds through upgraded IT systems (absorption rate <30%)	Introduction of a unified platform for publishing regional reports
2022	Development of online platforms for green energy monitoring	Planning regions’ investments in eco-projects increased by 12%	Interactive citizen sessions held in Riga and Ventspils
2023	Digital maturity report: gap between Riga (0.85) and Latgale (0.42)	+18% in open data-based startups in Riga	Information campaigns conducted in Rēzekne and Daugavpils
2024	Integration of digital platforms into the operations of public institutions	€120,000 allocated to economic statistics sections (Riga region)	Regular quarterly webinars with municipalities

Sources: elaborated by the authors based on OGP Latvia 2023; Latvijas Investīciju un attīstības aģentūra 2024.

The open data system has also impacted municipalities, including environmental and energy data. The Open Data Latvia portal (Latvian: *Latvijas Atvērto datu portāls*) offers access to data on renewable energy and carbon emissions. Since 2015, data on energy consumption from solar and wind stations, as well as information on regional green energy projects, have been available. However, access remains limited in remote areas like Sigulda or Balvi due to poor internet infrastructure and low digital literacy (Latvijas Valsts digitālās attīstības aģentūra 2017–2025).

Large municipalities and republican cities play a key role in implementing open government and digital solutions, particularly in the green energy sector. Cities like Riga and Ventspils have developed projects involving wind and solar energy, requiring digital platforms for energy and emissions monitoring to improve management and public engagement. However, cities further from the capital, such as Ludza and Preiļi, face infrastructure and staffing constraints that hinder such initiatives (Chmielewski 2023).

Table 2
Challenges and solutions in digital transformation and green energy at the municipal level

Challenges	Solutions
Fragmented budget coordination (70% of funds returned to reserve)	Set regulation: at least 15% of regional budgets for IT infrastructure and open data
Low digital literacy (51% basic skills, 38% in rural areas)	Conduct training programs (≥€50,000 for workshops per major municipality)
Underinvestment in green energy (<55% fund absorption in Latgale)	Introduce grant schemes: up to €200,000 for renewable projects in high-potential municipalities
Limited internet access in remote areas	Increase fiber-optic investments (≥1 million for Latgale and Vidzeme, 2022–2024)
Weak citizen engagement (trust <30% in small municipalities)	Launch targeted campaigns (10% of outreach budget) and at least 4 interactive online consultations annually

Source: elaborated by the authors based on OGP Latvia 2023; Latvijas Investīciju un attīstības aģentūra 2024.

Furthermore, Jelgava has successfully launched green energy projects. Jelgava Palace was connected to a centralized biomass heating system under a sustainable energy project for historic buildings implemented by Gren Group (2024). The region is also home to the largest wind park in Latvia, being developed in the Kaigu bog by Laflora Energy, which will include 16 turbines with a total capacity of 108.8 MW, powering over 160,000 households (Latvenergo 2024).

Daugavpils exemplifies progressive energy management through solar energy adoption. The city has implemented an Energy Management System (EnMS) compliant with ISO 50001, covering over 100 municipal properties, yielding annual savings of 4.3 TJ and CO₂ reductions of 311 tons (Clean Energy Ministerial 2022). The nearby Augšdaugava county’s Kalkūni parish hosts the country’s largest solar power station (13.3 MW), supplying electricity to 6,500 households (Saules Energy 2025).

Communication strategies are critical for the successful implementation of open government initiatives. Beyond tool development, transparent and inclusive dialogue with citizens is essential. In smaller or remote municipalities, lack of communication hinders civic participation. Targeted information campaigns, interactive platforms, and digital feedback channels are key to involving local communities. Effective communication fosters trust, reduces digital inequality, and builds a culture of engagement.

Major risks include insufficient infrastructure and qualified staff, especially for green energy technology. In some municipalities, despite national efforts, skepticism toward new technologies persists. Education and digital literacy programs are essential for successful implementation.

The e-signature program (Latvian: *e-paraksts*) has seen success in cities like Riga and Liepāja, but remains underused in small municipalities such as Ludza and Preiļi, limiting access to digital services and hindering local integration into national projects. E-signatures are crucial for contracts related to solar panels and environmental initiatives (Latvijas Valsts kontrole 2024).

Green energy is part of Latvia’s sustainable strategy, with emphasis on renewable sources like wind, solar, and biomass (International Energy Agency (IEA) 2024).

National and local governments support such initiatives, including public building electrification in Ventspils and Kuldīga. Larger cities implement broader projects, such as wind farms in Riga. Smaller municipalities require financial and technical support to transition to a green economy.

Table 3

Challenges and solutions in green energy integration for Latvia

Challenges	Solutions
Insufficient infrastructure for green energy in remote areas	Develop targeted investment programs (≥200,000 per year per renewable project in small municipalities)
Lack of local expertise to maintain green energy systems	Organize annual engineer training (≥30,000 per year)
Lack of coordination between central and municipal green energy programs	Establish quarterly meetings with ministry, business, and local stakeholders
Limited funding (low co-financing from local budgets)	Introduce 50/50 grant schemes (regional and national/EU funding)

Source: elaborated by the authors.

The implementation of open government and green energy principles significantly contributes to Latvia’s sustainable development. EU studies show that access to open data on energy efficiency and renewables enables municipalities to optimize utility expenses, reducing operational costs by 8–12% annually (European Commission 2025a).

Municipal-level co-financing of green energy projects—up to 50% covered by EU structural funds and the remainder by national or local budgets – enables even smaller municipalities to launch pilot initiatives like smart grids and solar stations (State Audit Office of Latvia 2024; European Commission 2025b). Digital technologies not only promote transparency but also serve as economic drivers: open energy monitoring platforms led to a 15% increase in green grant applications in the Riga planning region alone (Central Statistical Bureau of Latvia 2024).

Thus, the synergy of open data and green energy improves governance quality, boosts citizen participation, and enhances Latvia’s overall economic resilience.

Key challenges and reform perceptions

Despite the existence of a strategic regulatory framework – such as the Declaration on Open Governance in Latvia (Latvian: *Deklarācija par atklātu pārvaldību Latvijā*) (2020), the State Administration Development Plan 2020–2025, and the National Open Government Partnership (OGP) Action Plans – persistent institutional and cultural barriers continue to hinder the effective implementation of open government principles in Latvia. One of the key challenges remains the lack of coordination among executive institutions, particularly in the horizontal dimension. An analysis by the State Chancellery and SIGMA (OECD 2021) revealed that cooperation on openness and digital participation issues is typically confined within the boundaries of individual ministries. This leads to the duplication of platforms (e.g., *līdzdalība.lv* and various ministerial initiatives), the absence of unified standards for processing feedback, and inconsistencies in the implementation of open government initiatives.

In 2021, three ministries – the Ministry of Environmental Protection and Regional Development, the Ministry of Finance, and the Ministry of Economics – independently

initiated citizen consultations on sustainable development. However, they employed different platforms, timelines, and engagement mechanisms, resulting in confusion and reduced effectiveness of public participation (Latvias Pilsoniskā alianse 2022). Despite the availability of tools such as *ManaBalss.lv* and *līdzdalība.lv*, their influence on decision-making remains limited. According to Open Government Partnership IRM reports for 2017–2019 and 2020–2022, fewer than 40% of supported initiatives were reflected in actual policy-making. Feedback is often absent or limited to formal notifications, lacking genuine dialogue with participants. This undermines trust in participation mechanisms and renders state–society interaction largely one-sided.

A local study in the city of Ludza (Ludzas novada pašvaldība 2019) revealed typical problems: of the 416 residents surveyed, 57% expressed interest in participating, yet 49% lacked access to relevant information. Traditional media, such as the *Ludzas Novada Vēstis* newspaper, remain the primary source of information (75%), while digital platforms are used by less than 11% of respondents. This indicates a significant gap between the development of digital tools and their integration into daily life. More than half of the respondents struggled to suggest improvements in communication, indicating a weak participatory culture.

An assessment of the third and fourth OGP National Action Plans showed that only 35% of planned activities were fully implemented, nearly all at the central level (Providus 2023; OGP Latvia 2023). Municipalities rarely integrate OGP objectives into their strategies and budgets, often limiting themselves to formal participation in centrally driven initiatives. Meanwhile, Estonia and Lithuania demonstrate more sustainable models: in Estonia, over 80% of local governments use the *Volis* platform for electronic voting (Eesti Koostöökogu 2022); in Lithuania, a mandatory procedure exists for aligning draft regulations with citizen input (Transparency International Lithuania 2023).

The typology and scale of stakeholder engagement in Latvia between 2017 and 2023 are presented in the following table, reflecting institutional constraints and formats of interaction.

Table 4

Forms of stakeholder participation in Latvia, 2017–2023

Form of participation	Level of engagement	Examples / Initiatives
Information	Low	Website publications, OGP implementation reports
Consultation	Medium	Online surveys, public discussions, <i>ManaBalss.lv</i> platform
Co-design	Medium / High	Working groups at the Ministry of Finance and the State Chancellery
Joint decision-making	Limited	NGO participation in sustainable development strategies
Civic monitoring	Very limited	Individual initiatives using open data
Bottom-up initiatives	Fragmented	Budget transparency, civic activism via <i>#ManaBalss</i>

Source: elaborated by the authors.

In addition to institutional factors, sociocultural preconditions play a critical role. Sociocultural features and historical legacy significantly influence how reforms are perceived and the degree of civic engagement across different regions. Latvia’s historical

regions – Kurzeme, Zemgale, Latgale, and Vidzeme – developed under varying political, religious, and economic regimes: from Polish–Lithuanian influence in Latgale to German–Swedish governance in Kurzeme and Vidzeme. These distinctions are still reflected today in levels of civic activity, regional loyalty, and responsiveness to governmental reforms.

For example, in Latgale – a region with pronounced religious and cultural identity – there is traditionally a stronger commitment to preserving regional distinctiveness, which leads to a more reserved attitude toward centralized initiatives. Trust in local self-governments is higher than in national authorities. According to OECD data, only 29% of Latvians report high or moderately high trust in the national government, compared to 41% who trust local governments (OECD 2021). This limits receptiveness to top–down reforms, particularly when those reforms are perceived as disconnected from local community interests. In such regions, participation in public consultations remains low, due to both institutional constraints and accumulated skepticism regarding the ability to influence policy.

At the same time, the absence of political subjectivity among historical regions prevents these differences from being institutionalized in the current governance framework. This hinders the adaptation of national reforms to regional specificities and weakens feedback channels between the population and the state.

In this context, communication performs not only an informational but also an integrative function. The clarity, transparency, and targeting of communication concerning reform goals and rationales affect both trust and the willingness to participate. In Latvia – where skepticism and detachment between the center and regions are pronounced – a shift is needed from formal, uniform channels of communication to formats tailored to local needs. This includes visualizations, storytelling, interactive formats, and targeted campaigns via local media. Effective communication requires not only technical solutions but also a conscious strategy that reflects regional differences, digital maturity, demographic specifics, and established participation practices.

Comparative data on trust and civic involvement in Latvia, Lithuania, and Estonia provide a more systemic picture. In Latvia, the share of citizens participating in public consultations does not exceed 10% (Providus 2023), whereas in Estonia it reaches approximately 18% (Eesti Koostöökogu 2022). Trust levels in both national and local governments in Latvia are also significantly lower than in neighboring countries, pointing to the need to strengthen both institutional frameworks and communication mechanisms for citizen engagement.

A comparative analysis of trust and participation in public consultations across the Baltic States highlights institutional divergences and varying levels of civic engagement.

Table 5

Comparative data on trust and participation, 2022–2023

Indicator	Latvia, 2023	Lithuania, 2023	Estonia, 2022
Trust in the national government	22%	34%	50%
Trust in local self-governments	35%	47%	60%
Participation in public consultations	up to 10%	up to 12%	around 18%

Source: elaborated by the authors on the data from Eesti Koostöökogu 2022; Providus 2023; Lithuanian Open Data Portal 2023.

In addition to sociocultural and institutional challenges, a major obstacle remains the lack of a stable and coherent methodology for measuring the effectiveness of open government policy. Different institutions apply their own approaches and indicators, complicating not only the assessment of progress but also the comparison of results at both national and international levels. The absence of harmonized monitoring tools reduces the capacity for adaptive governance and strategic adjustment, while also weakening the evidence base for decision-making.

Structural barriers also include pronounced inequalities between central and local levels. Open government initiatives are predominantly implemented by national agencies, while the role of municipalities remains limited. This is particularly acute in small and peripheral self–governments, where financial and human resources, as well as analytical and digital infrastructures, are insufficient. As a result, reforms are implemented unevenly: in some areas systematically and effectively, in others only partially or formally. This leads to institutional asymmetry and exacerbates territorial inequality, diminishing trust in centralized strategies and undermining the overall resilience of the open government model.

Thus, the sustainable development of open government principles in Latvia requires not only regulatory and methodological harmonization but also the construction of lasting communication bridges between the center and the regions, and between the state and society. Only with a unified methodology, targeted support for municipalities, and open, trust–based formats of interaction is it possible to advance toward a more equitable and inclusive model of governance.

Comparative analysis with other OGP countries

Continuing the analysis of internal barriers that constrain the development of open government in Latvia, it is appropriate to turn to international experience to identify institutional and communication practices that ensure the sustainability and effectiveness of related reforms. Comparison with other countries participating in the Open Government Partnership (OGP) not only helps identify successful mechanisms but also assesses how the quality of strategic communications influences citizen engagement and institutional resilience. The most illustrative examples are Estonia, Finland, and Georgia, where comprehensive approaches to digital transformation, feedback, and participatory support are implemented.

Estonia demonstrates a high level of digitalization and a systemic approach to citizen engagement. A key element is the e–Consultation platform, where ministries are required to publish draft legislation and accept citizen comments in an open format. All feedback is documented and made available for analysis, enhancing accountability and ensuring procedural transparency (Eesti Koostöökogu 2022). This approach not only involves stakeholders but also builds trust based on visible participation outcomes. In Latvia, by contrast, public consultations are not mandatory and are not regulated by a unified standard, leading to inconsistent practices and a formal approach to feedback.

Moreover, the digital ecosystem of e–Estonia is structured as an integrated model of citizen–state interaction. It includes notifications, case tracking, automated feedback, and a single access point to services. This ensures continuous communication and proactive citizen participation. In Latvia, the analogous platform latvia.lv does not fully integrate participatory mechanisms and primarily functions as a technical interface (Kassen 2017).

Finland promotes a model based on the “open by default” principle, under which government data must be accessible from the moment of creation. This policy is

supported by active communication: the government conducts public information campaigns, thematic seminars, and consultations, including with businesses and research institutions. Particular attention is paid to monitoring perceptions of open data – annual audits include user surveys and feedback analysis (Open Data Finland 2021). This builds a culture of responsiveness, in which public authorities are required to consider citizen input. In Latvia, the Data.gov.lv platform lacks such mechanisms: systematic user feedback collection is not carried out, and data on usage and engagement are not regularly analyzed (Latvijas Valsts digitālās attīstības aģentūra 2017–2025).

Georgia is an example of a post-Soviet country where citizen participation has been institutionalized through the my.gov.ge platform. It combines access to public services, budget monitoring tools, voting on initiatives, and the ability to submit proposals. These functions are embedded in the decision-making cycle and legally supported. Georgia's national open government plans include specific measures for involving vulnerable groups – through local NGOs, regional media, and blended communication channels. In Latvia, similar principles were outlined in the OGP Action Plan for 2020–2022, but mechanisms for sustainable implementation have not been established, as noted in national and international assessments (Providus 2023).

Comparative analysis highlights several systemic shortcomings in Latvia's strategic communications. First, there is no mandatory procedure for open consultations: unlike in Estonia, neither the format, nor the publication scope of drafts, nor the feedback mechanism is regulated. This reduces transparency and leads to fragmented practices – some institutions are active, others completely ignore participatory mechanisms. Second, Latvia lacks indicators for evaluating communication effectiveness. There is no monitoring of engagement, no analysis of digital user behavior, and no use of feedback to revise strategies. This sharply contrasts with Finland's practices, where such metrics are built into annual decision-making cycles. Third, communication with civil society remains institutionally unstructured. Unlike Georgia, which has a coordination council involving NGOs and local initiative representatives, Latvia engages with NGOs sporadically and without clear integration into communication strategy development.

These differences have not only institutional but also potential economic consequences. International research emphasizes that sustainable open government practices help reduce transaction costs, improve budget efficiency, and strengthen trust – thus contributing to fiscal discipline and lower administrative costs (Peixoto, Fox 2016; World Bank 2020). For example, in Finland and Estonia, the active use of open data by the private sector led to the creation of new digital services, increasing added value without additional public spending (European Data Portal 2021). Such outcomes are only possible with an institutionalized and two-way communication environment, where digital tools serve not as a showcase, but as a mechanism of interaction. In Latvia's context, this means that investments in platform development and regulatory support for participation must be linked with feedback systems, regular engagement assessments, and support from local structures. Only under these conditions can one speak not only of democratic, but also of economic returns from implementing open government principles.

Open Government in Latvia: the role of communication in institutional strengthening

An in-depth analysis of comparative international experience reveals not only the strengths of open government systems in Estonia, Finland, and Georgia, but also outlines the areas where Latvia objectively requires institutional restructuring. This is not about

technically replicating individual elements – such as digital platforms or formal consultations – but about a systemic transformation of administrative culture. In modern terms, open government is not a set of isolated decisions but a model of interaction in which transparency, participation, and feedback are embedded into the everyday logic of public administration. For Latvia, the key challenge is to shift from a declarative approach to an institutionally embedded practice based on standards, stability, and trust.

One of the central development priorities should be the formalization of public consultation procedures. As of now, Latvian legislation does not require mandatory public discussion of regulatory initiatives, except in isolated areas. As a result, some ministries publish draft documents and solicit citizen feedback, while others bypass this practice entirely. The absence of unified standards – for publication deadlines, response formats, and documentation of comments – makes citizen participation irregular and largely symbolic. Meanwhile, the experiences of Estonia and Finland show that procedural obligation, platform institutionalization, and ease of access create real conditions for stakeholder involvement in decision-making. If Latvia introduced regulatory standards for such consultations, it would foster greater predictability, enhance administrative accountability, and establish a foundation for evaluating the substantive impact of civic participation on regulatory content.

Another crucial direction is strengthening the role of municipalities within the open government ecosystem. The municipal level is closest to citizens' daily needs, and this is where the impact of openness principles can be most tangible. However, in Latvia, municipal involvement in OGP-related initiatives remains episodic. Municipalities rarely develop their own open interaction tools, and participation in national strategies is often limited to the endorsement of isolated projects. This stems from a lack of resources, personnel shortages, inadequate methodological support, and weak institutional ties with central government. Under such conditions, a state support framework for local open governance initiatives is essential – including the creation of methodological centers, capacity-building programs, co-financing for digital tools, and stable partnerships with local NGOs. Such support is particularly vital in a territorially fragmented context, where differences between municipalities extend not only to scale but also to managerial innovation capacity. Expanding participation at the local level not only increases the legitimacy of reforms but also enables regional differentiation, laying the groundwork for territorially balanced policy.

A core component of institutional strengthening should be the establishment of a monitoring and evaluation system. Currently, Latvia lacks a harmonized set of indicators for tracking progress in implementing openness principles. Neither the level of citizen engagement, nor the usage intensity of digital platforms, nor the quality of feedback is systematically analyzed. This makes adaptive governance – revising strategies based on empirical data – virtually impossible. International practice demonstrates that such indicators can be integrated into annual strategic planning cycles and serve as a basis for resource reallocation and policy adjustment. Moreover, a transparent evaluation system enhances external accountability and fosters public trust. Economically, it also improves budget planning efficiency, reduces transaction costs by eliminating duplicative procedures, and minimizes spending on ineffective initiatives.

Finally, open government cannot be sustained without a strategically designed communication system. Communications in this sphere must not merely disseminate information but serve as a fully functional mechanism for building trust between the state and society. In Latvia, where skepticism toward reforms remains high and participation in consultations is low, a transition from basic information campaigns to structured

dialogue formats is necessary. This entails a multi-level communication architecture tailored to the digital habits of various social groups, including visualization, storytelling, local channels, offline events, and feedback mechanisms. Only through such measures can the effect of administrative detachment be overcome, and open governance be perceived as genuinely serving citizens' interests. In the long term, investment in quality communication is not only about democratic consolidation but also economic efficiency: engaged citizens are more receptive to reforms, more fiscally loyal, and more active in joint initiatives.

Thus, institutional development of open government in Latvia requires a comprehensive reassessment of approaches at four levels: legal, territorial, evaluative, and communicative. Each of these dimensions is closely interconnected, forming a mutually reinforcing architecture of resilience. Only through legal guarantees, municipal empowerment, transparent monitoring systems, and coherent communication policies can an environment be established in which open government is not a declaration but a lived reality. This, in turn, will serve as the foundation for more flexible, economically efficient, and socially legitimate public administration.

Prospects

For Latvia, which strives to strengthen its position within the international Open Government Partnership (OGP) initiative, the key strategic direction is to shift from a declarative approach to openness toward building a sustainable, measurable, and inclusive model of governance. Such transformation is impossible without the institutional entrenchment of open government principles and without effective strategic communications that not only accompany reforms but are integrated into the very logic of their implementation (Latkovska 2023).

The prospect of integrating open governance into national strategies and the legislative framework is the foundation of long-term resilience. These principles must not be externally imposed but organically embedded in development strategy documents so that they become part of administrative practice rather than temporary campaigns. Communications efforts, in this context, aim not only to inform but also to establish a trust-based dialogue in which reforms are explained, discussed, and adjusted with citizen participation. This approach reduces resistance, strengthens institutional accountability, and enhances coordination across different levels of government.

Digitalization of participation processes becomes the second key pillar of transformation. The experience of countries like Estonia demonstrates that the use of digital platforms can significantly expand civic engagement in decision-making. In Latvia, this requires not only technical modernization but also a thoughtful implementation of new forms of digital interaction based on convenience, accessibility, and transparency. Digital channels—such as e-consultations, thematic forums, or mobile apps—gain political significance only when complemented by a robust communication strategy that ensures actual engagement rather than an illusion of participation. Economically, the effectiveness of digital solutions is reflected in reduced administrative costs, faster response times, and automation of routine procedures. Estonia has shown that transitioning to digital interaction allows for substantial annual savings through streamlined documentation processes and reduced burden on the public sector (OECD 2021).

According to the European Data Portal (2021), efficient use of open data enables EU states to generate cumulative economic benefits of up to €1.7 billion annually.

Proportionate to Latvia's scale and infrastructure, the potential return could be about €80 million per year, including reduced transaction costs, shorter citizen-government interaction times, and growth in digital services. In Estonia, such mechanisms have led to savings equivalent to 2% of the national GDP, thanks to full-scale electronic administration and unified feedback channels (Eesti Koostöökogu 2022).

Equally important to a sustainable model is the development of partnerships with civil society and the private sector. Effective open data use, including in urban planning, healthcare, and education, requires both access to information and mechanisms for collaboration. Establishing platforms for joint data analysis, co-programming of solutions, and priority alignment should occur within an institutionalized dialogue framework. In Finland, where data openness is enshrined in national strategy, over 2,500 datasets are available for commercial use, stimulating Civic Tech and digital entrepreneurship, particularly in mobile services, transportation, and education (Open Data Finland 2021). These examples confirm that transparent and open digital ecosystems not only enhance citizen engagement but also drive economic growth. Strengthening such links improves decision-making quality and boosts economic activity, especially in digital startups and service platforms. Open, machine-readable data becomes a valuable resource for commercial and non-commercial innovation, as shown in countries with developed Civic Tech ecosystems (European Data Portal 2021). Communications in this context function as the "connective tissue" between sectors, overcoming fragmentation and lowering transaction costs.

Long-term success also critically depends on educational support. This involves not only training in digital technologies and analytics but also fostering a culture of participation, data literacy, and understanding of governance mechanisms. Engaging educational institutions, launching targeted campaigns, creating open courses, and participating in transnational education initiatives can sustain capacity growth. Over time, such investments in digital literacy and data skills reduce state dependency on external contractors, enhance domestic technological potential, and foster a more resilient knowledge economy. With strategic communication, these initiatives can serve as entry points for youth into public governance, thus improving the staffing resilience of the public sector.

Technological prospects such as using blockchain for tracking budget flows or artificial intelligence for analyzing large open data sets open new horizons for transparency and accountability. However, successful implementation depends on society's digital maturity and trust in government innovations. Without communications strategies that clarify functions, boundaries, and risks of new technologies, technical innovations may lead to alienation rather than support. Thus, digital solutions and communications must evolve synchronously, reinforcing each other and forming a sustainable ecosystem.

On this path, Latvia will face challenges—institutional inertia, inter-agency fragmentation, limited resources, and resistance from some actors. Overcoming these barriers is only possible with political will and a coordinated strategy. Here again, communications play a key role by ensuring not only transparency but also inclusive participation in shaping changes, mitigating misunderstanding and conflicts of interest.

In the long run, with a systemic approach, Latvia has the potential to become a model country for digital and democratic transformation in Eastern Europe. Achieving this requires not simply emulating international examples but developing context-specific national solutions. At the core of these solutions must be people-informed, engaged, empowered, and trusting those who govern. Communications in this sense are not

auxiliary tools but primary resources for open government resilience. Their significance lies in reducing institutional and transactional barriers, enhancing business climate, and increasing investment predictability—especially when transparency and accountability are key benchmarks in international assessments of governance systems.

Conclusions

Since joining the Open Government Partnership (OGP) initiative in 2011, Latvia has demonstrated a clear commitment to building a more open, accountable, and participatory system of public administration. Significant initiatives have been implemented, including the ManaBalss.lv platform, the open data portal Data.gov.lv, and the active engagement of organizations such as Delna and Providus in drafting and monitoring national action plans. These instruments laid the foundation for dialogue between the state and society, marking the beginning of the institutionalization of open government practices.

Nevertheless, alongside these achievements, numerous unresolved structural and communication problems persist. The līdzdalība.lv platform, initially created as a tool for online consultations, has not become an effective channel of interaction between ministries and citizens. Unlike in Estonia, where public e-consultations are mandatory, in Latvia they remain irregular and often symbolic. Local examples, such as the participatory digital budget in Valmiera, are exceptions rather than the rule. Although Data.gov.lv formally hosts a large volume of datasets, it suffers from outdated content, a lack of systematic user feedback analysis, and weak integration with decision-making processes. All of this points to a lack of coordination, systematic monitoring, and institutional resilience.

Open government has the potential to significantly improve the effectiveness of public decision-making, strengthen trust in public authorities, and ensure a fairer allocation of resources. However, this requires moving from a patchwork of digital and political initiatives to a coherent model centered on citizens and the public interest. In this model, communications cease to be a technical accompaniment to reforms and become a structural element of resilience. Only through institutionalized forms of dialogue—mandatory consultations, co-programming, regular feedback—can declarations of openness be transformed into actual administrative practice.

To move in this direction, Latvia needs to establish a stable coordination mechanism involving all stakeholders—from ministries and municipalities to NGOs and the academic sector. In addition, it is necessary to legally enshrine participation procedures, develop indicators for assessing the effectiveness of open data and civic engagement, and ensure the active involvement of regions in the implementation and monitoring of reforms. Communication strategies play a special role, ensuring the visibility, transparency, and accessibility of these processes for broad segments of society.

Beyond democratic and institutional significance, open government also has a clearly measurable economic dimension. International research shows that digitalization and open data reduce administrative costs, shorten procedural timelines, and increase the return on IT infrastructure investments. In the Baltic states, the economic impact of Civic Tech innovations is estimated at a GDP increase of 0.3% to 0.7% in specific sectors, including transport, public services, and municipal governance (European Data Portal 2021). Latvia already allocates more than 1% of its public budget to digital government (OECD 2021), but to achieve returns comparable to Estonia or Finland, systematic feedback loops, civic engagement monitoring, and digital literacy support are required.

At this point, the principles of institutional economics become particularly relevant. The development of open government institutions is not only a matter of technical design but also of understanding the incentive structures, transaction costs, and informal norms that shape behavior within public administration. Institutional economics emphasizes the role of stable rules, credible commitments, and predictable interactions in enhancing the efficiency and legitimacy of governance. In the Latvian context, applying these principles means prioritizing not just technological or procedural fixes, but also cultivating a culture of trust, accountability, and cooperation across all levels of government.

In the context of growing international competition in governance quality, the ability to maintain openness and effective dialogue is not only a marker of democratic maturity but also a factor of economic resilience (Chehabeddine, Tvaronavičienė 2020). Latvia, with its digital infrastructure and civic potential, can become a regional model. But this is only possible if political will is supported by institutional mechanisms and a systemic communication policy that ensures not just information dissemination but shared responsibility for the country's future.

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SOCIOLOĢIJA

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ORGANIZATION AND MANAGEMENT OF COVID-19 PREVENTION IN OUTPATIENT FACILITIES IN DNIPRO CITY (UKRAINE)

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The purpose of this study is to analyze the effectiveness of existing methods of organization and preventing COVID-19 infection in patients of outpatient clinics in the city of Dnipro and to identify ways to improve them. Methodology and methods of the study are general scientific methods of analysis and synthesis, systematization and comparison, theoretical analysis of literature sources, comparative analysis of international experience, statistical analysis of results. The study identified current problems in the implementation of preventive measures, identified the most effective practices based on the experience of other countries, and proposed a set of practical recommendations for improving the prevention of COVID infection at the local level. The relevance of the study is determined by the urgent need to enhance the effectiveness of health systems in response to the ongoing risks of infectious diseases, particularly in the urban context of Dnipro, where high population density and limited healthcare resources intensify the challenges of disease prevention. The COVID-19 pandemic has underscored the importance of preventive medicine, especially in outpatient clinics, which serve as the first point of contact for most of the population. Efficient preventive strategies at this level not only reduce the incidence of infection but also alleviate the burden on hospitals and emergency services. Furthermore, the study highlights the critical role of social determinants of health in shaping the outcomes of preventive measures. Drawing on insights from medical sociology, it emphasizes the influence of socioeconomic disparities, public trust in healthcare systems, health literacy, and access to medical services on the success of COVID-19 interventions. Incorporating these factors into policy and practice is essential for building resilient local healthcare infrastructures capable of addressing both current and future public health threats. The results of the study can be applied to the organization of preventive work in primary health care facilities, the development of local health care programs, and raising public awareness of viral disease prevention.

Keywords: prevention, management, organization, medical aid, public health system, Dnipro.

COVID-19 profilakses organizēšana un vadība ambulatorajās iestādēs Dņipro pilsētā (Ukraina)

Pētījuma mērķis – analizēt esošo COVID-19 infekcijas organizācijas un profilakses metožu efektivitāti ambulatoro klīniku pacientiem Dņipro pilsētā un noteikt iespējas to uzlabošanai. Pētījuma metodoloģija un metodes ietver vispārzinātniskās analīzes un sintēzes metodes, sistematizāciju un salīdzinājumu, teorētisko literatūras avotu analīzi, starptautiskās pieredzes salīdzinošo analīzi, kā arī rezultātu statistisko analīzi. Pētījumā tika identificētas pašreizējās problēmas profilakses pasākumu ieviešanā, noteiktas efektīvākās prakses, balstoties uz citu valstu pieredzi, kā arī izstrādāts praktisko ieteikumu kopums COVID infekcijas profilakses uzlabošanai vietējā līmenī. Pētījuma aktualitāti nosaka steidzamā nepieciešamība uzlabot veselības aprūpes sistēmu efektivitāti, reaģējot uz turpinātajiem infekcijas slimību riskiem, jo īpaši pilsētvidē, kāda ir Dņipro, kur augsts iedzīvotāju blīvums un ierobežoti veselības aprūpes resursi saasina slimību profilakses izaicinājumus. COVID-19 pandēmija uzsvēra profilaktiskās medicīnas nozīmīgumu, īpaši ambulatorajās klīnikās, kas kalpo kā pirmais kontakta punkts lielākajai daļai iedzīvotāju. Efektīvas profilakses stratēģijas šajā līmenī ne tikai samazina saslimstības gadījumu skaitu, bet arī mazina slimnīcu un neatliekamās palīdzības dienestu slodzi. Turklāt pētījumā tiek uzsvērta sociālo veselības noteicošo faktoru nozīmīgā loma profilakses pasākumu rezultātos. Atsaucoties uz medicīnas socioloģijas atziņām, tiek akcentēta sociāli ekonomisko atšķirību, sabiedrības uzticības veselības sistēmai, veselības prātības un pieejamības medicīnas pakalpojumiem ietekme uz COVID-19 iejaukšanās pasākumu sekmīgumu. Šo faktoru iekļaušana politikā un praksē ir būtiska, lai veidotu noturīgas vietējās veselības aprūpes infrastruktūras, kas spēj risināt gan esošos, gan nākotnes sabiedrības veselības apdraudējumus. Pētījuma rezultāti var tikt izmantoti profilaktiskā darba organizēšanai primārās veselības aprūpes iestādēs, vietējo veselības aprūpes programmu izstrādē un sabiedrības informētības palielināšanā par vīrusu slimību profilaksi.

Atslēgvārdi: profilakse, vadība, organizācija, medicīniskā palīdzība, sabiedrības veselības sistēma, Dņipro.

Introduction

The COVID-19 pandemic has become an unprecedented challenge for healthcare systems around the world, demonstrating the vulnerability of even the most developed countries to new infectious threats. At the same time, it has raised the issue of prevention as one of the key areas in combating the spread of diseases. In the context of high population density in cities and limited resources of medical institutions, it is especially important to organize an effective COVID-19 prevention system at the primary level of health care - in outpatient clinics.

In recent years, the COVID-19 pandemic has further highlighted the importance of the sociology of medicine, drawing attention to how social inequalities and systemic issues affect disease spread, vaccination rates, and health outcomes across different populations.

Sociology of medicine is a subfield of sociology that explores the social dimensions of health, illness, and healthcare. It examines how societal factors – such as culture, socioeconomic status, race, gender, and political structures – influence both individual health outcomes and the organization of medical systems.

One of the key concerns of medical sociology is understanding how health and illness are not just biological phenomena but also deeply shaped by social contexts.;

For instance, access to healthcare, patient-doctor relationships, health disparities, and public health policies are all influenced by broader social dynamics.

Medical sociologists study topics such as:

- social determinants of health (e.g., poverty, education, environment);
- the structure and function of healthcare systems
- medical professionalization and ethics;
- patient behavior and compliance;
- health-related stigma and discrimination;
- the impact of pandemics and public health responses.

Importantly, the sociology of medicine also challenges traditional biomedical models by promoting a more holistic understanding of health – one that includes psychological, environmental, and social dimensions.

The relevance of this study is due to the need to improve preventive measures in the post-pandemic period and to adapt international experience to Ukrainian realities. The significance of the topic lies in the practical contribution to improving the level of protection of the population, reducing pressure on the health care system and forming a sustainable culture of infectious disease prevention.

The object of the study is COVID-19 infection. The subject is modern approaches and methods of preventive work on COVID infection among patients of outpatient clinics in Dņipro.

The purpose of the study is to analyze the effectiveness of existing preventive measures in outpatient facilities in the city of Dņipro, as well as to develop practical recommendations for their improvement based on international experience.

Methods and materials

The information base of the work was based on the scientific works of Ukrainian and foreign scholars, textbooks, methodological developments, static data, and Internet sources.

In particular, the research materials include:

1. Regulatory and legal documents:

- orders of the Ministry of Health of Ukraine (No. 1777 of 03.08.2020, No. 1614 of 03.08.2021) on infection prevention and infection control in health care facilities (Ministry of Health 2020; Ministry of Health 2021);
- state standards of Ukraine that regulate the requirements for personal protective equipment.

2. Statistical data:

- annual report on the state of health of the population of Ukraine and the epidemic situation for 2022 (Ministry of Health 2023);
- data from the Center for Medical Statistics and information on the number of COVID-19 cases in Dņiproregion (Medstat 2023).

3. Scientific publications:

- works on the management and organization of prevention of COVID-19 (Güner et al. 2020; Zhou 2020; Almeida et al. 2020; Simakhova 2025);
- international experience of COVID-19 prevention (Warren et al. 2021; Rajan et al. 2022).

4. Practical resources:

- information on the vaccination campaign in Ukraine (Ministry of Health 2024);

- data on laboratories that test for COVID-19 in Dnipropetrovsk region (Public Health Centre 2023).

Research methods:

1. Analysis of literary sources:

- systematization of scientific works, regulatory documents and statistical data to study the effectiveness of preventive measures.

2. Statistical analysis:

- analysis of data on COVID-19 incidence in Dnipropetrovsk region;
- assessment of the effectiveness of vaccination and other preventive measures based on official statistical reports.

3. Comparative analysis:

- comparison of Ukraine's experience with international practices of COVID-19 prevention.

4. Monitoring methods:

- visual observation of compliance with sanitary and epidemiological standards in healthcare facilities;
- analysis of documentation of health care facilities (e.g., examination logs, reports on the use of protective equipment).

5. Systematic approach:

- assessment of comprehensive prevention measures, including;
- use of personal protective equipment;
- organization of remote consultations;
- implementation of modern technologies, such as artificial intelligence, to monitor morbidity.

6. Graphical interpretation of the results.

Thus, the study is based on a comprehensive approach that combines literature analysis, practical observations, and sociological surveys. The results will help to optimize preventive measures and increase the effectiveness of the fight against COVID-19 in outpatient clinics in Dnipro.

Organization and management of COVID prevention in Dnipro city

Since the first case of COVID-19 was registered in Ukraine (from March 3, 2020, to December 31, 2022), a total of 5,361,770 confirmed cases have been recorded (intensity rate - 14,078.3 per 100 thousand people), 5,219,299 cases of recovery and 110,839 deaths. The course of the COVID-19 epidemic was wave-like, and over the past three years, the country has recorded five waves of the disease, with peaks in February and October-November each year. The first four waves demonstrated a gradual increase in intensity due to the emergence of new SARS-CoV-2 strains. At the same time, the fifth wave, which began in October 2022, acquired the features of a seasonal rise in respiratory infections, peaking at 38-39 weeks, followed by a gradual decline.

In the summer of 2022, there was a significant decrease in the incidence of COVID-19, and at the end of the year, the figures decreased by 35.2% compared to the previous year. Various factors influenced the change in the epidemic activity, including the outbreak of Russia's large-scale armed aggression against Ukraine, which led to the destruction of medical facilities and limited access to medical care in the occupied territories. This had the greatest impact on the number of registered cases in Donetsk (-53.8%), Luhansk (-57.4%), Kharkiv (-58.1%), Zaporizhzhia (-57.3%), and Kherson (-

48.1%) regions. Other important factors were changes in the characteristics of the virus (reducing its ability to spread), quarantine measures, and the effectiveness of vaccination.

In 2022, the mortality rate from COVID-19 in Ukraine tended to decrease. The exception was the 40th week, when, after another peak in the incidence in the 38th week (44,137 cases), the highest number of fatalities was recorded - 208 people. In general, in 2022, there was a decrease in mortality rates in all age groups, but among the elderly, the rates remained high (Ministry of Health 2023).

The Dnipropetrovsk region ranked 4th in terms of the number of cases after Kyiv city, Odesa and Kharkiv region. The high density of cases (4.0 per 100 thousand) indicates the intensity of the virus spread compared to other regions (for example, in Vinnytsia region - 1.2, in Lviv region - 0.4). However, a positive aspect is the high recovery rate (97.2%), which is in line with the national trend.

Vaccination played an important role in the prevention of coronavirus infection, which began in Ukraine on February 24, 2021. As of March 6, 2023, a total of 35,215,713 vaccinations were performed, and 16,292,959 people were vaccinated. As of 22.01.2022, 96% of educators (1 million 178 thousand) have received at least one dose of the COVID-19 vaccine, and 91% have received both doses (1 million 113 thousand educators). As of February 2022, more than 90% of healthcare workers have been vaccinated with at least one dose (Ministry of Health 2024).

Prevention of COVID-19 in patients of outpatient facilities in Dnipro city included the following methods:

1. General methods:

- 1.1. Hand hygiene (washing with soap and water, antiseptics).
- 1.2. Wearing masks in public places.
- 1.3. Maintaining social distance (1.5-2 m).
- 1.4. Ventilating the premises and using bactericidal irradiators.

2. Specific prevention:

- 2.1. Vaccination. Receiving basic and booster doses of the vaccine.

3. Isolation measures:

- 3.1. Self-isolation of infected persons.
- 3.2. Quarantine for contact persons.

4. Testing and monitoring:

- 4.1. Regular testing (PCR, rapid tests).
- 4.2. Monitoring of symptoms.

5. Information work:

- 5.1. Public education on prevention. Distribution of information materials on COVID-19 among patients, in the registry.
- 5.2. Counteracting the spread of fakes. Informing about fakes and the effectiveness of vaccination, based on the materials of the Ministry of Health of Ukraine.

6. Strengthening immunity:

- 6.1. Balanced diet, physical activity, sleep.

7. Organizational measures:

- 7.1. Restrictions on mass events held during 2020-2021 in Dnipro.
- 7.2. Disinfection of public places.

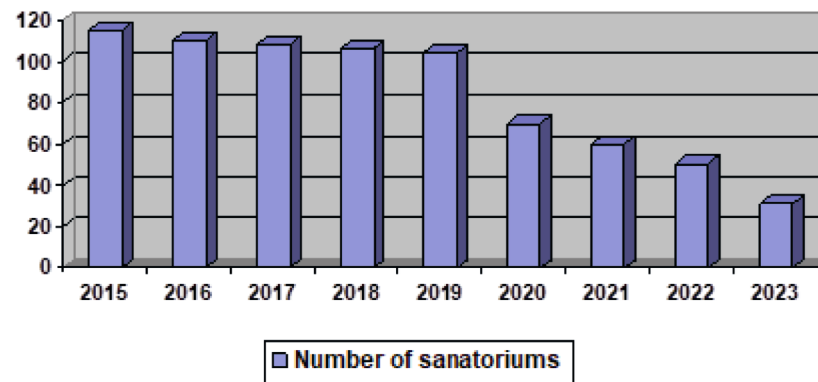
Of course, COVID-19 prevention includes a set of medical, social and organizational measures aimed at reducing morbidity and complications. Among them, physiotherapy procedures, exercise therapy and sanatorium rehabilitation play an

important role, helping to boost immunity and recovery from the disease. That is why it is expedient to analyze data on the activities of physiotherapy departments and sanatoriums in the Dnipro region in 2023 in the context of COVID-19 prevention.

According to the Ministry of Health of Ukraine, in 2023, 34,238,517 physiotherapy procedures were performed in Ukraine, which indicates their significant role in medical rehabilitation. In the Dnipro region, this figure amounted to 3,279,653 procedures (9.6% of the total Ukrainian volume), which ranks the region 3rd after Kyiv and Kharkiv region.

Figure 1

Number of sanatoriums of regional and municipal subordination that were managed by the Ministry of Health of Ukraine by specialty for the period 2015–2023



Source: Medstat 2023.

Based on the data shown in Fig. 1 for the period of 2015-2023, there is a critical decrease in the number of sanatoriums managed by the Ministry of Health in Dnipropetrovsk region:

- in 2015: 7 sanatoriums (2 for adults and 5 for children);
- in 2020-2023: none.

This trend indicates a decrease in opportunities for sanatorium rehabilitation, which is important for patients with COVID-19 consequences, in particular for restoring the functions of the respiratory and cardiovascular systems. The lack of sanatoriums in Dnipropetrovsk region limits accessibility:

- rehabilitation programs for patients with post-COVID-19 syndrome;
- preventive measures for risk groups (elderly people with chronic diseases).

This, in turn, can lead to an increase in the number of complications and a decrease in the quality of life after the infection.

As part of the COVID-19 prevention study, attention should be paid to the laboratories verified by the Ministry of Health that conducted PCR testing (polymerase chain reaction). In the Dnipro region, which is one of the most populated regions of Ukraine, the activities of such laboratories are of particular importance for monitoring the epidemic situation. In Dnipropetrovsk region, the verified laboratories ensured prompt sample processing, which reduces the time between sample collection and results (24-48

hours on average). Timely detection of infected people allowed: isolation of patients, epidemiological investigation (contact tracing).

In Dnipro, there was a network of verified laboratories operating based on: regional medical institutions and private medical centers accredited by the Ministry of Health. In 2023, 20,826,258 PCR tests were performed in Ukraine, of which more than 1 million (approximately 5% of the total) were performed in the Dnipro region. Detection of COVID-19 at an early stage allows to Prevent severe disease; reduce the number of patients with post-COVID syndrome (in 2023, 97.2% of patients recovered in the region). PCR test data is used to plan rehabilitation measures (physiotherapy, exercise therapy).

The following are the priority areas of COVID-19 prevention for outpatient facilities in Dnipro:

1. Vaccination and revaccination. Mobile points: organization of vaccinations in shopping centers, near transport hubs. Information campaigns: use of social media to combat disinformation (Simakhova et al. 2022). Priority groups: the elderly, patients with COPD, diabetes mellitus - their vulnerability has been confirmed by research.
2. Telemedicine as a tool to reduce the workload. Monitoring chronic patients: remote monitoring of blood pressure and glucose levels via IoT devices.
3. Sanitary and hygienic measures:
 - disinfection of premises: the use of drones to treat public areas (markets, bus stops). The technology is already being used in China and can be adapted for Dnipro;
 - creation of "safe zones" in outpatient clinics.
4. Hygiene education of the population. Conducting trainings on hand hygiene, use of masks, etc. (Stukalo et al. 2022).
5. Optimization of in-hospital protocols in the context of COVID-19 prevention requires a comprehensive approach, including the introduction of innovative diagnostic methods and systematic training of medical staff.
6. Technological innovations. Modern technological innovations in healthcare are actively transforming approaches to monitoring, diagnostics and logistics. This is manifested in the introduction of digital contact tracing platforms such as CDC systems that automate the collection and analysis of data on potential infectious risks; the use of artificial intelligence (AI) to analyze medical images, including CT scans, which significantly increases the speed and accuracy of diagnosis (Pinto-Coelho 2023) and the use of autonomous drones for contactless delivery of medicines to chronic patients, especially the elderly, ensuring safe and efficient logistics even in remote areas. In response to the challenges of the COVID-19 pandemic, numerous countries and cities have developed mobile apps and systems for digital contact tracing, borrowing from the CDC's experience in creating platforms for case management and automated monitoring of infection cases. Powered by Bluetooth Low Energy and GPS, such applications quickly identify close contacts and send users alerts about the risk of exposure, reducing delays in identifying potentially infected individuals. Examples of large-scale implementations include Trace Together in Singapore and Corona 100m in South Korea, where the combination of large data sets with SMS alerts ensured a high response rate of local health authorities. However, the effectiveness of such systems depends on the level of app download: in the United States, for example, only 5.7% of residents downloaded the app, which resulted in a minimal number of contact notifications.

Integration of AI into the process of medical image interpretation, including CT scans, opens new opportunities for early detection of pathologies and increase of

radiologists' efficiency. Convolutional neural networks (CNNs) have demonstrated the ability to automatically segment pulmonary nodules from CT scans with an AUROC of 94.4%, which exceeds the performance of six expert radiologists (Pinto-Coelho 2023).

Autonomous unmanned aerial vehicles are becoming an indispensable tool for delivering medicines to chronically ill and elderly patients, especially in remote or inaccessible regions.

7. International experience and its adaptation in outpatient clinics of Dnipro city: analysis of innovative approaches to combating the COVID-19 pandemic. The COVID-19 pandemic has become a global challenge that has forced countries to look for new, effective ways to inform the public, provide healthcare services, and implement preventive measures. Let's look at the experience of four countries – Japan, South Korea, and the United States – that have implemented unique strategies to combat the pandemic that can be adapted in outpatient clinics in the city of Dnipro:

- Japan: using animation to explain social distancing. Japan, known for its culture and art, has used traditional images to inform the public about safety measures. One such example is the use of the image of Amabie, a mythical creature from Japanese folklore that is said to bring prosperity and protect against disease. During the COVID-19 pandemic, the image of Amabie became a symbol of hope and protection, and was widely used in animation, illustrations, and social media to promote social distancing measures and wearing masks.

This approach to informing the population through cultural symbols and animation can be effectively adapted in the city of Dnipro. The use of local cultural images and animations in social advertising can increase public awareness of safety and disease prevention measures.

- South Korea: SMS alerts on new COVID-19 strains. South Korea introduced an emergency SMS notification system to inform citizens about new cases and potential risk areas. These messages contained information about places visited by infected individuals, allowing citizens to avoid potentially dangerous locations. This approach contributed to a rapid public response and reduced the level of infection (Lee, Lee 2020).

In Ukraine, a similar system was implemented through the Diia app, which provided up-to-date information on quarantine restrictions and notifications of contact with infected persons. Further development of such digital tools in the city of Dnipro could increase the effectiveness of communication between the authorities and citizens during emergencies.

- USA: “green certificates and telemedicine. In the United States, “green certificates” were introduced to encourage vaccination and safe attendance at public events - documents confirming vaccination or a negative COVID-19 test result. This allowed event organizers to control access and ensure the safety of participants.

In addition, the Teladoc Health platform has become an important telemedicine tool that helped reduce the burden on hospitals by 25% during the peak periods of the pandemic. Thanks to remote consultations, patients could receive medical care without the need to physically visit medical facilities, which reduced the risk of spreading the virus.

The city of Dnipro also partially used this practice, which contributed to the effective management of medical resources and the safety of citizens during emergencies.

Conclusions

The study confirmed the relevance and significance of the topic of COVID prevention in outpatient clinics in the city of Dnipro. The theoretical analysis of scientific sources and practical data allowed us to comprehensively characterize modern approaches to the prevention of coronavirus infection, in particular through hygiene measures, vaccination, physiotherapy, public awareness and the use of digital technologies.

The study found that effective prevention of COVID infection requires a systematic approach that includes not only medical interventions but also social, educational, and technological components. Particular attention should be paid to vaccination, early diagnosis, health education, physical therapy, and the introduction of new methods such as telemedicine and remote monitoring of patients.

The analysis of the state of prevention of COVID infection in outpatient facilities in Dnipro showed both positive changes - active implementation of vaccination, use of exercise therapy and functioning of testing laboratories - and identified problematic issues: insufficient infrastructure for rehabilitation, limited sanatorium treatment, uneven awareness of preventive measures among the population. Public participation and communication with city residents play a significant role in this process.

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ANALYSIS OF APPROACHES TO DEFINING ARTIFICIAL SOCIALITY BASED ON THE DIALECTIC OF HEGEL'S CONCEPTS AND LUHMANN'S SYSTEM THEORY

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The article is devoted to the theoretical and methodological analysis of the phenomenon of artificial sociality as a new form of social organization emerging at the intersection of human and artificial agents. In the context of rapid digitalization, the development of algorithmically governed systems, and the expanding use of artificial intelligence, interactions between humans and AI acquire characteristics previously attributed solely to human communication: the ability to coordinate, normative regulation, emotional mimicry, and adaptation. These features justify the need to comprehensively conceptualize an artificial sociality. To achieve this goal, the article employs two methodological foundations: Hegel's philosophical dialectic and Luhmann's systems theory. The former enables the synthesis of various approaches to defining artificial sociality by uncovering their logical connections and sequences, leading to the formulation of a final definition—a logically complete theoretical concept that reveals the essential features of the phenomenon. The latter—systems theory—assumes a plurality of observational positions and functional differentiation, within which artificial sociality is defined as the result of interactions among various cognitive, normative, technical, and communicative subsystems. This provides the basis for an integral definition characterized by a high degree of interdisciplinary adaptability and empirical applicability. A comparative analysis of these definitions reveals their complementarity: the final definition ensures conceptual rigor, while the integral one offers analytical flexibility. In the course of further synthesis, an extended definition is introduced, combining philosophical, systemic, and empirical foundations, including cases from AI practice such as voice assistants, companion robots, and platform algorithms. It is emphasized that artificial sociality is not merely the presence of AI in social interaction but represents a fundamental transformation of the very nature of the social environment. The article contributes to the development of a theoretical foundation for further research, regulation, and ethical evaluation of interactions within a posthumanist and platform society.

Keywords: artificial sociality, philosophical dialectic, systems theory, artificial intelligence (AI), digital communication, agentivity, platform society.

Mākslīgās sociālītātes definēšanas pieeju analīze, pamatojoties uz Hēgeļa konceptu dialektiku un Luhmaņa sistēmteoriju

Raksts ir veltīts teorētiski metodoloģiskai mākslīgās sociālītātes fenomena analīzei kā jaunai sociālās organizācijas formai, kas rodas cilvēka un mākslīgo agentu mijiedarbības krustpunktā. Straujās digitalizācijas, algoritmiski vadītu sistēmu attīstības un mākslīgā intelekta (MI) pielietojuma paplašināšanās apstākļos cilvēku un MI mijiedarbība iegūst iezīmes, kas agrāk bija raksturīgas tikai cilvēku savstarpējai saziņai: spēja koordinēties, normatīvā regulācija, emocionālā mimikrija un adaptācija. Šīs pazīmes pamato nepieciešamību visaptveroši konceptualizēt mākslīgo sociālītāti. Lai sasniegtu šo mērķi, rakstā tiek izmantoti divi metodoloģiskie pamati: Hēgeļa filozofiskā dialektika un Lūmaņa sistēmu teorija. Pirmā ļauj sintezēt dažādas pieejas mākslīgās sociālītātes definēšanai, atklājot to loģiskās saiknes un secību, kas noved pie finālās definīcijas – loģiski pabeigta teorētiska jēdziena, kas atklāj fenomena būtiskās iezīmes. Otrā – sistēmu teorija – pieņem novērojuma pozīciju daudzveidību un funkcionālo diferenciāciju, kuras ietvaros mākslīgā sociālītāte tiek definēta kā dažādu kognitīvo, normatīvo, tehnisko un komunikatīvo apakšsistēmu mijiedarbības rezultāts. Tas nodrošina pamatu integrālai definīcijai, kurai piemīt augsts starpdisciplināras pielāgojamības un empīriskas piemērojamības līmenis. Šo definīciju salīdzinošā analīze parāda to savstarpējo papildināmību: finālā definīcija nodrošina jēdzienisku stingrību, bet integrālā – analītisko elastību. Turpmākajā sintēzē tiek ieviests paplašināts jēdziens, kas apvieno filozofiskos, sistēmiskos un empīriskos pamatus, ieskaitot MI prakses gadījumus: balss asistentus, robotus-kompanjonus, platformu algoritmus. Tiek uzsvērts, ka mākslīgā sociālītāte nav tikai MI klātbūtne sociālajā mijiedarbībā, bet gan fundamentālas pārmaiņas pašas sociālās vides raksturā. Raksts sniedz ieguldījumu teorētiskās bāzes veidošanā turpmākai izpētei, regulēšanai un ētiskai izvērtēšanai mijiedarbības apstākļos posthumānistiskā un platformu sabiedrībā.

Atslēgvārdi: mākslīgā sociālītāte, filozofiskā dialektika, sistēmu teorija, mākslīgais intelekts (MI), digitālā komunikācija, agentiskums, platformu sabiedrība.

Introduction

The development of artificial intelligence (AI), algorithmically governed platforms, and digital interfaces is increasingly transforming the forms of interaction between humans and technical systems (Rezaev et al. 2018; Menshikov et al. 2020; Golinowski 2024; Meņšikovs u.c. 2024). These interactions are increasingly acquiring characteristics previously considered the exclusive domain of human communication: adaptability, norm compliance, emotional mimicry, and the ability to coordinate actions. The combination of such features constitutes a new social dimension – **artificial sociality** (Rezaev et al. 2018; Rezaev i dr. 2020; Rezaev, Tregubova 2018, 2019, 2021; Men'shikov 2020; Hofstede et al. 2021; Komarova et al. 2021; Men'shikov i dr. 2024).

Despite the relative novelty of the term, the issue of artificial sociality is rooted in philosophical, sociological, and systems theory discourses. The introduction of this concept is associated with the works of Malsch, who defines artificial sociality as a communicative network in which, alongside humans, other agents – including artificial ones – participate (Malsch 1998, 2001). As digital technologies become more complex and AI is applied in increasingly diverse domains, the question of artificial sociality is gaining importance – both in theoretical and applied contexts (Rezaev, Tregubova 2018; Rezaev i dr. 2020; Voronov et al. 2023; Menshikov et al. 2024; Meņšikovs et al. 2024).

Contemporary cases – such as interactions with voice assistants (Siri, Alexa, ChatGPT), companion robots for the elderly (e.g., PARO), algorithmic moderation on social media, and labor platforms (Uber, Yandex.Taxi) – demonstrate that machines no longer merely mediate social interaction but increasingly act as active participants in it. These technologies do not simply transmit information; they structure social expectations, norms, and even emotional behavior patterns (Menshikov et al. 2024). This raises an important theoretical question: is it possible to develop a comprehensive concept of artificial sociality that integrates diverse approaches – from cognitive psychology to systems theory?

The aim of this article is to develop a theoretical and methodological foundation for defining artificial sociality. To achieve this, the article employs two key tools: Hegel's philosophical dialectic (Gegel' 1974) and Luhmann's systems theory (Luhmann 1984, 1995, 2013). The former allows various approaches to be viewed as elements of a dialectical process – theses, antitheses, and syntheses – revealing the logical development of the concept. The latter serves as a method of observational plurality, enabling the phenomenon to be described as the interaction of multiple functionally autonomous systems, each operating with its own logic and observational framework. This dual foundation – dialectical and systemic – creates the conditions for constructing both a final (based on the resolution of contradictions) and an integral (based on the inclusion of multiple observational perspectives) definition of artificial sociality.

The article is organized as follows. The first part presents a philosophical-dialectical analysis of four approaches to defining artificial sociality, aiming to uncover the logic of their synthesis. The second part examines the foundations of the systems approach, which enables the construction of an integral definition of the phenomenon as a multiplicity of interacting observational systems. The third part formulates an extended definition of artificial sociality based on the synthesis of theoretical and empirical sources. In the conclusion, a comparative analysis of the final and integral definitions is carried out, demonstrating the preference for the latter due to its theoretical depth, interdisciplinary flexibility, and practical applicability.

Thus, this study proposes a comprehensive approach to understanding artificial sociality – as a distinct form of digital and techno-mediated social reality. The article shows that artificial sociality is not merely an imitation of social behavior, but a fundamentally new form of social organization in which technical agents – from AI to algorithms – become full participants in social interaction, possessing both cognitive and normative significance.

Philosophical-dialectical analysis of approaches to defining artificial sociality

The phenomenon of artificial sociality, which is attracting increasing attention in the context of digitalization and the development of AI, represents a complex interdisciplinary construct that requires not merely a comparison of approaches, but their philosophical integration. The use of Hegelian dialectics makes it possible to view seemingly irreconcilable contradictions between different definitions as stages in the development of a conceptual structure, where each new definition overcomes the one-sidedness of the previous one, leading to a more comprehensive and internally necessary understanding.

Hegel stated: "Dialectic is... the moving soul of all scientific unfolding of thought and represents the only principle that brings into the content of science an immanent connection and necessity, in which true, rather than external, transcendence of the finite

is contained” (Gegel’ 1974: 191). Following this principle, we will examine four key approaches to defining artificial sociality as moments of dialectical movement: the communicative (Malsch 1998, 2001), the modeling (Hofstede et al. 2010, 2021), the agent-activity-based (Rezaev, Tregubova 2018, 2019, 2021), and the systems approach (Men’shikov 2020). Each of these approaches will be considered as a thesis, followed by an antithesis, and subsequently synthesized within the framework of the final definition.

The first stage of the dialectical analysis involves examining Malsch’s communicative approach, as he was one of the first to introduce the term ‘artificial sociality’ into academic discourse. In his interpretation, artificial sociality is a communicative network in which AI functions as a participant, and sometimes even as a substitute for a human in social interaction (Malsch 2001). Malsch emphasizes that AI can be not merely a tool, but an integral part of interaction structured according to norms and procedures characteristic of human communities. His definition focuses on the role of networked media and digital technologies as the environment in which this interaction takes place. Here, sociality is presented as a function of communication between agents, both human and non-human.

However, this definition reveals its limitations: it hardly addresses aspects of cognitive autonomy, the capacity for self-organization, and does not explore the internal structure of these interactions. This one-sidedness is resolved by the antithesis – the modeling approach proposed by Hofstede and his colleagues (Hofstede et al. 2010, 2021). According to their definition, artificial sociality consists of “computational models of essential aspects of human social behavior” (Hofstede et al. 2021). Here, the focus shifts from communication to structural modeling: how behavioral patterns based on cultural, social, and normative variables can be reproduced through algorithms. This approach is particularly important for designing virtual agents that simulate social functions, for example in commerce, negotiations, or ethical dilemmas.

Nevertheless, Hofstede’s approach is limited in that it describes sociality as an external model, remaining within the paradigm of behavioral imitation without recognizing the agentive capacity of artificial subjects. The next synthesis is introduced through the definition by Rezaev and Tregubova: “Artificial sociality is an empirical fact of the participation of artificial intelligence agents in social interactions as active intermediaries or participants in these interactions” (Rezaev, Tregubova 2019: 39). This represents the third stage of the dialectical movement, in which the concept of artificial sociality is expanded: AI is viewed not as a model or a signal carrier, but as a subject of interaction capable of initiating, interpreting, and modifying social processes.

However, even this definition retains a degree of ambiguity regarding the criteria for subjectivity and systemic reproducibility. This gap is addressed through the approach of Men’shikov, who interprets artificial sociality as a form of self-organizing social system possessing an autopoietic nature. He writes: “We understand sociality as the essence of communication among agents autonomously functioning in a self-organizing network with an autopoietic character” (Men’shikov 2020: 34). Thus, artificial sociality is not merely the fact of AI’s presence in social relations, but a process in which interaction structures can self-reproduce, adapt, and maintain systemic integrity without external control.

Based on these four positions, the following elements of the final dialectical synthesis can be identified. First, artificial sociality presupposes the existence of stable forms of communication between human and artificial agents (Malsch 2001). Second, these interactions can be described and predicted through computational modeling (Hofstede et al. 2021). Third, AI can act not merely as an object of interaction but as its

initiator and mediator (Rezaev, Tregubova 2019). Fourth, sociality in its artificial form acquires the characteristics of a system possessing autonomy, self-regulation, and autopoiesis (Men’shikov 2020). In this synthesis, all four approaches are developed further, eliminating each other’s limitations and forming a conceptual construct in which artificial sociality is understood as a multi-layered structure encompassing communicative, structural-modeling, agent-based, and systemic levels.

The final definition formulated in this way can be expressed as follows: artificial sociality is a dynamic, self-organizing system of interactions between human and artificial agents, realized within a digital environment and based on the capacity of AI to participate in the reproduction and transformation of social norms, patterns, and structures. This definition integrates the theses of all the approaches discussed and aligns with the spirit of Hegelian dialectics, in which each subsequent concept negates, preserves, and transcends the limitations of the previous ones.

It should be emphasized that such dialectical integration differs from an eclectic aggregation of definitions. The Hegelian synthesis entails a qualitative transformation of conceptual content – a transition from disparate, opposing definitions to their internally necessary unification. This is where the methodological strength of the philosophical approach lies: in uncovering the logic of conceptual development, rather than in their mechanical comparison.

The dialectical analysis of artificial sociality as a theoretical construct also makes it possible to identify its developmental prospects. For instance, a future expansion may include the concept of transagency – the capacity of social systems to encompass hybrid forms of agency that transcend the traditional division between subject and object. In this context, AI becomes not merely a tool for action but a condition for the emergence of a new type of sociality, in which the usual boundaries between the natural and the artificial no longer apply. Here, we approach the perspectives of posthumanist philosophy (Haraway 1991), actor-network theory (Latour 2005), and cognitive psychology (Nass, Moon 2000), which – despite not using the term ‘artificial sociality’ – emphasize the transformation of the very nature of social interaction under conditions of technological mediation.

Thus, the philosophical-dialectical analysis of approaches to defining artificial sociality makes it possible not only to identify their methodological differences but also to achieve their synthetic unification at the conceptual level. The final definition, derived from the logic of Hegelian dialectics, does not negate the plurality of perspectives; on the contrary, it enables their internally coherent coexistence within a theoretically unified model. This creates a solid foundation for further analysis of the phenomenon across systemic, ethical, cognitive, and technological dimensions, which will be developed in the following sections of the article.

Foundations of the systems approach for constructing an integral definition of the phenomenon as a plurality of interacting systems

The development of an integral definition of the phenomenon of artificial sociality requires a shift from the level of philosophical-dialectical analysis to the level of systemic integration. While Hegelian dialectics (Gegel’ 1974) enables the construction of internally necessary connections between definitions through the synthesis of contradictions, Luhmann’s systems theory offers a methodology grounded in the plurality of observational perspectives, autonomous structures, and self-referential processes. Within the systemic paradigm, it becomes possible not merely to combine various

approaches, but to formulate a comprehensive understanding of the phenomenon as a dynamic system of interacting yet functionally differentiated components.

According to Luhmann, society consists of a multitude of operationally closed but structurally coupled systems – such as politics, economics, law, and science – each of which reproduces itself through communication (Luhmann 1984). This principle is also applicable to the analysis of artificial sociality, which can be understood as a constellation of multiple interacting systems – cognitive, normative, technical, communicative, and algorithmic. These systems are not subordinated to a single center and do not merge into a unified whole, but are coordinated through semantic structures and codes of communication.

A key conceptual foundation borrowed from Luhmann is the concept of the observer. In systems theory, observation is understood as the distinction between ‘something’ and ‘something else’ made by a system. From this follows that any definition of a phenomenon, including artificial sociality, is an observation performed by one system in relation to another. Thus, the definitions of artificial sociality proposed by various authors (Malsch 1998, 2001; Hofstede et al. 2010, 2021; Rezaev, Tregubova 2018, 2019; Men’shikov 2020) reflect not so much an ‘objective’ essence as the specific codes of observation characteristic of particular disciplinary frameworks.

Malsch’s communicative approach observes artificial sociality as a network of informational interaction between agents (Malsch 1998, 2001). Hofstede’s modeling approach focuses on systems that reproduce behavioral patterns (Hofstede et al. 2021). Rezaev and Tregubova’s agent-activity approach views AI as an active participant in social interactions (Rezaev, Tregubova 2018, 2019). Men’shikov’s systems approach conceptualizes artificial sociality as an autopoietic network that self-reproduces through communicative operations (Men’shikov 2020). All of these observations represent different fragments of one complex phenomenon, which cannot be exhaustively described within the framework of a single theory.

The systems approach requires a shift from comparing definitions to embedding them within one another. This means that the goal is not to select one definition as the “true” one, but to identify which aspects of the phenomenon become visible through different observational perspectives. Such a methodological shift allows for the formulation of an integral definition that takes into account the multiplicity of interacting systems and their intersections within specific contexts (Luhmann 1995).

This integrality is expressed, above all, in the recognition of a multiplicity of logics: the logic of algorithmic information processing, the logic of normative regulation, the logic of everyday communication, the logic of market mechanisms, the logic of emotional response, and others. Artificial sociality, in the systemic sense, is not a sum of elements but a structure that emerges from communications between heterogeneous functional systems. It arises at the intersection of algorithms and social norms, user interfaces and legal procedures, cognitive predispositions and media intermediaries.

From the perspective of Luhmann’s systems theory, artificial sociality is not something fixed or essential but rather an operational construct that depends on the mode of its observation. This means that the definition of the phenomenon is always contextual and functional. For example, within the framework of a digital platform (such as Uber), artificial sociality may be observed as the algorithmic management of interactions between drivers and customers, where the agents include not only humans but also digital systems of evaluation, order distribution, and moderation. Within a voice interface (such as Siri or ChatGPT), artificial sociality is manifested in the AI’s ability to maintain semantic and pragmatic interaction with the user, creating the illusion of dialogue.

The systems perspective allows for a rethinking of the question of subjectivity in the context of AI. Unlike the philosophical approach, which demands a rigid ontology of the subject, the systems approach permits variability of agentivity depending on systemic conditions. Within one system (e.g., the social system), AI may be regarded as a subject of interaction, while in another (e.g., the legal system), it may be viewed as an object of regulation. Thus, subjectivity is not a universal category but a functional variable dependent on the observational framework.

The integral definition, based on systems theory, posits that artificial sociality is a plurality of observable phenomena arising at the intersection of technical, cognitive, normative, and social systems. This plurality cannot be eliminated through theoretical synthesis but can be understood as a principle of organization of the contemporary sociotechnical world. Such an approach is especially important in a context where artificial agents are entering a wide range of domains – from education and medicine to politics and justice. In each of these spheres, AI will interact with different systems, and consequently, artificial sociality itself will manifest in different ways.

Thus, the systems approach allows not only for the integration of various definitions but also for the conceptualization of the very logic of their diversity. This is the key contribution of Luhmann: to abandon the pursuit of a universal definition in favor of analyzing systemic plurality. In this context, artificial sociality appears as a heterogeneous, dynamically reproducible multiplicity of communicative systems, in which technical and human agents participate in the joint structuring of social reality (Luhmann 2013; Meņšikovs et al. 2024; Golinowski 2024).

Formulating an expanded definition of artificial sociality based on the synthesis of theoretical and empirical sources

The transition from abstract-theoretical reflection on artificial sociality to its expanded definition requires not only logical-dialectical and systemic integration, but also the careful incorporation of empirical observations and interdisciplinary research. Such an approach makes it possible not only to establish a final conceptualization but also to reveal the complexity, dynamism, and normative significance of the phenomenon under consideration.

Contemporary social and technoscientific processes increasingly demonstrate that sociality formed under conditions of algorithmic governance and digital mediatization cannot be reduced to traditional forms of human-to-human interaction. More and more frequently, agents of non-human nature – AI, algorithms, robots, and digital interfaces— are becoming involved in these processes. Their participation is no longer auxiliary; on the contrary, they often initiate, structure, and sustain forms of social interaction, mediating not only communication but also normative expectations, emotional scenarios, and everyday practices.

In the previous sections of the article, a number of theoretically grounded definitions were developed. The final definition, derived through philosophical-dialectical analysis, presented artificial sociality as a self-organizing system of interactions between human and artificial agents, possessing the capacity to reproduce and transform social norms, patterns, and structures. The integral definition, based on Luhmann’s systems theory, emphasized the plurality of observational perspectives and the functional differentiation of interacting systems – cognitive, normative, algorithmic, and technical.

However, in the context of growing technosocial complexity, there arises a need for further expansion and empirical verification of these definitions. This involves

formulating an expanded integral definition that would take into account not only theoretical foundations but also contemporary cases demonstrating how artificial sociality is realized in practice. Such a synthesis requires the inclusion of works in which the term "artificial sociality" is not used directly, but which nevertheless describe its fundamental characteristics in substantive terms.

First, the work of Nass and Moon (2000) is of particular significance, as it demonstrated that even simple forms of machine behavior exhibiting social traits elicit typically social responses from humans. This finding – the so-called ‘mindlessness’ paradox – suggests that the perception of sociality can be triggered not by the subject itself, but by the communicative form of the interface’s behavior. People unconsciously attribute social qualities to computers if they imitate speech, emotions, or humor. This makes cognitive inclusion of AI in social reality possible regardless of its ‘true’ nature – what matters is the presence of features that activate social interpretation. Thus, sociality emerges as not only an objective phenomenon but also an interpretive one – generated by the sociocognitive disposition of the perceiving subject.

Second, the works of van Dijck (2013), Couldry and Hepp (2017) reveal the structural level of artificial sociality. Their concepts of ‘platformed sociality’ and ‘mediated reality’ indicate that the social is constructed and sustained not through direct interpersonal interaction, but through algorithmically structured environments – APIs, digital interfaces, recommendation models. It becomes clear here that sociality itself is technologically mediated and therefore artificial: it arises not as a spontaneous consequence of human nature, but as a programmable, manageable, and codable structure.

This allows us to identify a crucial foundation for the expanded definition: artificial sociality includes not only interaction between humans and AI, but also the construction of the social environment by the digital systems themselves. Platforms, being essentially sociotechnical agents, shape the architecture of the possible – predetermining which forms of communication, identity, and behavior will be accessible, permissible, or encouraged.

Third, the philosophical and methodological grounds for expansion are provided by the posthumanist perspective, as represented in the works of Haraway (1991) and Latour (2005). Haraway’s image of the cyborg breaks down the binary opposition of ‘human–technology’, asserting the hybridity of identity and agency. In the context of artificial sociality, this means that human and technical agents do not merely interact, but form a shared field of action in which a strict division between subject and instrument is no longer possible. In the logic of Latour’s actor-network theory, non-human agents are regarded as full participants in social networks. Their influence lies not in conscious subjectivity but in the ability to initiate and direct social processes through technical infrastructure, code, algorithms, and standards.

Finally, the normative and ethical aspect, addressed in the work of Floridi et al. (2018), emphasizes that artificial sociality brings with it not only cognitive or technical but also profound social consequences: it transforms the logic of justice, privacy, responsibility, and trust. These changes require corresponding institutional and legal reflection, and therefore must be included in the definition as essential contexts for the functioning and regulation of artificial sociality.

An expanded definition of artificial sociality can be formulated as follows: artificial sociality is a multidimensional, dynamically organized system of interactions between human and artificial agents (including AI, algorithms, digital platforms, and robots), within which social norms, structures, meanings, and practices are formed, reproduced,

and transformed. This system is characterized by the cognitive perceptibility of AI agency, the algorithmic mediatization of the social, the normative significance of techno-subjects, and their ability to participate in shaping new forms of social identity, communication, and coordination of actions. Artificial sociality encompasses technical, cognitive, normative, and institutional aspects, structured as the result of interactions among multiple functionally differentiated systems and observational perspectives.

Table 1

Comparison of theoretical sources of the extended definition of artificial sociality

Author(-s) / Source	Uses the term ‘artificial sociality’	Level of analysis	Contribution to definition
T. Malsch (1998, 2001)	✓ Yes	Communicative	The concept of artificial sociality as a network communication between AI and humans
G.J. Hofstede et al. (2010, 2021)	✓ Yes	Modeling	Definition of artificial sociality as computational modeling of social behavior
A. Rezaev, N. Tregubova (2018–2021)	✓ Yes	Agent-active	Artificial sociality as the participation of AI in social interactions as a subject
V. Men’shikov (2020)	✓ Yes	Systemic, sociological	Artificial sociality as an autopoietic self-organizing network of agents
C. Nass, Y. Moon (2000)	✗ No	Cognitive-psychological	Demonstration of social perception of AI by humans without conscious analysis
J. van Dijck (2013)	✗ No	Media-technological	‘Platformed sociality’: algorithms and interfaces as constructs of the social environment
N. Couldry, A. Hepp (2017)	✗ No	Media-ontological	Media as participants in the construction of reality; the structure of the social through media technologies
D. Haraway (1991)	✗ No	Philosophical, posthumanist	Hybridity of agency (cyborg), rejection of binary oppositions ‘natural/artificial’
B. Latour (2005)	✗ No	Actor-networking	Methodological rationale for including non-human agents in social networks
L. Floridi et al. (2018)	✗ No	Ethical, normative	Ethical agentivity of AI, normative principles of the ‘AI society’

Source: elaborated by the authors.

This definition includes several levels:

- (1) agent-communicative – AI and platforms participate in communication, are perceived as subjects (Nass, Moon 2000), and are attributed emotions and intentions;

- (2) media-technological – sociality is constructed and structured by platforms, code, and interfaces (van Dijck 2013; Couldry, Hepp 2017);
- (3) philosophical – subjectivity and agency are decentralized and reassembled as hybrid (Haraway 1991; Latour 2005);
- (4) normative – the need arises for ethical and legal regulation of a new type of social interaction (Floridi et al. 2018).

This comparison demonstrates that the expanded definition is not a simple eclectic combination, but a synthesis of substantive, observational, and normative perspectives that are legitimately related to the essence of artificial sociality.

The advantage of such a definition lies in its analytical flexibility and methodological depth. It can be applied both to empirical cases (labor platforms, voice assistants, companion robots) and to theoretical analysis (decentralized agentivity, systemic self-reference, second-order observation, etc.). Moreover, it avoids reductionism, not reducing artificial sociality to any single disciplinary lens or ontological assumption.

It should be emphasized that the expanded definition does not negate either the final or the integral definition, but serves as their development. The final definition describes artificial sociality as a logically necessary result of the synthesis of approaches; the integral definition views it as a plurality of systemic observations. The expanded definition, in turn, focuses on the operationalization and practical applicability of the concept within the context of sociotechnical reality. It serves as a bridge between theory and empiricism, philosophy and politics, sociology and cybernetics.

In this context, artificial sociality appears as an essential attribute of platform capitalism, digital biopolitics, and posthumanist ontology—not as a marginal phenomenon, but as a central process in the constitution of 21st-century social reality.

Comparative analysis of the final and integral definitions

The formation of conceptual foundations for defining the phenomenon of artificial sociality is based on two key methodological approaches – Hegel's dialectical method and Luhmann's systems theory. These approaches respectively give rise to the final and integral definitions, each reflecting different epistemological orientations, research strategies, and levels of abstraction. This section presents a comparative analysis of these two definitions with the aim of identifying their substantive differences, shared foundations, and the epistemological and applied implications of their use in scientific analysis.

Methodological foundations. The final definition is based on Hegelian dialectics – a method that entails the movement of thought from thesis to antithesis and then to synthesis, in which the one-sidedness of previous definitions is overcome. Within this approach, artificial sociality is seen as the result of the logical evolution of various theoretical positions – from the communicative (Malsch) to the systemic (Men'shikov 2020). Each definition serves as a historical-logical stage in the development of the concept, and the final definition represents its necessary conceptual completion – logically derived, internally coherent, and abstractly generalized.

The integral definition, by contrast, is formed within the logic of Luhmann's systems theory, where the central concept is the observer. According to Luhmann, every theoretical definition is an observation by one system of another, meaning that the truth of a phenomenon is always multiple, relative to the systemic position, and operational. The integral definition does not seek logical synthesis; on the contrary, it preserves a

plurality of perspectives – technical, social, cognitive, normative – as legitimate and functional descriptions of the phenomenon.

Structural differences. The final definition has a clear logical structure: it emerges from the conflict between definitions, overcomes their contradictions, and offers a holistic, internally consistent understanding. Its strength lies in this philosophical completeness – it presents a fully developed conceptual image of the phenomenon, in which each component (communication, modeling, agency, self-organization) is embedded in a hierarchically ordered conceptual framework.

The integral definition, by contrast, is structured as a network: its components are not hierarchical but interrelated. It is not so much finalized as open to new levels of analysis and new observational frameworks. This makes it less rigorous from a logical standpoint but significantly more flexible – especially for interdisciplinary and empirical research.

The question of agentivity. Both definitions acknowledge the participation of AI in social interactions. However, the final definition emphasizes the possibility of AI being a subject capable of transforming norms and structures, based on the philosophical premise of autonomy. The integral definition offers a more flexible model of agentivity: depending on the system, AI can be a subject (in a cognitive system), an object of regulation (in a legal system), or a mediator (within platform logic).

Thus, the final definition makes stronger ontological claims about AI as an agent, whereas the integral definition operationalizes agentivity as a system-dependent function.

Level of abstraction and applicability. The final definition excels in theoretical rigor and conceptual clarity. It is particularly useful for philosophical inquiries, normative debates, and the ontological analysis of artificial agents. However, in the context of applied disciplines – such as digital sociology, the anthropology of technology, or HCI (Human-Computer Interaction) – it may prove overly abstract and insufficiently responsive to empirical variability.

The integral definition, by contrast, is originally constructed with an orientation toward multiple empirical contexts: from labor platforms to voice assistants. It enables the study not of the essence of the phenomenon, but of its manifestations in various environments, making it especially productive for applied research.

Temporal perspective: finality vs. openness. The final definition aspires to completeness. It is conceived as the result of development, the endpoint of conceptual evolution. This is its strength—it forms a concept suitable for philosophical assertion. But it is also its limitation: it may struggle to keep pace with the rapid transformations of the technosocial structures in which artificial sociality is realized.

The integral definition, from the outset, assumes its own openness to change—to the addition of new elements to the system and the revision of observational frameworks. This makes it less stable in a philosophical sense but more adaptable in a research-oriented one.

Illustrative example: voice assistant. If we consider the case of Siri or ChatGPT, the final definition will focus on the question: to what extent does the AI in this case exhibit subjectivity, the ability to reproduce social patterns, and normative communication? Here, the researcher will look for alignment with concepts such as autonomy, reproducibility, and cognitive mimicry.

The integral definition, on the other hand, will suggest viewing Siri/ChatGPT as a point of intersection between systems: technological (algorithms), communicative (language interaction), cognitive (user perception), and normative (content regulation).

Each aspect will be interpreted as a fragment of a single system – not from the standpoint of unity, but from the standpoint of observational plurality.

Table 2

Comparative analysis of definitions of artificial sociality

Criterion	Final definition	Integral definition
Methodology	Hegelian dialectic (thesis-antithesis-synthesis)	Systems theory (observation, functional differentiation)
Purpose	Logically complete concept	Considering multiple observational perspectives
Agentivity of AI	Ontological subjectivity	Functional agentivity (contextual)
Level of abstraction	High, philosophical	Medium, empirically operationalized
Variability and adaptability	Low (complete system)	High (open system)
Practical applicability	Theoretical and philosophical	Applied (sociology, design, etc.)
Integration of new cases	Limited by the logic of synthesis	High (adding new observation positions)
Approach to complexity	Concept as a result of removing complexity	Complexity as an element of analysis

Source: elaborated by the authors.

Both definitions play a key role in the conceptualization of the phenomenon of artificial sociality. The final definition is important for establishing conceptual rigor, philosophical argumentation, and normative analysis. The integral definition, on the other hand, is essential for applied, interdisciplinary, and empirically sensitive research. However, in the context of accelerating technosocial dynamics, the integral definition is preferable, as it:

- allows for a plurality of interpretations without sacrificing theoretical rigor;
- adapts to new technological forms of sociality;
- enables the construction of research frameworks that are sensitive to media environments, interfaces, normative expectations, and behavioral patterns.

In the future, it may be possible to construct a meta-definition that combines philosophical completeness with empirical flexibility. However, for the current stage of analysis, the integral definition represents the most productive starting point for theoretical and applied research on artificial sociality.

Conclusions

In the context of rapid technosocial transformation and the growing influence of artificial intelligence on various aspects of social life, the phenomenon of artificial sociality is moving beyond the realm of marginal theoretical interest and becoming a central object of interdisciplinary research. This study aims to establish the conceptual foundations and methodological frameworks for analyzing artificial sociality as a complex, multi-layered phenomenon that integrates philosophical, systemic, technological, and normative dimensions. The use of Hegel’s dialectics and Luhmann’s systems theory has made it possible not only to compare different approaches to defining artificial sociality but also to construct conceptual structures that explain how this phenomenon operates in the modern world.

The key outcome of the study was the formulation of two conceptual definitions – the final and the integral. The final definition, based on Hegelian logic of resolving contradictions and synthesis, made it possible to construct an abstract-theoretical model that generalizes and overcomes the one-sidedness of previously proposed approaches—communicative, modeling, agent-activity-based, and systemic. In this view, artificial sociality appears as a self-organizing system of interactions between human and artificial agents, possessing the ability to reproduce and transform norms, patterns, and structures. This definition is important in terms of conceptual rigor, philosophical clarity, and normative analysis, and it provides an ontological foundation for understanding the phenomenon.

In turn, the integral definition, derived from Luhmann’s systems theory, has demonstrated its value in terms of empirical applicability and interdisciplinary flexibility. In accordance with the logic of functional differentiation and the plurality of observational systems, artificial sociality is understood as the product of interactions among cognitive, technical, normative, and communicative subsystems, each of which generates its own interpretation and manifestation of the phenomenon. This framework allows for the consideration of the specificity of various contexts – from algorithmic governance on labor platforms to emotional mimicry in voice assistants – without reducing the phenomenon to a single universal essence. Moreover, the systems approach introduces an important methodological principle: the researcher does not aim for a final conceptual synthesis but instead studies the dynamics and structure of multiple points of observation and their interactions.

The comparative analysis of the final and integral definitions has shown that both are necessary for a complete conceptualization: the former provides a philosophical and normative foundation, while the latter offers analytical flexibility and empirical operationalization. However, in the context of accelerating technosocial dynamics, increasing variability of interaction forms, and the expansion of AI into various spheres of life, the advantage lies with the integral definition. It allows for a plurality of interpretations without sacrificing rigor, adapts to new technological formats of sociality, and enables the construction of research frameworks that are sensitive to media environments, interfaces, everyday behavioral patterns, and normative expectations.

An additional outcome of the study was the formulation of an expanded integral definition that not only integrates philosophical and systemic foundations but also incorporates empirical and normative dimensions. It takes into account research that does not directly use the term ‘artificial sociality’ but describes its fundamental features – cognitive perceptibility (Nass and Moon), platform-mediated sociality (van Dijck), posthumanist hybridity (Haraway), and algorithmic normativity (Floridi et al.). The expanded definition emphasizes that artificial sociality is not only interaction between humans and AI, but also the construction of the social environment itself by digital agents, interfaces, and platforms. This approach allows the phenomenon to be grasped in its entirety: as a cognitively perceived, structurally constructed, normatively significant, and technologically mediated form of contemporary sociality.

Thus, artificial sociality emerges as an operational and plural reality formed at the intersection of social, technical, legal, cognitive, and cultural systems. This necessitates a shift away from reductionist models toward a multidisciplinary and systemic analysis, in which each research perspective – from philosophy to HCI and digital ethics – contributes to a more comprehensive understanding of the phenomenon. The proposed definitions and conceptual frameworks do not claim to represent ultimate truth but serve as a platform for further research, critical reflection, and empirical verification.

In the future, it may be possible to construct a meta-definition that combines the logical rigor of the final formulation with the flexibility of the integral description. Such a meta-definition could serve as a bridge between philosophy and applied science, between conceptual synthesis and systemic plurality. However, even today, the integral definition represents the most productive starting point for understanding artificial sociality as a central process in the formation of 21st-century social reality.

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MĀKSLĪGĀ INTELEKTA RĪKU IZMANTOŠANA STUDENTU VIDŪ: DAUGAVPILS UNIVERSITĀTES (LATVIJA) PIEMĒRS

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Mūsdienās mākslīgā intelekta (MI) rīki kļūst par neatņemamu studiju procesa sastāvdaļu, taču to izmantošanas paradumi un attieksmes studentu vidū ir neviennozīmīgas. Šī pētījuma mērķis ir analizēt MI rīku izmantošanu Daugavpils Universitātes (DU) studentu vidū, īpaši koncentrējoties uz tiem, kuri nestudē informācijas tehnoloģiju jomā un izmanto MI rīkus pēc savas iniciatīvas. Pētījuma teorētiskais pamats veidots, integrējot Tehnoloģiju pieņemšanas modeli (TPM) un Inovāciju difūzijas (InD) teoriju, kas ļāva identificēt studentu attieksmes un lietošanas stratēģijas bez kvantitatīva faktoru testējuma. Pētījuma metodoloģiskais ietvars balstās uz ideālo tipu pieeju (M. Vēbers), kas ļāva strukturēti klasificēt studentus pēc attieksmes un lietošanas biežuma. Pētījumā izmantota strukturēta anketēšana ar 423 respondentu izlasi (2024.g.), izslēdzot IT studentus. Rezultāti parādīja trīs galvenās ideālo tipu grupas – “lietotāji-optimisti”, “izmēģinošie neitrāli” un “izvairīgie skeptiķi” – kā arī jauktu grupu “izmēģinošie optimisti”, kura dominē respondentu vidū. Statistiski nozīmīgas atšķirības tika konstatētas attieksmēs pret MI ietekmi uz izglītību un pasniedzēju lomu. Pētījuma jaunums ir reģionālās, netehniskās studentu grupas izpēte socioloģiskā griezumā, izmantojot ideālo tipu salīdzināšanu kā galveno analītisko instrumentu. Secināts, ka pastāv strukturēta studentu stratifikācija pēc attieksmes pret MI, kas nākotnē var ietekmēt augstākās izglītības segmentāciju. Pētījums uzsver nepieciešamību pēc stratēģiskas, ētiskas un starpdisciplināras pieejas MI rīku integrācijā izglītībā. Nākotnes pētījumu virzienos ieteicams iekļaut longitudinālu attieksmju analīzi, ietekmi uz mācību rezultātiem un starpaugstskolu salīdzinājumus.

Atslēgvārdi: mākslīgais intelekts (MI), augstākā izglītība, Tehnoloģiju pieņemšanas modelis (TPM), Inovāciju difūzijas (InD) teorija, “ideālie tipi”, studenti, socioloģiska aptauja, Daugavpils Universitāte (Latvija).

Use of artificial intelligence tools among students: a case of Daugavpils University (Latvia)

Nowadays, artificial intelligence (AI) tools are becoming an integral part of the learning process; however, their usage habits and attitudes among students are ambiguous. The aim of this study is to analyze the use of AI tools among students at Daugavpils University (DU), with a particular focus on those who are not studying in the field of information technology and use AI tools on their own initiative. The theoretical framework of the study is built by integrating the Technology Acceptance Model (TAM)

and the Diffusion of Innovation (DOI) theory, which made it possible to identify students' attitudes and usage strategies without quantitatively testing individual factors. The methodological framework is based on Max Weber's ideal type approach, allowing for the structured classification of students according to their attitudes and frequency of use. The study employed a structured survey (2024) with a sample of 423 respondents, excluding IT students. The results revealed three main ideal type groups – "optimistic users", "experimenting neutrals", and "avoidant skeptics" – as well as a mixed group of "experimenting optimists", which was the dominant group among respondents. Statistically significant differences were found in attitudes toward the impact of AI on education and the role of teachers. The novelty of the study lies in the sociological examination of a regional, non-technical student group using ideal type comparison as the main analytical tool. It was concluded that there is a structured stratification among students in terms of their attitudes toward AI, which may influence the segmentation of higher education in the future. The study emphasizes the need for a strategic, ethical, and interdisciplinary approach to integrating AI tools in education. Recommended future research directions include longitudinal analysis of attitudes, the impact on academic performance, and inter-university comparisons.

Keywords: artificial intelligence (AI), higher education, Technology Acceptance Model (TAM), Diffusion of Innovation (DOI) theory, ideal types, students, sociological survey, Daugavpils University (Latvia).

Ievads

Mūsdienu digitālajā laikmetā mākslīgā intelekta (MI) tehnoloģijas strauji ienāk dažādās sabiedrības jomās, tai skaitā izglītībā, kur to izmantošana kļūst par neatņemamu mācību procesa sastāvdaļu. Latvijā MI rīku lietošana pēdējā gada laikā būtiski pieaugusi – 2025. gada pavasarī tos izmantoja jau 38,5% Latvijas iedzīvotāju vecumā no 16 līdz 74 gadiem, un šis rādītājs gada laikā palielinājies par 58% (Apsīte 2025). Īpaši augsts lietotāju īpatsvars ir jauniešu vidū – 81% jauniešu vecumā no 16 līdz 24 gadiem, kas liecina par augstu MI integrācijas pakāpi ikdienas dzīvē un izglītības procesos. Tikmēr Rīgas Stradiņa universitātes (RSU) Pedagoģiskās izaugsmes centrs (2024) uzsver, ka MI ir kļuvis par neatņemamu izglītības vides sastāvdaļu, īpaši augstākajā izglītībā, kur būtiska ir atbildīga un jēgpilna šo rīku izmantošana.

MI rīki, kā piemēram *ChatGPT*, kļuviši par bieži izmantotu palīgu studiju un skolas darbā – gan ideju ģenerēšanai, gan teksta radīšanai un informācijas sistematizēšanai. Vienlaikus sabiedrībā valda dalītas domas – daļa redz MI kā iespēju uzlabot mācību kvalitāti un efektivitāti, savukārt citi pauž bažas par pārmērīgu palaušanos uz šiem rīkiem un par to ietekmi uz kritisko domāšanu un zināšanu dziļumu (Bite Latvija 2023; Labs of Latvia 2024a, 2024b). Piemēram, 2023. gadā veiktā vecāku aptauja atklāj, ka 46% vecāku ir satraukti par MI lomu bērnu mācību procesā, lai gan daļa atzīst to pozitīvo ietekmi un potenciālu izglītības personalizācijā (Bite Latvija 2023). Arī RSU vadlīnijās uzsvērts, ka mācībspēkiem un studentiem nepieciešams kopīgi noteikt, kādos apmēros un nolūkos MI rīki izmantojami, lai tie papildinātu, nevis aizvietotu tradicionālo mācību pieeju (Rīgas Stradiņa universitātes (RSU) Pedagoģiskās izaugsmes centrs 2024).

Šī straujā tehnoloģiju ienākšana izglītībā rada nepieciešamību analizēt, kā studenti augstākajā izglītībā reaģē uz MI rīku pieejamību, kā tos izmanto, kādu lomu tie ieņem mācību procesā, un kāda ir šo rīku uztvere ārpus tehniskajām specialitātēm. Kamēr programmēšanas vai datorsistēmu studenti bieži sastopas ar MI kā studiju saturu vai rīku,

daudz retāk tiek pētīta situācija starp humanitāro, sociālo vai citu netehnisko virzienu studentiem, kuriem MI nav tieši integrēts mācību saturā, bet kļūst pieejams kā pašvadītas izglītības instruments. Šī neviendabīgā pieeja rada izaicinājumu – kā panākt līdzsvarotu, jēgpilnu un kritiski apzinātu MI rīku izmantošanu augstākajā izglītībā visās jomās?

Līdz ar to aktuāls kļūst jautājums: kāda ir augstākās izglītības studentu izpratne par mākslīgā intelekta izmantošanu mācību procesā un kā šī izpratne atšķiras dažādos studiju virzienos, īpaši starp tiem, kuros MI nav tieši iekļauts programmā? Šī problēma kļūst īpaši nozīmīga reģionālajās augstskolās, piemēram, Daugavpils Universitātē, kur studējošie nāk no dažādiem reģioniem un sociālajiem slāņiem, un kur nepieciešama elastīga pieeja mācību modernizācijai. Pastāv risks, ka bez atbilstošas sagatavošanas un akadēmiskās vadības MI rīki var tikt izmantoti virspusēji vai neatbilstoši, radot sekas gan mācību kvalitātei, gan akadēmiskajai godīgumam.

Pamatojoties uz iepriekšminēto, šī pētījuma mērķis ir analizēt mākslīgā intelekta rīku izmantošanu studentu vidū Daugavpils Universitātē, koncentrējoties uz tiem studiju virzieniem, kuros mākslīgais intelekts nav tieši iekļauts mācību saturā, bet kur studenti to izmanto individuāli kā palīgīdzekli. Šāda izvēle ļauj izprast, kā MI rīki ietekmē mācību procesa struktūru, zināšanu apguves stratēģijas un studentu attieksmi pret akadēmisko darbu netehniskajos kontekstos.

Lai sasniegtu šo mērķi, tiks veikts socioloģisks pētījums – studentu aptauja Daugavpils Universitātē, īpaši pievēršot uzmanību humanitāro, sociālo un citu netehnisko jomu studējošajiem. Aptaujā tiks iekļauti jautājumi par MI izmantošanas biežumu, nolūkiem, studentu attieksmi pret šiem rīkiem, kā arī par uztverto ietekmi uz mācību rezultātiem un motivāciju. Šis pētījums tiks balstīts arī uz esošo empīrisku datu analīzi un diskursu par MI vietu izglītībā Latvijā. Kā liecina Kantar Latvia (2025) dati, MI lietošana strauji pieaug ne tikai jauniešu vidū, bet arī citās sabiedrības grupās, tajā skaitā senioru un mazākumtautību pārstāvju vidū, kas liecina par tehnoloģijas kļūšanu par sabiedrības ikdienas sastāvdaļu (Apsīte 2025). Tajā pašā laikā eksperti uzsver nepieciešamību pēc pedagoģiskās un ētiskās vadlīnijas, kas palīdzētu šo integrāciju padarīt jēgpilnu un drošu (Rīgas Stradiņa universitātes (RSU) Pedagoģiskās izaugsmes centrs 2024).

Apskatot mācību kontekstu kopumā, svarīgi uzsvērt arī starpdisciplināro pieeju MI izpētei, ko atzīst pētnieki (Meņšikovs u.c. 2024), norādot, ka tikai sadarbībā starp tehniskajām un sociālajām zinātnēm iespējams izprast šīs tehnoloģijas ietekmi gan uz izglītību, gan uz plašākiem sabiedriskiem procesiem. Datorlingvistika, pedagoģiskā psiholoģija, socioloģija un komunikācijas zinātne kļūst par būtiskām disciplinām, lai veidotu integrētu un kritisku skatījumu uz MI vietu izglītībā.

Literatūras apskats un īsa analīze

Zinātniskās literatūras apskats šajā pētījumā tiks veltīts mākslīgā intelekta (MI) rīku izmantošanai mācību procesā, īpaši koncentrējoties uz augstāko izglītību. Augstākās izglītības iestādes kļūst par eksperimentālām platformām MI integrācijai, kas būtiski ietekmē gan pedagoģiskās prakses, gan akadēmiskos rezultātus, kā arī studentu un pasniedzēju savstarpējo mijiedarbību. Šajā kontekstā ir nozīmīgi analizēt pieejamo literatūru, lai saprastu gan MI sniegtās iespējas, gan izaicinājumus un to, kā tie var izpausties arī Latvijas reģionālās augstskolās, piemēram, Daugavpils Universitātē.

Viens no būtiskākajiem darbiem šajā jomā ir empīriskais pētījums par studentu psiholoģiskiem faktoriem, kas ietekmē viņu vēlmi izmantot chatbotus kā MI rīkus (Ayanwale, Ndlovu 2024). Autori izmanto paplašinātu Inovāciju difūzijas (InD) (angļu val.: *Diffusion of Innovation, DOI*) teoriju (Rogers 1983; Bass 2004; Wang et al. 2023)

kombinācijā ar Tehnoloģiju pieņemšanas modeli (TPM) (angļu val.: *Technology Acceptance Model, TAM*) (Davis 1986, 1989; Granić, Marangunić 2019; Lin, Yu 2023), kas nodrošina teorētiski daudzslāņainu analīzi. Tika izvirzīti septiņi ietekmes faktori, piemēram, uzticēšanās, saderība, lietošanas vienkāršība un salīdzinošās priekšrocības. Šī strukturētā pieeja ļāva iegūt nozīmīgus rezultātus – visbūtiskākā korelācija tika novērota starp uzticēšanos MI rīkiem un uzvedības nodomu tos izmantot. Pētījums (Ayanwale, Ndlovu 2024) ir metodoloģiski noderīgs arī Latvijas kontekstā, jo tā struktūra var tikt pielāgota turpmākai izpētei Daugavpils Universitātē, kur paredzēta aptauja studentiem, kuri nestudē IT nozarē.

Latvijas kontekstā īpaši nozīmīgs ir A. Āboliņa, S. Mežinskas un V. Ļubkinas (2024) pētījums, kas veikts Rēzeknes Tehnoloģiju akadēmijā. Šis jaukto metožu pētījums balstās gan uz fokusa grupām un ekspertu intervijām, gan uz tiešsaistes aptauju rezultātiem, ļaujot analizēt studentu MI lietošanas paradumus un attieksmi. Tika konstatēts, ka studenti plaši izmanto tādas rīkus kā *ChatGPT*, *Bing Chat* un *ChatPDF*, un MI pozitīvi ietekmē gan radošumu, gan efektivitāti. Tomēr tiek uzsvēta arī nepieciešamība pēc kritiskās domāšanas attīstības un izglītojošām aktivitātēm (Āboliņa et al. 2024). Eksperti uzsver MI kā instrumenta nozīmi, nevis aizvietošanu cilvēkam. Šie secinājumi ir svarīgi, gatavojot līdzīgu pētījumu Daugavpilī, īpaši pievēršoties ne-IT studentu vajadzībām un izpratnei (Āboliņa et al. 2024).

Pētījumā par MI rīku izmantošanu mācību un mācīšanās procesā (Fitria 2021) tiek analizētas teorētiskās dimensijas par MI rīkiem izglītībā. Pētījumā tiek aprakstīti dažādi MI risinājumi, piemēram, virtuālie asistenti, automatizēta vērtēšana, personalizēta mācīšanās un viedie mācību satura tulkotāji (Fitria 2021). Autore uzsver MI potenciālu uzlabot gan skolotāja darbu, gan skolēnu mācīšanās pieredzi, bet arī norāda uz robežām – MI nespēj aizstāt skolotāja empātiju vai ētisko vadību. Šis pētījums (Fitria 2021) ir noderīgs kā vispārīgs teorētisks ietvars, kas ļauj strukturēt izpratni par MI iespējām augstākajā izglītībā.

Papildu socioloģisku un komunikācijas perspektīvu piedāvā DU pētnieku V. Meņšikova, V. Komarovas, I. Boļakovas un A. Radionova pētījums (2024), kurā analizēta mākslīgā socialitāte – cilvēka un MI kopveidotā komunikācijas vide. Izmantojot Niklāsa Lūmana sistēmu teoriju, autori analizē mijiedarbību starp cilvēku un *ChatGPT*, uzsverot emocionālās trajektorijas un kognitīvo reakciju uz MI (Meņšikovs u.c. 2024). Tiek secināts, ka MI nespēj kļūt par komunikācijas subjektu, bet tā lietojums izglītībā var veicināt kritiskās domāšanas mazināšanos, ja tam tiek piešķirts nekritisks statuss. Šī pieeja (Meņšikovs u.c. 2024) piedāvā vērtīgu konceptuālu bāzi, kuru var izmantot, analizējot DU studentu pieredzi ar MI un vērtējot viņu attieksmi pret tehnoloģijām kā sociālo partneri.

Vēl viens būtisks resurss ir pētījums par MI izmantošanu mūsdienu mācību procesā, kurā izmantota sistemātiskā literatūras apskata metode, īpaši pievēršoties MI izmantojumam valodu apguvē (Nurjanah et al. 2024). Autori uzsver MI priekšrocības, piemēram, personalizētas atsauksmes, automatizētas gramatikas korekcijas un studentu atbalsta sistēmas. Viņi arī iezīmē riskus – piemēram, radošuma zudumu un pārmērīgu atkarību no MI (Nurjanah et al. 2024). Raksts (Nurjanah et al. 2024) piedāvā starptautisku perspektīvu arī mūsu pētījumam, palīdzot identificēt vispārīgas tendences un to lokalizācijas iespējas Latvijas akadēmiskajā vidē.

No organizatoriskā un izglītības sistēmu pārvaldības viedokļa MI potenciāls augstākajā izglītībā detalizēti tiek analizēts pētījumā par MI rīku pielietojumu šajā izglītības līmenī (Venkateswaran et al. 2024). Šis teorētiskais pārskats analizē IKT un MI ietekmi uz izglītības digitalizāciju, pārvaldes procesu automatizāciju un personalizētās

izglītības modeļu attīstību (Venkateswaran et al. 2024). Autori norāda, ka nākotnē MI kļūs par būtisku studiju procesa sastāvdaļu un tikai tās iestādes, kuras spēlēs proaktīvu lomu MI ieviešanā, saglabās konkurētspēju (Venkateswaran et al. 2024). Šis skatījums ir īpaši nozīmīgs DU pētījumā, jo ļauj izprast arī institucionālo ietvaru, kurā notiek MI adaptācija.

Pētījumā par MI inovācijām, iespējām un izaicinājumiem augstākās izglītības iestādēs tiek veikts padziļināts MI rīku pielietojuma izvērtējums augstākās izglītības iestādēs, aptverot gan pētniecības, gan administratīvās un pedagoģiskās funkcijas (Ocen et al. 2025). Autori uzsver *ChatGPT*, *Elicit* un citu MI rīku svarīgo lomu datu apstrādē un mācību efektivitātes uzlabošanā, kā arī akcentē būtiskākos izaicinājumus – akadēmiskā godīguma riski, privātuma jautājumi un kritiskās domāšanas zudums (Ocen et al. 2025).

Pēdējais analizējamais un mūsu izpētes tēmai lietderīgs pētījums piedāvā būtisku skatījumu uz MI ietekmi uz studentu akadēmisko attīstību (Vieriu, Petrea 2025). Izmantojot jaukto metodi, autori identificē gan augstu MI lietošanas izplatību, gan arī pozitīvu ietekmi uz izglītības kvalitāti. Vienlaikus tiek uzsvērti riski – pārmērīga atkarība, informācijas kvalitāte un nepieciešamība pēc ētiskas un stratēģiskas MI integrācijas (Vieriu, Petrea 2025). Šie secinājumi ir tieši pielietojami DU pētījumā, kurā MI rīku ietekme tiks analizēta arī no studentu pieredzes perspektīvas.

Kopumā šajā literatūras apskatā analizētie pētījumi piedāvā daudzdimensionālu skatījumu uz MI rīku izmantošanu studiju procesā augstākajā izglītībā. Tiek atklāti gan tehnoloģiskie, gan pedagoģiskie, sociālie un ētiskie aspekti. Tie nodrošina teorētisko un metodoloģisko ietvaru, kas ļauj strukturēti pievērsties MI izmantošanas izpētei Daugavpils Universitātes studentu vidū. Īpaši nozīmīgs ir uzsvars uz ne-IT studentiem, jo tie veido lielu daļu no akadēmiskās vides un bieži vien ir mazāk sagatavoti digitālo rīku izmantošanā. Literatūras apskats rāda, ka MI integrācija ir komplekss un daudzslāņains process, kas prasa līdzsvaru starp tehnoloģiju priekšrocībām un cilvēkfaktora saglabāšanu. Tieši šāds līdzsvarots skatījums tiks mēģināts panākt arī turpmākajā pētījumā par Daugavpils Universitātes studentu pieredzi ar MI rīkiem.

MI rīku izmantošanas empīriskās izpētes teorētiski metodoloģiskais pamatojums

Daugavpils Universitātē veiktās empīriskās izpētes teorētiskais un metodoloģiskais ietvars veidots, balstoties uz aktuālākajām sociālo zinātņu un tehnoloģiju pieņemšanas izpētes tradīcijām. Lai gan pats pētījums neanalizē atsevišķu tehnoloģiskās pieņemšanas vai uztveres faktoru ietekmi uz uzvedības nodomu, tā teorētiskais pamats veidots, integrējot vairākas savstarpēji papildinošas zinātniskās perspektīvas, kas ļauj strukturēti interpretēt iegūtos rezultātus.

Kā konceptuāls pamats kalpo teorētiskie priekšstati, kas atvasināti no Tehnoloģiju pieņemšanas modeļa (TPM), izstrādāta F. Deivisa (*F. Davis*) darbos (Davis 1986, 1989). Šis modelis plaši izmantots, lai izskaidrotu tehnoloģiju pieņemšanas uzvedību izglītībā (Granić, Marangunić 2019; Lin, Yu 2023), un tā kodolā ir divas centrālās kategorijas: uztvertā lietderība (angļu val.: *perceived usefulness*) un uztvertā lietošanas vienkāršība (angļu val.: *perceived ease of use*). Lai arī šie jēdzieni netiek tieši mērīti kvantitatīvi DU pētījumā, tie tiek izmantoti kā interpretācijas rīks, analizējot studentu tipoloģiskās grupas (skat. 1. attēlu) un to pašpozicionējumu attiecībā pret MI. Šāda pieeja ir metodoloģiski pamatota, jo ļauj pāriet no faktoru testēšanas pie holistiskas pieredzes izpratnes (Granić, Marangunić 2019; Lin, Yu 2023).

Līdzīgu teorētisko pamatu piedāvā arī Inovāciju difūzijas (InD) teorija, ko izstrādājis E. Rodžerss (*E. Rogers*) (1983) un ko vēlāk papildinājis F. Bass (*F. Bass*) savā difūzijas modelī (angļu val.: *Bass Diffusion Model*) (Bass 2004). Šī teorija uzsver, ka jauninājumi sabiedrībā izplatās, balstoties uz pieņemšanas tempu, sociālo ietekmi un adaptācijas kanāliem. MI rīku lietošana studentu vidū tiek interpretēta kā inovācijas difūzijas process, kurā novērojami dažādi adaptācijas posmi – no pilnīgas noraidīšanas līdz entuziasma pilnai lietošanai (Wang et al. 2023). Šīs pieejas vērtība Daugavpils Universitātes pētījumā atklājas studentu klasifikācijā pa tipoloģiskajām grupām (skat. 1. attēlu), kur katrs tips faktiski atbilst noteiktam inovācijas pieņemšanas posmam. “Lietotāji-optimisti” atbilst agrīnajiem pieņēmējiem (angļu val.: *early adopters*), “izmēģinošie neitrāļi” – racionālajiem vairākuma pārstāvjiem (angļu val.: *early majority*), savukārt “izvairīgie skeptiķi” – vēlīnajam vairākumam vai pat atpalicējiem (angļu val.: *laggards*).

Vēl viena būtiska metodoloģiska iezīme ir fokusēšanās uz reģionāla universitātes kontekstu un mērķtiecīga IT studentu izslēgšana no izlases. Šī stratēģija ļauj pievērsties to studentu grupu izpētei, kuriem MI nav studiju programmas obligāta sastāvdaļa, bet kuri to lieto pēc pašiniciatīvas, kā individuālu mācību atbalsta rīku. Līdz ar to pētījuma objekts nav tehnoloģiju prātība *per se*, bet gan studējošo paštēls un attieksmes struktūra MI klātbūtnes kontekstā, kas saskan ar N. Lūmana (*N. Luhmann*) sistēmu teorijā balstītās mākslīgās sociālās (angļu val.: *artificial sociality*) konceptu (Malsch 1998, 2011; Rezaev, Tregubova 2019, 2021; Men'shikov 2020; Komarova et al. 2021; Menshikov et al. 2024), kur MI kļūst par jaunu komunikācijas elementu, ar kuru indivīdam jāiemācās mijiedarboties.

Tā kā autoru veiktajā empīriskajā pētījumā netiek tieši testētas TPM vai InD teorijas konstruktu korelācijas vai cēloņsakarības, šo teoriju / modeļu loma aprobežojas ar vispārīgu analītisko rāmi. TPM palīdz strukturēt interpretāciju par studentu tehnoloģijas lietošanas komfortu un uztveri, savukārt InD teorija piedāvā skatījumu uz studentu tipoloģisko piederību dažādiem adaptācijas līmeņiem. Šī pieeja ir līdzīga tai, ko piedāvā M. Ajanvale (*M. Ajanwale*) un M. Ndlovu (*M. Ndlovu*) (2024), kuri savā pētījumā kombinē InD teoriju un TPM, lai strukturēti izprastu studentu uzvedību saistībā ar MI rīku izmantošanu, taču atšķirībā no viņu modeļa, DU pētījumā nav mērķa statistiski noteikt noteikto faktoru ietekmes spēku vai virzienu. Tā vietā tiek izmantota studentu pašidentifikācija un vērtējumi, kas tiek salīdzināti pēc socioloģiski interpretējamām “ideālajiem tipiem” (Weber 1949, 1978), radot telpu kvalitatīvai analīzei.

Tāpat metodoloģiski būtisks ir tas, ka izmantotais anketēšanas rīks sastāv no strukturētiem, slēgta tipa jautājumiem, kas fokusējas uz lietošanas biežumu, attieksmi un uztverē balstītiem spriedumiem. Tas nodrošina pamatotu iespēju studentus klasificēt nevis pēc tehnoloģiskās lietpratības līmeņa, bet pēc subjektīvās pozicionēšanās attiecībā pret MI tehnoloģijām kā tādām. Šāda pieeja ļauj iegūt dziļāku izpratni par studentu vērtību orientācijām un viņu priekšstatiem par MI kā mācību procesa daļu. Tas arī izslēdz nepieciešamību ieviest plašu konstruktu mērīšanas aparātu un saglabā empīriskā pētījuma vienkāršību, nezaudējot interpretācijas potenciālu.

Empīriskais pētījums par mākslīgā intelekta rīku izmantošanu mācību procesā Daugavpils Universitātē

Savos iepriekšējos pētījumos (Men'shikov, Komarova 2023; Menshikov et al. 2024) Daugavpils Universitātes pētnieki norādīja, ka „par aktuālāko turpmākās izpētes virzienu mākslīgās sociālās socioloģijas ietvaros tuvākajā perspektīvā kļūst dažādu sabiedrības

grupu uztvere par mākslīgā intelekta rīkiem, kā arī viņu pieredze (vai tās neesamība) komunikācijā ar to, proti, cilvēku praktiskā pieredze funkcionēšanā mākslīgās sociālās kontekstā. Ir acīmredzams, ka arī šajā jomā izpaudīsies zināma sabiedrības stratifikācija, kuras cēloņi, raksturs un sekas kļūst par mūsdienu socioloģijas uzmanības objektu” (Men'shikov, Komarova 2023: 87).

Kā savu pirmo mēģinājumu empīriski analizēt cilvēku praktisko pieredzi funkcionēšanā mākslīgās sociālās ietvaros, autori veica studentu aptauju Daugavpils Universitātē (DU, Latvija, 2024. gada janvāris, n = 423 respondenti), izslēdzot informācijas tehnoloģiju programmu studentus, kuru studiju programmā mākslīgā intelekta apguve ir iekļauta kā obligāta sastāvdaļa un kuri, attiecīgi, nevar neizmantot mākslīgā intelekta rīkus.

Šīs socioloģiskās aptaujas izlases apjoms tika aprēķināts, izmantojot šādu formulu:

$$SS = \frac{p \cdot (1-p) \cdot Z^2}{e^2}, \quad (1.)$$

kur:

SS – izlases apjoms (angļu val.: *sample size*), respondentu skaits;

p – to respondentu īpatsvars, kuriem piemīt pētījumā pazīme, decimālskaitļa formā;

Z – Z vērtība (angļu val.: *Z-score*) (tabulas vērtība atbilstoši pētnieku izvēlētajam uzticamības līmenim (angļu val.: *confidence level, CL*));

e – izlases kļūdas robeža, decimālskaitļa formā.

Avots: Cochran 1963.

Minimālais izlases apjoms šim socioloģiskajam pētījumam ir 384 respondenti, pamatojoties uz šādiem parametriem:

- 1) respondentu īpatsvars ar pētāmo pazīmi tiek pieņemts pēc noklusējuma – 0,5 (Kish 1965);
- 2) uzticamības līmenis šai socioloģiskajai aptaujai ir 95%, attiecīgi Z vērtība – 1,96 (LTCC 2024);
- 3) izlases kļūdas robeža pie 95 % uzticamības līmeņa ir 0,05, kas nozīmē: ±5% (Cochran 1963).

Faktiskais izlases apjoms ir 423 respondenti, un šī izlase ir reprezentatīva DU studentiem, kas [DU] atrodas Latgalē – Latvijas dienvidaustrumu reģionā, kuram raksturīgs salīdzinoši zems sociāli ekonomiskās attīstības līmenis [5]. Izlase ir stratificēta pēc tādiem parametriem kā dzimums, vecums un studiju līmenis (bakalaura, maģistra u.c. programmas). Maksimālā novirze (jeb izlases kļūdas robeža) no Daugavpils Universitātes studentu kopējās struktūras ir 5% (skat. 1. tabulu).

Lai iegūtu datus Daugavpils Universitātes studentu socioloģiskās aptaujas gaitā, tika izvēlēta respondentu aptaujas metode izglītības iestādē, izmantojot izdrukātu anonīmu anketu ar slēgtiem jautājumiem, kuru respondents aizpildīja patstāvīgi un nodeva atpakaļ intervētājam. Aptaujas rezultāti tika ievadīti datubāzē, ko autori izveidoja, izmantojot datorprogrammu *IBM SPSS Statistics*, un kas atrodas DU Sociālo un humanitāro zinātņu institūta rīcībā Daugavpils Universitātes Sociālo un humanitāro zinātņu institūts 2024.

1. tabula

Pētījuma izlases struktūra salīdzinājumā ar Daugavpils Universitātes (DU) studentu ģenerālās kopas struktūru, 2024. gads

Pētījuma izlases parametri	Īpatsvars izlasē (n = 423 cilv.), %	Īpatsvars ģenerālajā kopā (N = 2305 cilv.), %	Izlases novirze no DU studentu ģenerālās kopas, %
Dzimums			
Vīrietis	19,2	21,5	-2,3
Sieviete	80,8	78,5	+2,3
Vecums			
19–29 gadi	63,7	59,4	+4,3
30–39 gadi	25,7	26,9	-1,2
40–49 gadi	7,8	7,0	+0,8
50 gadi un vairāk	2,8	6,7	-3,9
Studiju līmenis			
Bakalaura studijas	64,5	60,0	+4,5
Maģistra studijas	32,6	37,6	-5,0
Pēcdiploma izglītība	2,9	2,4	+0,5

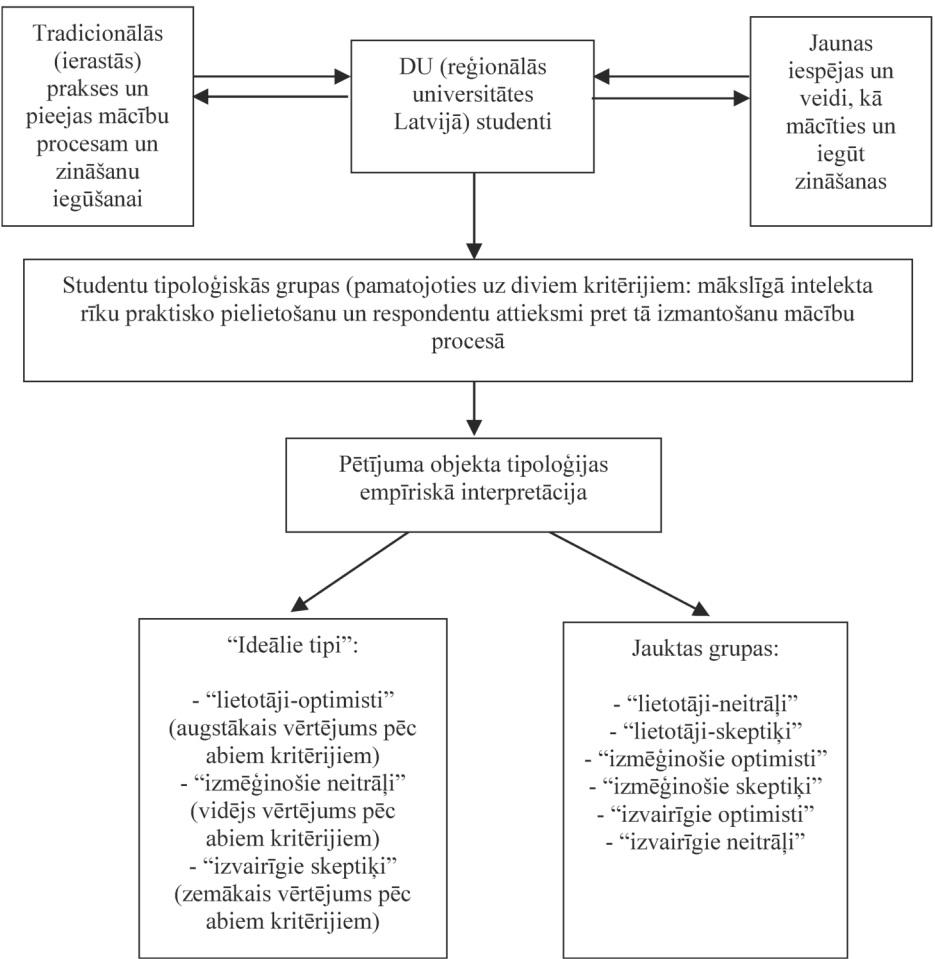
Avots: autoru izveidota tabula, pamatojoties uz Daugavpils Universitātes Sociālo un humanitāro zinātņu institūts 2024; Daugavpils Universitātes Studējošo servisa centrs 2024.

Nākamajā attēlā ir parādīta autoru veikta (balstoties uz V. Jadova (*В. Ядов*) metodoloģiju (Iadov 1972)) sistēmiska analīze par autoru veikta socioloģiskā pētījuma objektu – DU (reģionālās universitātes Latvijā) studentiem, kurus ietekmē gan tradicionālās (ierastās) mācību un zināšanu apguves prakses un pieejas, kas veidojušās iepriekšējās desmitgadēs cita tehnoloģiskā attīstības līmeņa apstākļos, gan arī jaunas iespējas un mācību formas, ko piedāvā strauji attīstošās informācijas tehnoloģijas (skat. 1. attēlu).

Pēc autoru domām, vismaz divu DU studentu tipoloģijas kritēriju kombinācija – mākslīgā intelekta praktiskā pielietošana un respondentu attieksme pret tā izmantošanu mācību procesā – ļauj visefektīvāk identificēt šī pētījuma objektu (skat. 1. attēlu) “ideālos tipus” (Weber 1949, 1978), kas ir piemēroti tālākai salīdzinošai analīzei. «Ideālais tips» (vai «tīrais tips») ir viens no pazīstamākajiem klasiskā vācu sociologa M. Vēbera (*M. Weber*) ieguldījumiem mūsdienu socioloģijā (Johnson 2000). M. Vēbers īpašu uzmanību pievērša objektivitātes problēmai sociālajās zinātnēs, tādēļ viņš izmantoja «ideālā tipa» jēdzienu kā metodoloģisku instrumentu, kas ļauj objektīvi skatīties uz realitāti (Weber 1949). «Ideālajam tipam» nav nekāda sakara ar vērtībām. Tā funkcija kā pētniecības instrumentam ir klasificēšana un salīdzināšana. Pēc M. Vēbera domām, «ideālais tips» var kalpot kā realitātes mērs. Ideālo tipu izveides mērķis nav salīdzināt empīrisko situāciju ar ideālo, bet gan salīdzināt vairākas empīriskās situācijas savā starpā (Swedberg 2018).

1. attēls

Pētījuma objekta – Daugavpils Universitātes (DU) studentu – sistēmiska analīze



Avots: autoru izveidots attēls, pamatojoties uz Iadov 1972; Weber 1949, 1978.

Nākamajā tabulā ir sniegta empīriskā interpretācija un kvantitatīvs vērtējums DU studentu tipoloģiskajām grupām attiecībā uz mākslīgo intelektu, iekļaujot gan «ideālos tipus», gan jauktās grupas (skat. 2. tabulu).

Turpmākajā salīdzinošajā analīzē tiks iekļauti tikai aptaujāto DU studentu “ideālie tipi”, kuru apjoms ir pilnīgi pietiekams kvantitatīvai analīzei, jo “minimālajam izlases lielumam sociālo zinātņu pētījumos jābūt vismaz 30 cilvēkiem” (Kish 1965: 17) – proti, “lietotāji-optimisti” (17,7% jeb 75 cilvēki), “izmēģinošie neitrāli” (17,0% jeb 72 cilvēki) un “izvairīgie skeptiķi” (10,0% jeb 42 cilvēki) (skat. 2. tabulu).

Papildus minētajiem DU studentu “ideālajiem tipiem” (attiecībā uz mākslīgo intelektu) īpašu uzmanību ir pelnījusi arī jauktā respondentu grupa – “izmēģinošie optimisti” (30,5% jeb 129 cilvēki). Šī grupa ir vislielākā starp respondentiem, un tuvākajā laikā, strauji attīstoties mākslīgā intelekta rīkiem un ar tiem saistītajām mācību un

zināšanu apguves praksēm, tā var pāriet vai nu uz augstāku kvadranta “ideālo tipu” (“lietotāji-optimisti”), vai uz labajā pusē esošo “ideālo tipu” (“izmēģinošie neitrāļi”), vai arī sadalīties starp šiem diviem “ideālajiem tipiem”, ievērojami palielinot to kvantitatīvo apjomu.

Lai izteiktu uz datiem balstītu (angļu val.: *data-driven*) pieņēmumu par jauktās grupas “izmēģinošie optimisti” iespējamo pāreju tuvākajā nākotnē uz kādu no “ideālajiem tipiem”, autori veiks četru neatkarīgu izlases grupu proporciju salīdzinājumu. Mērķis ir noskaidrot, ar kuru no “ideālajiem tipiem” šī skaitliski lielākā jauktā respondentu grupa jau šobrīd visvairāk sakrīt savos vērtējumos un spriedumos, vai arī – vai tā statistiski nozīmīgi atšķiras no visiem autoru identificētajiem “ideālajiem tipiem”, tostarp arī no tai vistuvākajiem tipiem – “lietotājiem-optimistiem” un “izmēģinošajiem neitrāļiem” (skat. 2. tabulu).

2. tabula

DU studentu tipoloģiskās grupas attiecībā uz mākslīgo intelektu,
n = 423 cilv., 2024. gads

Cik bieži jūs pielietojat mākslīgo intelektu?	Kāda ir jūsu attieksme pret mākslīgā intelekta izmantošanu mācību procesā augstākajā izglītībā?		
	Ļoti pozitīvi Diezgan pozitīvi	Grūti pateikt	Diezgan negatīvi Ļoti negatīvi
Katru dienu 3-4 reizes nedēļā	“Lietotāji-optimisti” – 17,7% (75 cilv.)	“Lietotāji-neitrāļi” – 3,5% (15 cilv.)	“Lietotāji-skeptiķi” – 0,0% (0 cilv.)
1-2 reizes nedēļā 1-2 reizes mēnesī	“Izmēģinošie optimisti” – 30,5% (129 cilv.)	“Izmēģinošie neitrāļi” – 17,0% (72 cilv.)	“Izmēģinošie skeptiķi” – 10,6% (45 cilv.)
Nekad	“Izvairīgie optimisti” – 5,0% (21 cilv.)	“Izvairīgie neitrāļi” – 5,7% (24 cilv.)	“Izvairīgie skeptiķi” – 10,0% (42 cilv.)

Avots: autoru izveidota tabula, pamatojoties uz 1. attēlu un Daugavpils Universitātes Sociālo un humanitāro zinātņu institūts 2024.

Nākamajās vairākās tabulās ir parādīti rezultāti, kas atspoguļo statistisko nozīmību atšķirībām vērtējumos un spriedumos (pēc atsevišķiem jautājumiem, kas saistīti ar mākslīgā intelekta rīku izmantošanu augstākajā izglītībā) starp DU studentu tipoloģiskajām grupām, izmantojot neatkarīgu izlašu proporciju salīdzināšanas statistisko metodi.

Kā rāda atšķirību starp DU studentu tipoloģiskajām grupām statistiskās nozīmības novērtēšanas rezultāti, kas parādīti 3. tabulā, vairāk nekā puse (57,2%) “izvairīgo skeptiķu” (3. grupa) uzskata, ka mākslīgais intelekts tuvāko piecu gadu laikā apdraud augstāko izglītību, kamēr starp “lietotājiem-optimistiem” (1. grupa) tā domā tikai 16,0%. Atšķirības šo divu polāro studentu tipoloģisko grupu atbildēs uz konkrēto jautājumu ir statistiski nozīmīgas ($p = 0,005$), tāpat kā atšķirības starp “lietotājiem-optimistiem” (1. grupa) un “izmēģinošajiem neitrāļiem” (2. grupa) ($p < 0,001$), kā arī starp “lietotājiem-optimistiem” (1. grupa) un jaukto grupu “izmēģinošie optimisti” (4. grupa) ($p < 0,001$). Tādējādi, mākslīgā intelekta uztverē kā apdraudējuma augstākajai izglītībai tuvāko piecu gadu laikā, tipoloģiskā grupa “lietotāji-optimisti” statistiski nozīmīgi izceļas ar savu relatīvo mieru salīdzinājumā ar pārējām analizētajām studentu grupām. Savukārt pārējās studentu tipoloģiskās grupas savā starpā neuzrāda statistiski nozīmīgas atšķirības atbilžu

proporcijās uz šo jautājumu ($p = 0,527$; $p = 0,806$; $p = 0,271$), paužot daudz lielāku satraukumu par mākslīgā intelekta iespējamiem draudiem augstākajai izglītībai nākamo piecu gadu laikā salīdzinājumā ar “lietotājiem-optimistiem”.

3. tabula

Mākslīgā intelekta draudu novērtējumu
salīdzinājums starp DU studentu grupām, n = 423 cilv., 2024. gads

Vai, jūsuprāt, mākslīgais intelekts apdraudēs augstāko izglītību nākamo 5 gadu laikā?	“Ideālie tipi”			Jauktā grupa
	“Lietotāji- optimisti” (n = 75 cilv.)	“Izmēģinošie neitrāļi” (n = 72 cilv.)	“Izvairīgie skeptiķi” (n = 42 cilv.)	“Izmēģinošie optimisti” (n = 129 cilv.)
	1.	2.	3.	4.
Noteikti jā	16,0%	41,7%	57,2%	34,9%
Drīzāk jā				
Grūti pateikt	36,0%	41,7%	21,4%	41,9%
Drīzāk nē	48,0%	16,6%	21,4%	23,2%
Noteikti nē				
Atšķirību divpusējā nozīmība atbilžu proporcijās starp studentu divām tipoloģiskajām grupām, Valda kritērijs (angļu val.: <i>Wald criterion</i>)	$p < 0,001$			-
	-	$p = 0,527$		-
	-	-	$p = 0,806$	
	$p = 0,005$	-	$p = 0,005$	-
	-	$p = 0,271$	-	$p = 0,271$
	$p < 0,001$	-	-	$p < 0,001$

Avots: autoru apkopots, pamatojoties uz aprēķiniem, kas veikti programmā IBM SPSS Statistics 29.0 1.0, izmantojot datus no Daugavpils Universitātes Sociālo un humanitāro zinātņu institūts 2024.

Kā rāda atšķirību starp DU studentu tipoloģiskajām grupām statistiskās nozīmības novērtēšanas rezultāti, kas parādīti 4. tabulā, gandrīz puse (48,0%) “lietotāju-optimistu” (1. grupa) nejut bailes, ka mākslīgais intelekts tuvāko piecu gadu laikā varētu iziet no kontroles augstākās izglītības jomā, kamēr starp “izvairīgajiem skeptiķiem” (3. grupa) tādu ir tikai 14,3%. Atšķirības atbilžu proporcijās starp šīm divām polārajām studentu tipoloģiskajām grupām ir statistiski nozīmīgas ($p < 0,001$), tāpat kā atšķirības starp “lietotājiem-optimistiem” (1. grupa) un “izmēģinošajiem neitrāļiem” (2. grupa) ($p = 0,004$).

Savukārt, atšķirībā no iepriekšējā jautājuma, starp “lietotājiem-optimistiem” (1. grupa) un jaukto grupu “izmēģinošie optimisti” (4. grupa) statistiski nozīmīgas atšķirības atbilžu proporcijās šoreiz nav novērojamas ($p = 0,131$). Tas nozīmē, ka šajā jautājumā jauktā grupa statistiski nozīmīgi neatšķiras ne no “lietotājiem-optimistiem” (1. grupa), ne no “izmēģinošajiem neitrāļiem” (2. grupa) ($p = 0,077$), lai gan nedaudz tuvāka tā tomēr ir pirmajai grupai (jo p-vērtība šajā gadījumā ir augstāka).

4. tabula

Mākslīgā intelekta vadāmības novērtējumu
salīdzinājums starp DU studentu grupām, n = 423 cilv., 2024. gads

Vai jūs baidāties, ka mākslīgais intelekts augstākajā izglītībā nākamo 5 gadu laikā izies no kontroles?	“Ideālie tipi”			Jauktā grupa
	“Lietotāji-optimisti” (n = 75 cilv.)	“Izmēģinošie neitrāļi” (n = 72 cilv.)	“Izvairīgie skeptiķi” (n = 42 cilv.)	“Izmēģinošie optimisti” (n = 129 cilv.)
	1.	2.	3.	4.
Noteikti jā	20,0%	50,0%	28,6%	30,2%
Drīzāk jā				
Grūti pateikt	32,0%	25,0%	57,1%	32,6%
Drīzāk nē	48,0%	25,0%	14,3%	37,2%
Noteikti nē				
Atšķirību divpusējā nozīmība atbilstu proporcijās starp studentu divām tipoloģiskajām grupām, Valda kritērijs (angļu val.: <i>Wald criterion</i>)	p = 0,004		-	-
	-	p = 0,176		-
	-	-	p = 0,006	
	p < 0,001	-	p < 0,001	-
	-	p = 0,077	-	p = 0,077
	p = 0,131	-	-	p = 0,131

Avots: autoru apkopots, pamatojoties uz aprēķiniem, kas veikti programmā IBM SPSS Statistics 29.0 1.0, izmantojot datus no Daugavpils Universitātes Sociālo un humanitāro zinātņu institūts 2024.

5. tabula

Spriedumu par mākslīgo intelektu un pasniedzējiem
salīdzinājums starp DU studentu grupām, n = 423 cilv., 2024. gads

Vai mākslīgais intelekts nākamo 5 gadu laikā aizstās universitāšu pasniedzējus?	“Ideālie tipi”			Jauktā grupa
	“Lietotāji-optimisti” (n = 75 cilv.)	“Izmēģinošie neitrāļi” (n = 72 cilv.)	“Izvairīgie skeptiķi” (n = 42 cilv.)	“Izmēģinošie optimisti” (n = 129 cilv.)
	1.	2.	3.	4.
Noteikti jā	16,0%	8,3%	14,3%	4,7%
Drīzāk jā				
Grūti pateikt	20,0%	29,2%	28,6%	23,3%
Drīzāk nē	64,0%	62,5%	57,1%	72,0%
Noteikti nē				
Atšķirību divpusējā nozīmība atbilstu proporcijās starp studentu divām tipoloģiskajām grupām, Valda kritērijs (angļu val.: <i>Wald criterion</i>)	p = 0,850		-	-
	-	p = 0,572		-
	-	-	p = 0,070	
	p = 0,465	-	p = 0,465	-
	-	p = 0,160	-	p = 0,160
	p = 0,228	-	-	p = 0,228

Avots: autoru apkopots, pamatojoties uz aprēķiniem, kas veikti programmā IBM SPSS Statistics 29.0 1.0, izmantojot datus no Daugavpils Universitātes Sociālo un humanitāro zinātņu institūts 2024.

Kā rāda atšķirību starp DU studentu tipoloģiskajām grupām statistiskās nozīmības novērtēšanas rezultāti, kas parādīti 5. tabulā, gandrīz vienāds respondentu skaits divās polārējās tipoloģiskajās grupās – “lietotāji-optimisti” (1. grupa) un “izvairīgie skeptiķi” (3. grupa) – uzskata, ka mākslīgais intelekts pēc pieciem gadiem aizstās universitāšu pasniedzējus (attiecīgi 16,0% un 14,3%), un šajā jautājumā nav statistiski nozīmīgu atšķirību atbilstu proporcijās starp šīm pretstatītajām grupām (p = 0,465).

Ir ievērojams cēlonis, ka, lai gan “lietotāji-optimisti” (1. grupa) un “izvairīgie skeptiķi” (3. grupa) gandrīz vienādi vērtē pašas universitāšu pasniedzēju aizstāšanas ar mākslīgo intelektu iespējamību pēc pieciem gadiem, viņu attieksme pret šo iespēju ir atšķirīga, un šīs atšķirības ir statistiski nozīmīgas (skat. 6. tabulu).

6. tabula

Attieksmes pret pasniedzēju aizstāšanu ar mākslīgo intelektu
salīdzinājums starp DU studentu grupām, n = 423 cilv., 2024. gads

Ja mākslīgais intelekts aizstās universitāšu pasniedzējus, kā jūs par to izturēsieties?	“Ideālie tipi”			Jauktā grupa
	“Lietotāji-optimisti” (n = 75 cilv.)	“Izmēģinošie neitrāļi” (n = 72 cilv.)	“Izvairīgie skeptiķi” (n = 42 cilv.)	“Izmēģinošie optimisti” (n = 129 cilv.)
	1.	2.	3.	4.
Noteikti pozitīvi				
Drīzāk pozitīvi	8,0%	0,0%	0,0%	4,7%
Grūti pateikt	28,0%	16,7%	7,1%	23,3%
Drīzāk negatīvi				
Noteikti negatīvi	64,0%	83,3%	92,9%	72,0%
Atšķirību divpusējā nozīmība atbilstu proporcijās starp studentu divām tipoloģiskajām grupām, Valda kritērijs (angļu val.: <i>Wald criterion</i>)	p = 0,008		-	-
	-	p = 0,147		-
	-	-	p = 0,005	
	p < 0,001	-	p < 0,001	-
	-	p = 0,073	-	p = 0,073
	p = 0,228	-	-	p = 0,228

Avots: autoru apkopots, pamatojoties uz aprēķiniem, kas veikti programmā IBM SPSS Statistics 29.0 1.0, izmantojot datus no Daugavpils Universitātes Sociālo un humanitāro zinātņu institūts 2024.

Kā rāda atšķirību starp DU studentu tipoloģiskajām grupām statistiskās nozīmības novērtēšanas rezultāti, kas parādīti 6. tabulā, neviens respondents no “izmēģinošajiem neitrāļiem” (2. grupa) un “izvairīgajiem skeptiķiem” (3. grupa) nav pozitīvi noskaņots pret iespēju, ka mākslīgais intelekts piecu gadu laikā aizstās universitātes pasniedzējus, kamēr starp “lietotājiem-optimistiem” (1. grupa) šādu ir 8,0 %. Šajā ziņā “lietotāji-optimisti” (1. grupa) statistiski nozīmīgi neatšķiras tikai no jauktās grupas “izmēģinošie optimisti” (4. grupa) (p = 0,228).

Tādējādi jauktās grupas “izmēģinošie optimisti” (4. grupa) vērtējumi un spriedumi statistiski nozīmīgi līdzinās gan “lietotāju-optimistu” (1. grupa), gan “izmēģinošo neitrāļu” (2. grupa) vērtējumiem un spriedumiem, un dažkārt pat – “izvairīgo skeptiķu” (3. grupa) skatījumam. No tā var secināt, ka tuvākajā nākotnē salīdzinoši daudz pārstāvju no jauktās grupas “izmēģinošie optimisti” (4. grupa) varētu pāriet uz jebkuru no trim “ideālajiem tipiem”, taču visbiežāk – uz pirmajiem diviem: “lietotāji-optimisti” (1. grupa)

vai “izmēģinošie neitrāli” (2. grupa). Tajā pašā laikā pastāvēs arī trešais tips – “izvairīgie skeptiķi” (3. grupa), kuru īpatsvars sabiedrībā kopumā, visticamāk, ir daudz lielāks nekā studentu vidū. Netieši šo pieņēmumu apstiprina arī fakts, ka pēc oficiālās Latvijas statistikas datiem 2022. gadā 16,3 % iedzīvotāju Latgalē – valsts dienvidaustrumu reģionā, kur atrodas Daugavpils Universitāte – vispār nelietoja internetu regulāri (vismaz reizi nedēļā) (Latvijas Republikas Centrālā statistikas pārvalde (LR CSP) 2024).

Kopumā novērtējot savas pirmās empīriskās izpētes par cilvēku praktisko darbību mākslīgās sociālītātes (Malsch 1998, 2011; Rezaev, Tregubova 2019, 2021; Men'shikov 2020) ietvaros – DU studentu socioloģiskās aptaujas – rezultātus, autori var konstatēt mūsdienu Latvijas studentijas pastāvošo stratifikāciju attiecībā uz mākslīgā intelekta rīku izmantošanu mācību procesā. Šī stratifikācija nākotnē var novest pie augstākās izglītības nozares segmentācijas, kur šie segmenti kvalitatīvi atšķirsies cits no cita pēc mācību formāta, iesaistītajiem dalībniekiem (gan pasniedzējiem, gan studentiem), savstarpējo attiecību rakstura, mācību un pētniecības procesa organizācijas, un, iespējams, arī pēc mācību rezultātiem.

Secinājumi

Pētījuma rezultāti apstiprina, ka mākslīgā intelekta rīku izmantošana studentu vidū Daugavpils Universitātē nav viennozīmīga, bet strukturēta dažādās tipoloģiskās grupās, kuru attieksmes, izmantošanas biežums un uztvere par MI lomu mācību procesā būtiski atšķiras. Dominējošā grupa – “izmēģinošie optimisti” – veido potenciālu pārejas punktu starp skeptiskiem un pozitīvi noskaņotiem studentiem, liecinot par strauji attīstošu adaptācijas procesu. Savukārt “izvairīgie skeptiķi” saglabā ievērojamu distanci pret MI rīkiem, atklājot dziļākas sociālās un kultūras pretestības saknes, kas nākotnē var ietekmēt gan individuālās, gan institucionālās pieejas tehnoloģiju integrācijai. Nozīmīgi ir tas, ka, lai arī tikai neliela daļa studentu uzskata MI par tiešu apdraudējumu pasniedzēju lomai, lielākā daļa ir noskaņota kritiski pret šādu iespējamo attīstības scenāriju. Tādējādi MI rīku uztvere netiek reducēta uz vienkāršu "par vai pret", bet veido daudzslāņainu attieksmju spektru.

Pētījumā izmantotā socioloģiskā pieeja, kas balstās uz M. Vēbera “ideālo tipu” konceptu, nodrošināja iespēju strukturēti analizēt šo dažādību bez nepieciešamības pēc sarežģītiem korelācijas modeļiem, tādējādi padarot pētījumu īpaši piemērotu sabiedrisko zinātņu kontekstā. Tomēr jāatzīst arī šīs pieejas ierobežojumi – kvantitatīvā mērījuma trūkums neļauj identificēt cēloņsakarības starp noteiktiem faktoriem, piemēram, medijpratību, digitālajām prasmēm un uzticēšanos tehnoloģijām. Tāpat, fokusējoties uz netehnisko specialitāšu studentiem, pētījums neaptver vispārējo MI adaptācijas līmeni augstākajā izglītībā, kas būtu iespējams tikai, iekļaujot arī IT un inženierzinātņu studentus salīdzinošā analizē.

Pētījuma rezultāti uzrāda arī būtisku sociālās stratifikācijas iespējamību nākotnē – attiecībā gan uz pieeju MI resursiem, gan uz attieksmēm, kas var ietekmēt izglītības kvalitāti, akadēmiskās vides vienotību un pārmaiņu vadību augstākajā izglītībā. Šī stratifikācija iespējams novedīs pie augstākās izglītības segmentācijas, kuras ietvaros veidosies dažādi akadēmiskie modeļi atkarībā no tehnoloģiskās integrācijas pakāpes un iesaistīto pušu attieksmes. Tāpēc ir būtiski MI rīku integrāciju veidot ar stratēģisku skatījumu, kas ietver gan digitālo pratību, gan ētikas un kritiskās domāšanas aspektus.

Nākotnes izpētei paveras vairāki virzieni. Pirmkārt, nepieciešams analizēt MI ietekmi uz konkrētiem mācību rezultātiem un akadēmisko sniegumu, iekļaujot gan kvantitatīvus rādītājus, gan kvalitatīvas refleksijas. Otrkārt, būtu lietderīgi veikt

longitudinālus pētījumus, kas ļautu izsekot studentu attieksmju maiņai laika gaitā, MI tehnoloģijām attīstoties un institucionalizējoties. Treškārt, pētījumu iespējams paplašināt starpaugstskolu salīdzinājuma ietvaros, kas ļautu identificēt reģionālās un institucionālās atšķirības MI integrācijas praksēs. Un visbeidzot – nepieciešama starpdisciplināra sadarbība starp sociālajām, pedagoģiskajām un tehniskajām zinātnēm, lai veidotu ilgtspējīgu, iekļaujošu un jēgpilnu MI integrāciju izglītībā. Šādas pieejas ieviešana stiprinātu ne tikai izglītības kvalitāti, bet arī studentu spēju kritiski orientēties tehnoloģiju straujās pārmaiņās.

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INDIVIDUĀLI CENTRĒTA IZGLĪTĪBA UN PAŠMĀCĪBA AR MĀKSLĪGĀ INTELEKTA RĪKU PALĪDZĪBU: EKONOMISTA SPECIALITĀTES PIEMĒRS

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Pētījums analizē aktuālu tēmu – mākslīgā intelekta (MI) integrāciju augstākajā izglītībā individuāli centrētas izglītības un pašmācības kontekstā. Pētījuma aktualitāti nosaka MI rīku strauja izplatība sabiedrībā, tostarp izglītībā, kā arī nepieciešamība izstrādāt pedagoģiski pamatotus to izmantošanas modeļus. Pētījuma mērķis ir izpētīt MI rīku iespējas individuāli centrētā izglītībā un pašmācībā, izmantojot ekonomista specialitātes apguves piemēru. Teorētiskais pamats ietver tādus modeļus kā Tehnoloģiju pieņemšanas modelis (TPM), Kognitīvās slodzes teorija (KST), Aizvietošanas palielināšanas modifikācijas pārdefinēšanas (APMP) modelis un “cilvēka cilpā” pieeja. Metodoloģiski pētījums balstīts uz gadījuma izpēti – Daugavpils Universitātes bijušo studentu (šī pētījuma autoru) pieredzes analīzi, kā arī ChatGPT ģenerētu studiju plānu un mikroekonomikas kursa salīdzinājumu ar reālajām akadēmiskajām programmām. Būtisks pētījuma aspekts ir četru slāņu-līmeņu empīriskās izpētes struktūra: 1) studiju programmu līmenis, 2) atsevišķi kursi (piemēram, mikroekonomika), 3) koncepti un jēdzieni (piemēram, pieprasījuma elastība), un 4) apakšjēdzieni (piemēram, krustelastība). Šāda daudzslāņaina analīze ļauj izvērtēt MI spējas ne tikai satura strukturēšanā, bet arī tā pedagoģiskajā loģikā un dziļumā. Šo struktūru papildina pamatmetafora – zināšanas kā ogles, kas glabājas dziļi zemes dziļēs, bet MI rīki kalpo kā instrumenti, ar kuru palīdzību izglītojamais var šīs “ogles” atrast, izcelt un izmantot. Rezultāti rāda, ka MI spēj veidot strukturētus un didaktiski atbilstošus mācību materiālus. Tomēr MI ģenerētajās programmās tika konstatētas būtiskas nepilnības, piemēram, informācijas tehnoloģiju kompetenču neiekļaušana. Neskatoties uz pētījuma gaitā identificētajām nepilnībām (kas lielā mērā raksturīgas arī mūsdienu augstākajai izglītībai), ar MI rīku palīdzību par vienu no izglītības ieguves veidiem var kļūt patiesi individuāli centrēta pašmācība, kurā katrs ieinteresētais indivīds var apgūt zināšanas savā tempā un pēc programmas, kas pielāgota viņa vai viņas dzīves situācijai (piemēram, grūtībām fiziski apmeklēt lekcijas universitātē). Pētījuma novitāte ir tāda, ka tas piedāvā dziļu starpdisciplināru skatījumu uz MI kā potenciālu palīgu, nevis aizstājēju akadēmiskajam darbam, uzsverot nepieciešamību pēc cilvēka refleksijas, ētikas un kritiskas pārbaudes MI pielietojumā. Tiek izvirzīts arī kvalifikācijas validēšanas jautājums – kā atpazīt MI vadībā iegūtas zināšanas profesionālajā telpā. Pētījums secina, ka MI rīki var būt efektīvi individuāli centrētā studiju procesā, ja tie tiek stratēģiski un ētiski integrēti un ja tiek nodrošināta institucionāla kvalitātes pārbaude.

Atslēgvārdi: mākslīgais intelekts (MI), individuāli centrēta izglītība, pašmācība, ekonomista specialitāte, ChatGPT, kvalifikācijas validācija, tehnoloģiju integrācija.

Individually centered education and self-learning with the help of artificial intelligence tools: a case of the economist specialty

The study analyzes a topical issue – the integration of artificial intelligence (AI) into higher education within the context of individually centered education and self-learning. The relevance of the research is determined by the rapid spread of AI tools in society, including the education sector, as well as the need to develop pedagogically grounded models for their use. The aim of the study is to explore the possibilities of AI tools in individually centered education and self-learning, using the acquisition of the economist profession as an example. The theoretical foundation includes models such as the Technology Acceptance Model (TAM), Cognitive Load Theory (CLT), the Substitution Augmentation Modification Redefinition (SAMR) model, and the Human-in-the-Loop (HITL) approach. Methodologically, the study is based on a case study – the experience analysis of former students of Daugavpils University (who are also the authors of this study), as well as a comparison between a study plan and a microeconomics course generated by ChatGPT and actual academic programs. A key aspect of the research is the four-layer empirical analysis structure: (1) the level of study programs, (2) individual courses (e.g., microeconomics), (3) concepts and notions (e.g., demand elasticity), and (4) sub-concepts (e.g., cross-elasticity). This multilayered analysis makes it possible to assess AI's capabilities not only in content structuring but also in pedagogical logic and depth. This structure is complemented by a central metaphor – knowledge as coal hidden deep underground, and AI tools as instruments that help the learner discover, extract, and utilize these “coals”. The results show that AI can generate structured and didactically appropriate learning materials. However, significant shortcomings were identified in the AI-generated programs, such as the absence of information technology competencies. Despite the shortcomings identified within the study (many of which are also inherent in modern higher education), AI tools can enable a truly individually centered form of self-learning, where each motivated person can acquire knowledge at his or her own pace and through a program adapted to personal life circumstances (for example, difficulties with physically attending university lectures). The novelty of the study lies in its deep interdisciplinary perspective on AI as a potential assistant – rather than a substitute – for academic work, emphasizing the need for human reflection, ethics, and critical evaluation in the application of AI. The study also raises the issue of qualification validation – how to recognize knowledge acquired under the guidance of AI in professional settings. It concludes that AI tools can be effective in individually centered study processes if they are strategically and ethically integrated and if institutional quality control is ensured.

Keywords: artificial intelligence (AI), individually centered education, self-learning, economist specialization, ChatGPT, qualification validation, technology integration.

Ievads

Mūsdienu izglītības sistēma saskaras ar būtiskām pārmaiņām, ko izraisa digitālo tehnoloģiju, jo īpaši mākslīgā intelekta (MI) rīku, integrācija. Šīs pārmaiņas būtiski maina ne tikai pedagogiskās metodes un mācību vidi, bet arī pašu izglītības jēgu, virzot to uz personalizētāku, individuāli centrētu pieeju. Šajā kontekstā īpaša nozīme iegūst pašmācības iespējas un studentu spēja uzņemties atbildību par savu mācību procesu.

Šī pētījuma aktualitāti nosaka vairāki savstarpēji saistīti faktori. Pirmkārt, MI rīku lietošana kļūst par sabiedrības ikdienas sastāvdaļu – Kantar pētījuma dati (Apsīte 2025) rāda, ka 2025. gada pavasarī vairāk nekā trešdaļa Latvijas iedzīvotāju vecumā no 16 līdz 74 gadiem regulāri izmanto MI rīkus. Turklāt būtisks pieaugums novērots tieši tajās sabiedrības grupās, kuras agrāk uzskatītas par tehnoloģiski atturīgākām – senioros un mazākumtautību pārstāvjos. Tas liecina par tehnoloģiju iekļaušanos visplašākajās sabiedrības daļās un nepieciešamību attīstīt arī izglītības sistēmu tā, lai tā būtu pielāgota šai jaunajai digitālajai realitātei.

Otrkārt, Latvijas izglītības vidē MI tiek uztverts gan kā palīgs, gan kā potenciāls traucēklis. Kā norāda A. Margers (2024), diskusijās skolās tiek akcentēts, ka MI var palīdzēt izglītības procesā, piemēram, atbildot uz jautājumiem, kad skolotājs nav pieejams, vai sniedzot alternatīvus mācību materiālus. Vienlaikus tiek atzīts, ka MI nepietiek cilvēciskuma un emocionālās inteligences, kas ir neaizvietojami izglītības sastāvdaļas. Tādējādi rodas nepieciešamība skaidri definēt, kā MI var kalpot kā rīks skolotāju un studentu rokās, nevis kļūt par patstāvīgu izglītības aģentu.

Tieši šajā sakarā izceļas filozofa un pētnieka A. Baumeistera (*A. Baumeister*) (2025) pozīcija, kas padziļina izpratni par MI potenciālu un tā robežām. A. Baumeisters savā analītiskajā skatījumā pauž cieņas pilnu fascināciju par GPT tipa valodas modeļu spēju strukturēt un sintezēt informāciju, vienlaikus brīdinot par to virspusējību un “dzīvības” nepietiekamību. Viņš norāda, ka MI teksti bieži vien ir formāli pareizi, taču tiem nepietiek dziļākas cilvēciski filozofiskas izpratnes, kas rodas tikai caur dzīvu mijiedarbību un refleksiju. GPT piedāvātās atbildes, pēc viņa domām, rada izpratnes ilūziju un izglītības imitāciju (“ChatGPT var sastādīt arī programmu pat tam, kā iemācīties līdēt” – Baumeister 2025), bet tās, līdzīgi kā oficiālās padomju runas, ir estētiskas, pareizas, bet tukšas – tās nomāc patstāvīgu domāšanu (Baumeister 2025). Šī atziņa ir ārkārtīgi nozīmīga, jo parāda – MI rīki var būt efektīvi tikai tad, ja tos lieto apzināti, kā papildinājumu cilvēka domāšanai, nevis tās aizstājēju.

Šo uzskatu papildina arī Rīgas Stradiņa universitātes (RSU) Pedagoģiskās izaugsmes centra izstrādātās vadlīnijas (2024), kas uzsver nepieciešamību MI rīkus izmantot atbildīgi, ētiski un pedagoģiski pamatoti. Tiek izcelta vajadzība pēc mācībspēku apmācības, akadēmiskā godīguma nodrošināšanas un riska izvērtēšanas. Vadlīnijās ietverta arī ideja, ka MI var uzlabot personalizēto mācīšanos, sekmēt studentu iesaisti un palīdzēt strukturēt mācību materiālus – taču tikai tad, ja ir izstrādāti pārskatāmi lietošanas mērķi un ierobežojumi. Līdzīgi Labs of Latvia (2024) materiālā norādīts, ka MI lietošanai jābūt mērķtiecīgai, tai jābalstās uz skaidriem mācību mērķiem un kritiskās domāšanas attīstīšanu.

Pētnieciskā problēma izriet no šīs pretrunas starp MI sniegtajām iespējām un nepieciešamību saglabāt cilvēkcentrētu, dziļi izprotošu mācību procesu. Kā nodrošināt, lai MI būtu nevis pašmērķis, bet rīks, kas palīdz studentam attīstīt domāšanu, spēju mācīties pašvadīti un orientēties mācību procesā? Kā šādu balansu panākt, piemēram, ekonomista studiju kontekstā, kur MI var sniegt plašas iespējas datu analīzē, simulāciju radīšanā un informācijas strukturēšanā? Atbildes uz šiem jautājumiem kļūst arvien aktuālākas mūsdienu akadēmiskajā telpā, kur digitālā transformācija vairs nav nākotnes jautājums, bet tagadne.

Šī pētījuma mērķis ir izpētīt MI rīku iespējas individuāli centrētā izglītībā un pašmācībā, izmantojot ekonomista specialitātes apguves piemēru. Pētījumā ir pielietota gadījuma izpētes (angļu val.: *case study*) metode, balstoties šī pētījuma dažu līdzautoru reālajā studiju pieredzē Daugavpils Universitātes ekonomikas bakalaura studiju programmā, kur MI tiek lietots kā hipotētiskais instruments pašvadītai mācībai. Šāda

pieeja ļauj iedziļināties ne tikai tehnoloģiskajā, bet arī pedagoģiskajā un epistemoloģiskajā aspektā – analizēt, kā MI lietošana ietekmē mācīšanās motivāciju, satura izpratni, refleksijas spējas un profesionālās kompetences attīstību.

MI rīku izmantošana izglītībā ir neizbēgams un potenciāli ļoti vērtīgs virziens, tomēr tas pieprasa dziļu izpratni par to, kā šie rīki mijiedarbojas ar cilvēka domāšanu, mācīšanās procesiem un profesionālās identitātes veidošanos. Tikai tā iespējams izstrādāt pedagoģiski pamatotas stratēģijas, kas MI izmantošanu padara jēgpilnu, nevis virspusēju. Pētījums piedāvā ieguldījumu šīs izpratnes veidošanā, koncentrējoties uz individuāli centrētu mācīšanās pieredzi ekonomista specialitātē – jomā, kur MI rīki tuvākajos gados var zināmā mērā pat aizvietot universitātes pasniedzējus.

Literatūras apskats un īsa analīze

Pamatojoties uz analizētajām publikācijām, šajā sadaļā tiek apskatīti un īsumā analizēti būtiskākie pētījumi par MI rīku pielietojumu individuāli centrētā izglītībā un pašmācībā, jo īpaši saistībā ar augstāko izglītību un ekonomista specialitāti.

Pirmkārt, Vjetnamā veiktais pētījums par ChatGPT ietekmi uz studentu mācību paradumiem piedāvā detalizētu skatījumu uz ChatGPT ietekmi uz studentu mācīšanās uzvedību, izmantojot jaukto metožu dizainu (Nguyen et al. 2024). Kvantitatīvi dati no 73 studentiem un kvalitatīvas intervijas ar 15 pasniedzējiem ļāva izcelt gan ieguvumus (ātra informācijas ieguve, valodas apguve, personalizēta atgriezeniskā saite), gan riskus (kritiskās domāšanas samazināšanās, plagiāts, pasivitāte). Pētījumā (Nguyen et al. 2024) izmantots Tehnoloģiju pieņemšanas modelis (TPM) (angļu val.: *Technology Acceptance Model, TAM*) (Davis 1986, 1989; Granić, Marangunić 2019; Lin, Yu 2023) un Kognitīvās slodzes teorija (KST) (angļu val.: *Cognitive Load Theory, CLT*) (Sweller 1988, 2011; Paas et al. 2016), kas ļāva izprast, kā uztvertais lietderīgums un lietošanas ērtums ietekmē MI pieņemšanu, vienlaikus uzsverot kognitīvā atvieglojuma lomu. Pētījuma autori (Nguyen et al. 2024) uzsver, ka MI var būtiski sekmēt individuāli centrētu mācīšanos tikai tad, ja tiek ievēroti ētikas un pašregulācijas principi.

R. Beikers (*R. Baker*) piedāvā plašu teorētisku pārskatu par MI integrāciju izglītībā, uzsverot personalizācijas potenciālu. Autors akcentē, ka MI sistēmas var analizēt skolēnu iesaisti, progresu, emocijas un sniegt adaptīvas mācību rekomendācijas (Baker 2021). Svarīgi ir tas, ka R. Beikers izceļ datu nozīmi, norādot uz mācīšanās analītikas (angļu val.: *Learning Analytics*) un izglītojošo datu ieguves (angļu val.: *Educational Data Mining*) lomu personalizētā mācībā. Autors arī uzsver nepieciešamību pēc sistēmiskas MI integrācijas, lai izvairītos no fragmentētām pieredzēm (Baker 2021). Šie uzstādījumi ir būtiski ekonomista izglītības kontekstā, kur liela loma ir datu analītikai un individuālo spēju attīstībai.

Pētījuma autori par MI pielietojumu izglītības vidē izceļ piecas galvenās izaicinājumu kategorijas MI ieviešanā izglītībā (Ali et al. 2024): lietotāju, operacionālos, vides, tehnoloģiskos un ētiskos. Īpaši aktuāli ir lietotāju izaicinājumi, kas saistīti ar radošuma trūkumu, nepietiekamu kontekstuālo izpratni un pārāk lielu atkarību no datu kvalitātes. Tehnoloģiskie izaicinājumi ietver datu drošības riskus, bet ētiskie – aizspriedumus un iekļaušanas problēmas. Šis pētījums (Ali et al. 2024) ir svarīgs, lai analizētu riskus, ar kuriem var saskarties MI pielietošana ekonomikas izglītībā, kur precizitāte, konteksts un ētika ir īpaši svarīgi.

Sistēmiskajā pārskatā par MI saistību ar izglītību tiek analizēta personalizētās izglītības attīstība ASV, Ķīnā un Indijā, uzsverot “cilvēks cilpā” (angļu val.: *Human-in-the-Loop, HITL*) pieeju kā pamatu MI tehnoloģiju ieviešanai (Bhutoria 2022). Lielāka uzmanība tiek vērsta uz adaptīvajām mācību platformām, diagnostikas rīkiem un prognozējošām sistēmām. Šī pieeja īpaši piemērota profesionālajai izglītībai, tostarp ekonomistiem, jo tā ļauj savlaicīgi identificēt zināšanu trūkumus un optimizēt mācību trajektorijas. Autore uzsver nepieciešamību pēc pasniedzēju sagatavošanas un sabiedrības uzticības, kas ir priekšnoteikums veiksmīgai MI ieviešanai.

Nākamais analizējamais pētījums (Nguyen et al. 2023) piedāvā būtisku ieguldījumu MI ētisko aspektu izpētē izglītībā. Tiek identificēti septiņi ētiskie principi (Nguyen et al. 2023): pārvaldība, caurspīdīgums, ilgtspēja, privātums, drošība, iekļaušana un cilvēkcentrētība. Šie principi ir īpaši nozīmīgi individuāli centrētā izglītībā, kur MI pielietojumam jābūt balstītam uz cilvēktiesību, autonomijas un datu aizsardzības ievērošanu. Ekonomista specialitātē, kur liela loma ir datu izmantošanai, šie ētiskie standarti ir būtiski ne tikai no pedagoģiskā, bet arī profesionālās atbildības viedokļa.

Grāmatas “Mākslīgais intelekts izglītībā: ieceres un ietekme uz mācīšanu un mācīšanos” (angļu val.: *Artificial Intelligence in Education: Promises and Implications for Teaching and Learning*) (Holmes et al. 2019) autori analizē MI vēsturisko attīstību un tā ietekmi uz izglītības transformāciju, diskutējot par izglītības diviem galvenajiem jautājumiem – “ko mācīt?” un “kā mācīt?” – piedāvājot Aizvietošanas palielināšanas modifikācijas pārdefinēšanas (APMP) (angļu val.: *Substitution Augmentation Modification Redefinition, SAMR*) modeli (Hamilton et al. 2016) kā rīku MI integrācijas līmeņu analīzei. Grāmatas autori (Holmes et al. 2019) uzsver, ka MI spēj padziļināt refleksiju un izpratni, tomēr brīdina par iespējamu emocionālās dimensijas nepietiekamību. Šis līdzsvarotais skatījums uz tehnoloģiju potenciālu un ierobežojumiem ir nozīmīgs, plānojot mācību stratēģijas ekonomista sagatavošanā, kur līdzās racionālajai domāšanai jāveido arī vērtības balstīta izpratne par ekonomiskajiem procesiem.

Empīriskajā pētījumā par MI ietekmi uz studentu akadēmisko attīstību (Vieriu, Petrea 2025) tiek izmantota gan kvantitatīvā, gan kvalitatīvā analīze, balstoties uz aviācijas un medicīnas inženierijas studentu pieredzi. Rezultāti rāda augstu MI pieņemšanu (virs 80% respondentu uzskata, ka MI uzlabo mācību efektivitāti un akadēmisko sniegumu), bet arī izgaismo bažas – neprecīza informācija, kritiskās domāšanas samazināšanās, atkarība no tehnoloģijām (Vieriu, Petrea 2025). Pētījuma dati ir piemērojami arī ekonomikas izglītībā, kur MI var uzlabot datu analīzes prasmes, bet vienlaikus radīt risku zūdēt cilvēkcentrētai un kritiskai pieejai.

Apkopojot minēto, literatūras apskats parāda, ka MI rīkiem, piemēram, ChatGPT un citiem adaptīviem mācību palīgiem, ir būtisks potenciāls individuāli centrētas un pašmācībā balstītas izglītības uzlabošanai. Tomēr šo potenciālu iespējams pilnībā realizēt tikai tad, ja tiek ievēroti šādi nosacījumi:

- 1) personalizācija jāapvieno ar kritisku domāšanu un cilvēkcentrētību. Lai gan MI spēj sniegt individualizētu mācību pieredzi, tikai cilvēks var nodrošināt ētisko vadību, empātiju un kontekstuālu pielāgošanu;
- 2) nepieciešama līdzsvarota integrācija starp MI un pasniedzēja lomu. Skolotājs pārtop par mācību procesu dizaineru, atbalstītāju un refleksijas veicinātāju;
- 3) datu drošības un privātuma jautājumi ir centrāli. Ekonomista specialitātē, kur ikdienā tiek izmantoti lieli datu apjomi, ir būtiski nodrošināt ētisku datu izmantošanu un lietotāju tiesību ievērošanu;
- 4) tehnoloģijām jābūt uzticamām, pieejamām un uz lietotāju orientētām. Nepieciešama skolotāju un studentu digitālās kompetences pilnveide;

5) jāveicina starpdisciplināra pieeja, kur MI rīki tiek izmantoti ne tikai kā tehnoloģisks papildinājums, bet kā metodoloģisks instruments, kas palīdz strukturēt mācību procesus, attīstīt refleksiju un stratēģisko domāšanu.

Pēc autoru domām, šie literatūras avoti kopumā veido plašu un daudzdimensionālu izpratni par MI potenciālu un izaicinājumiem individuāli centrētā izglītībā. Tie sniedz teorētisku un empīrisku pamatojumu šī raksta galvenajai idejai: MI rīki, ja tie tiek ētiski un stratēģiski integrēti, var kalpot kā efektīvi palīgi pašmācībā un profesionālajā attīstībā, arī tādās jomās kā ekonomika, kur analītiskā, sistemiskā un reflektīvā domāšana ir īpaši nozīmīga.

Pētījuma metodoloģija

Metodoloģiskā pieeja šajā pētījumā ir balstīta uz koncepciju par izglītības procesu kā cilvēkcentrētu, dinamisku un dziļi personificētu pieredzi, kurā mākslīgā intelekta (MI) rīki kalpo kā instrumenti zināšanu ieguvei, nevis tās aizstāšana. Šī izpēte izmanto gadījuma izpētes dizainu, balstoties reālajā studiju pieredzē Daugavpils Universitātes ekonomikas bakalaura programmā, kur studēja vairākums no pētījuma autoriem. Šāda izvēle ļauj ne tikai novērot konkrētus piemērus, bet arī analizēt vispārīgus principus par MI un izglītības mijiedarbību, izmantojot teorētiskos ietvarus no literatūras (skat. iepriekšējo raksta sadaļu): Tehnoloģiju pieņemšanas modeli (TPM), Kognitīvās slodzes teoriju (KST), APMP modeli un “cilvēka cilpā” pieeju.

Pētījuma pamatmetafora – zināšanas kā ogles, kas glabājas dziļi zemes dzīlēs, un MI kā instruments, kas palīdz izglītojamajam tās atrast, izcelt un izmantot – nosaka arī metodoloģisko optiku. Tā vietā, lai mērītu tikai zināšanu daudzumu, tiek pētīts, vai mācību procesā ir izcelts vērtīgs saturs jeb “ogles”, vai arī iegūts kaut kas virspusējs, neatbilstošs patiesajām vajadzībām – “smiltis vai pelni”. Tāpēc mērķis nav vienkārši aprakstīt MI rīku lietošanu, bet gan izvērtēt, kā šie rīki palīdz (vai traucē) izglītojamajam ieraudzīt un strukturēt jēgpilnas zināšanas, attīstīt refleksiju un profesionālu kompetenci. Datu vākšana tika strukturēta vairākos līmeņos (skat. 1. attēlu).

1. attēls

Empīriskās izpētes līmeņi-“slāņi”

1. slānis: studiju programmas	Ekonomikas bakalaura studiju programma
2. slānis: studiju kursi	Mikroekonomikas studiju kurss
3. slānis: koncepti un jēdzieni	Pieprasījuma elastības jēdziens
4. slānis: apakšjēdzieni	Krustelastība kā jēdziena paveids

Avots: autoru izveidots attēls pētījuma metodoloģijas pielietošanas ilustrēšanai.

Pirmkārt, tika analizēts ChatGPT ģenerēts ekonomikas studiju plāns, kuru salīdzināja ar reālu Latvijas universitāšu akreditētu programmu saturu. Šī salīdzinājuma pamatā ir pieņēmums, ka MI spēj strukturēt informāciju un piedāvāt hipotētisku studiju trajektoriju, bet rodas jautājums – vai šī struktūra patiešām atbilst nozarē definētajām kompetencēm un profesionālajām prasībām? Tādējādi metodoloģiski šis posms kalpo kā sava veida “datu ieguves slānis” – kādas “ogles” MI identificē, kad tam tiek dots uzdevums definēt pilnvērtīgu izglītības ceļu.

Otrkārt, tika analizēts ChatGPT piedāvātais mikroekonomikas kursa plāns, sadalīts pa nedēļām un tematiskiem blokiem. Tika izmantota salīdzinošā analīze ar tradicionālajām akadēmiskajām programmām un pētījuma autoru-ekonomistu pieredzi, lai noteiktu, vai piedāvātās tēmas un to secība atbilst teorētiski pamatotai mācību loģikai. Šī pieeja ietver arī KST principu (Sweller 1988, 2011) piemērošanu, analizējot, vai informācijas sadalījums un uzdevumu struktūra ir piemērota kognitīvajai slodzei un mācīšanās efektivitātei. Tādējādi MI tiek vērtēts nevis pēc “zināšanu daudzuma”, bet pēc tā, vai tas palīdz izglītojamajam virzīties loģiski pa izziņas “šautuvēm”, nesapludinot informāciju vai neradot pārslodzi.

Treškārt, pētījuma metodoloģija balstās arī uz TPM modelī (Davis 1986, 1989), kas ļauj analizēt studentu uztverto lietderību un lietošanas ērtumu, attiecībā uz MI rīku izmantošanu pašmācībā. Lai to izdarītu, tika strukturēta refleksijas metode – pētījuma autori analizēja savu pieredzi, novērojot MI rīku izmantošanu konkrētajā studiju procesā. Tādējādi tika pētīts “ogļu ieguves process” – vai tas ir mērķtiecīgs, jēgpilns, vai arī kļūst par nejaušu klaiņošanu pa tukšām “pazemes ejām”.

Papildu tam, metodoloģija ietvēra APMP modeļa (Hamilton et al. 2016) piemērošanu. Tika analizēts, kurā līmenī konkrētajā gadījumā MI integrācija atrodas – vai tā ir tikai aizvietošana (angļu val.: *substitution*), uzlabojums (angļu val.: *augmentation*), būtiska modifikācija (angļu val.: *modification*), vai pilnīga pārdefinēšana (angļu val.: *redefinition*) nozares izglītības saturā. Šī analīze ļāva izdarīt secinājumus ne tikai par tehnoloģiju pielietojuma dziļumu, bet arī par to, cik lielā mērā MI spēj mainīt pašu mācību procesu no reproduktīvas uz reflektīvu, no transmisijas uz konstruējošu.

Saturiskā validācija tika nodrošināta ar “cilvēka cilpā” principa (Bhutoria 2022) ievērošanu. Lai gan MI rīki spēj ģenerēt daudzus mācību plānus, definīcijas, uzdevumus un analītiskās struktūras, visi šie rezultāti ir pakļauti cilvēka kontrolei un izvērtējumam. Šis aspekts ir būtisks, jo uzsver studiju procesa epistemoloģisko dimensiju: tikai cilvēks spēj noteikt, vai “iegūtās ogles” ir patiesi vērtīgas, vai arī tikai imitē spīdumu. “Cilvēka cilpā” modelis šajā pētījumā kalpo kā pamatojums hipotēzei – MI rīki palīdz virzīties dziļāk zināšanu “šahtās”, ja to vada cilvēka refleksija un kritiska domāšana.

Pētījuma rezultāti un diskusija

Lai izvērtētu, cik precīzi mākslīgā intelekta (MI) rīki spēj strukturēt akadēmisko saturu un piedāvāt studiju plānus, kas atbilst Latvijā akreditētām ekonomikas programmām, tika veikta salīdzinošā analīze starp reālu Daugavpils Universitātes bakalaura studiju programmu ekonomikā (1994.g.–1998.g.) un ChatGPT ģenerēto kursu sarakstu, kas balstīts uz jautājumu par to, kādi kursi būtu nepieciešami, lai iegūtu Latvijā pielīdzināmu izglītību un ekonomista kvalifikāciju. Šī salīdzinājuma mērķis bija identificēt, kādas “zināšanu ogles” MI spēj izcelt no pieejamajiem informācijas avotiem – vai tās atbilst nozarē definētajiem standartiem, vai arī rodas neatbilstības, kas var liecināt par strukturālu virspusību. Iegūtie rezultāti ir apkopoti 1. tabulā, kur redzama abu

programmu satura uzbūve, tematiskās grupas un to īpatsvars, ļaujot spriest par MI spēju saprast izglītības loģiku, prioritātes un profesionālās kompetences prasības ekonomikā.

1. tabula

Reālās un MI rīku izveidotās ekonomikas bakalaura studiju programmas salīdzinājums

Bakalaura studiju programma “Ekonomika”, kas rezultātā iegūts ekonomikas bakalaura grāds un ekonomista kvalifikācija, Daugavpils Universitāte, 1994.g.–1998.g.		ChatGPT atbilde jautājumam: “Kādi studiju kursi (ar procentuālo īpatsvaru kopējā studiju programmā) vajadzētu apgūt, lai iegūtu izglītību, kas Latvijā ir pielīdzināma ekonomikas bakalaura grādam un ekonomista kvalifikācijai?”	
Studiju programmā apgūtie kursi (secība atbilst diplomam)	Akadēmisko stundu skaits	Studiju programmā apgūtie kursi*	Īpatsvaru kopējā studiju programmā
Ekonomikas teorija (makro- un mikroekonomika)	140	1. Ekonomikas teorija	20–25%
Augstākā matemātika	140	Mikroekonomika I, II	
Ekonomisko procesu modelēšana	90	Makroekonomika I, II	
Grāmatvedība	120	Starptautiskā ekonomika	
Finanšu teorija un finanšu pārvalde	90	Pasaules ekonomika / Globālā ekonomika	
Firmas ekonomika	90	Ekonomikas vēsture / Doktrīnas	
Mārketinga pamati	60	2. Matemātika un statistika	10–15%
Prečzinības pamati	120	Augstākā matemātika (lineārā algebra, analīze)	
Banku darbība	60	Matemātika ekonomikā	
Ekonomikas teoriju vēsture	70	Statistika I, II	
Starptautiskā ekonomika	20	Ekonometrija I, II	
LR aktuālās ekonomiskās problēmas	20	3. Grāmatvedība un finanses	10–15%
Demogrāfija	70	Finanšu grāmatvedība	
Socioloģija	140	Vadības grāmatvedība	
Lietišķa socioloģija	40	Uzņēmējdarbības finanses	
Ekonomiskā socioloģija	40	Finanšu tirgi / Investīciju teorija	
Apdrošināšanas pamati	30	4. Vadības zinības un uzņēmējdarbība	10–15%
Informātikas pamati	136	Vadības teorija	
Lietišķo programmu paketes	124	Mārketinga	
Informācijas sistēmas un tīkli	30	Starptautiskā uzņēmējdarbība	
Darba tiesības	60	Stratēģiskā vadība	

Sociālā psiholoģija	60	5. Tiesības un ekonomikas regulācija	5–10%
Menedžmenta pamati	70	Komerctiesības / Uzņēmējdarbības tiesības	
Tiesību pamati	30	Ekonomikas tiesības / ES tiesības	
Saimnieciskās tiesības	20	Nodokļu politika	
Starptautiskās tiesības	70	6. Sociālās zinātnes un ētika	5–10%
Filozofijas pamati	60	Socioloģija / Politikas zinātne	
Politoloģija	20	Ekonomikas filozofija / Ētika uzņēmējdarbībā	
Intelektuālais īpašums	70	Psiholoģija / Organizāciju uzvedība	
Latvijas vēsture	20	7. Prakse	5–10%
Civiltiķete	20	Prakse uzņēmumā, finanšu institūcijā vai valsts iestādē	
Angļu valoda	140	8. Bakalaura darbs	5–10%
Kursa darbs socioloģijā	40	Zinātniski pētnieciskais darbs ar empīrisku vai teorētisku pieeju	
Kursa darbs mārketingā	40	9. Valodu un komunikācijas prasmes	5%
Bakalaura darbs	120	Akadēmiskā rakstīšana	
Prakses: Mācību prakse III kursā Mācību prakse IV kursā	4 nedēļas 4 nedēļas	Angļu valoda ekonomikā / Biznesa komunikācija	

* Lai iegūtu izglītību, kas Latvijā ir pielīdzināma ekonomikas bakalaura grādam un ekonomista kvalifikācijai, studiju programmai ir jāatbilst Latvijas normatīvajiem aktiem, īpaši:
- MK noteikumiem Nr. 512 (2014. gada 15. jūlijs) par akadēmisko izglītību, un
- Valsts standarta prasībām attiecībā uz pamatstudiju programmām ekonomikā.
Pamatojoties uz tipiskajām Latvijas augstskolu akreditētajām ekonomikas programmām (LU, SSE Rīga, RTU, RSU u.c.), ekonomikas bakalaura programma veidojas no noteiktajām kursu grupām ar aptuveno procentuālo īpatsvaru kopējā programmā (parasti 180 ECTS, t.i., 3 gadi pilna laika studijās).
Avots: autoru izveidota tabula, pamatojoties uz Daugavpils Universitāte 1998; Open AI 2025.

Salīdzinot Daugavpils Universitātes reālo studiju programmu (1994.g.–1998.g.) ar ChatGPT piedāvāto struktūru (skat. 1. tabulu), redzams, ka MI spēj identificēt galvenās tematiskās jomas – ekonomikas teoriju, finanses, vadību, sociālās zinātnes, tiesības un pat pētniecību, – piedāvājot līdzsvarotu (pēc procentuālā īpatsvara) kursu struktūru. Tomēr šajā salīdzinājumā atklājas arī būtiskas neatbilstības – piemēram, MI izveidotajā programmā nav atsevišķa informācijas tehnoloģiju bloka, kas mūsdienu ekonomikā ir ne tikai nozīmīga atbalsta joma, bet arī neatņemama ekonomista kompetenču sastāvdaļa. Reālajā programmā informātikas pamati un lietišķās programmatūras kursi bija iekļauti ar skaidru mērķi attīstīt digitālās prasmes, kas nepieciešamas datu apstrādei, prezentācijām, modelēšanai un vispārīgai profesionālajai darbībai (no otras puses, ir arī taisnība, ka 1990. gadu vidū ITursos mēs apguvām pamatlietas – piemēram, kā ielēgt datorus, – kas tagad ir zināmas jebkuram skolēnam, un MI rīka izmantošana studiju programmas izveides nolūkā jau paredz digitālo prasmju esamību izglītojamam). Tādējādi ChatGPT nespēja – vismaz šajā konkrētajā gadījumā – atpazīt IT aspektu (saturiski augstākajā, nekā 1990. gados, līmenī, ieskaitot to pašu MI kā studiju kursu) liecina par noteiktu strukturālu nepilnību, kas apdraud MI rīka veidotās studiju programmas atbilstību mūsdienu darba tirgus prasībām.

Šī neatbilstība uzsver nepieciešamību MI rīku rezultātus vienmēr pārskatīt cilvēkam – gan no pedagoģiskā, gan saturiskā viedokļa. Turklāt tas atgādina par “cilvēks cilpā” principa nozīmi – MI nevar pilnībā aizstāt ekspertu-cilvēku spriestspēju, īpaši jautājumos, kas saistīti ar profesionālo sagatavotību un kvalifikācijas standartiem. Neskatoties uz to, MI piedāvātajā struktūrā ir arī pozitīvi aspekti – tā uzrāda centienus nodrošināt tematisko līdzsvaru starp teorētisko pamatu, kvantitatīvajām metodēm, grāmatvedību, vadību, tiesībām un pētniecību, kas norāda uz noteiktu “izpratnes” līmeni par bakalaura programmas uzbūvi.

2. tabulā ir redzams, ka MI rīks spēj detalizēti strukturēt pilna laika ekonomikas bakalaura studiju programmu pa sešiem semestriem, ietverot gan tirgus ekonomikai klasiskās ekonomiskās disciplīnas (mikroekonomika, makroekonomika, statistika, ekonometrija, grāmatvedība), gan papildinot tās ar praksi un izvēles kursiem. Tomēr šī struktūra arī apstiprina iepriekš konstatēto – tajā nav iekļauta neviena informācijas tehnoloģijām vai digitālām prasmēm veltīta studiju vienība, piemēram, datu analīzes rīki, ekonomiskā programmēšana, vai pat vienkārši darbs ar lietiskām programmām. Šis trūkums vēl vairāk uzsver MI radītā satura potenciālo virspusību un nepieciešamību pēc papildināšanas ar reālo pieredzi un nozares prasību analīzi.

2. tabula

MI rīka piedāvātais pilna laika bakalaura studiju plāns ekonomikā uz 6 semestriem (3 gadiem)

Sudiju kursi	ECTS
1. gads	
1. semestris	30
Mikroekonomika I	6
Augstākā matemātika I	6
Statistika I	6
Ekonomikas vēsture un domas attīstība	6
Akadēmiskā rakstīšana un pētniecība	3
Ievads uzņēmējdarbībā	3
2. semestris	30
Mikroekonomika II	6
Makroekonomika I	6
Augstākā matemātika II	6
Statistika II	6
Tiesību pamati ekonomikā	3
Ekonomiskā ģeogrāfija vai izvēles kurss	3
2. gads	
3. semestris	30
Makroekonomika II	6
Ekonometrija I	6
Finanšu grāmatvedība	6
Mārketingss	6
Angļu valoda biznesā / komunikācija	3
Socioloģija / Psiholoģija	3
4. semestris	30
Starptautiskā ekonomika	6
Ekonometrija II	6

Vadības teorija	6
Vadības grāmatvedība	6
Politikas zinātne vai izvēles kurss	3
Prakse I (ievadprakse, 2–3 nedēļas)	3
3. gads	
5. semestris	30
Finanšu pārvaldība (<i>corporate finance</i>)	6
Starptautiskā uzņēmējdarbība	6
Nodokļu sistēma un politika	6
Stratēģiskā vadība	6
Pētniecības metodoloģija	3
Izvēles kurss (ekoloģiskā ekonomika, digitālā ekonomika u.tml.)	3
6. semestris	30
Bakalaura darbs	12
Prakse II (4–6 nedēļas)	6
Sabiedriskās attiecības un ētika	3
Izvēles kurss (ES ekonomika, uzvedības ekonomika u.tml.)	3
Reģionālā vai attīstības ekonomika	6

Papildus piezīmes:

- izvēles kursi var tikt pielāgoti studentu interesēm (piem., digitālā ekonomika, ESG, zaļā ekonomika, ekonomika un AI);
- prakses kopā ap 9 ECTS ir obligāts elements, lai iegūtu profesionālu kvalifikāciju;
- bakalaura darbs parasti ir empīrisks vai teorētisks pētījums (12 ECTS);
- kursu sadalījums nodrošina līdzsvaru starp ekonomikas teoriju, kvantitatīvajām metodēm, finansēm, vadību un pētniecību.

Avots: ChatGPT (Open AI 2025) izveidota tabula, pamatojoties uz 1. tabulu.

Nākamajā posmā (skat. 3. tabulu) tiek analizēta MI piedāvātā detalizētā mikroekonomikas kursa struktūra, lai noskaidrotu, cik padziļināti MI spēj izstrādāt konkrētus studiju kursus, ne tikai vispārīgu programmu.

3. tabula

MI rīka piedāvātais mācību plāns viena studiju kursa – mikroekonomikas – apguvei* (pa soļiem)

Nosaukums	Ilgums	Uzdevumi / rekomendācijas apguvei
Mikroekonomika I (pamati, <i>basic</i>)		
1. Teorētiskā bāze	1.–4. nedēļas	– Mācību grāmata: N. Gregory Mankiw – “ <i>Principles of Microeconomics</i> ” (pieejama arī kā PDF) – Katru nedēļu 1–2 nodaļas + pieraksti ar shematisku izklāstu (grafiki!) – Uzzīmē pieprasījuma un piedāvājuma līknes un analizē līdzsvaru
2. Grafiskā intuīcija un matemātika	5.–7. nedēļas	– Apgūsti grafiku interpretāciju: kas mainās, kad mainās nodokļi, subsīdijas utt. – Pamata funkciju analīze: $Q_d = a - bP$, $Q_s = c + dP$. – Elastības aprēķini: $\% \Delta Q / \% \Delta P$

3. Patērētāja un ražotāja teorija	8.–10. nedēļas	– Uzzīmē budžeta ierobežojumus un vienlīdzīgas lietderības līknes – Praktiski piemēri: kā izvēlas patērētājs? Kā optimizē ražotājs?
Mikroekonomika II (padziļināta, <i>advanced</i>)		
4. Tirgus struktūras un reālās situācijas	11.–13. nedēļas	– Analizē piemērus no dzīves: monopols (Latvenergo?), oligopols (telekomunikācijas) – Iepazīsties ar spēļu teorijas pamatiem (piem., ieslodzītā dilemmas spēle)
5. Īss pārskats un praktiskie uzdevumi	14.–15. nedēļas	– Atrisini 20–30 testa uzdevumus – Analizē konkrētu situāciju: piem., kā mainās līdzsvars, ja valdība ievieš cenu griestus?

* Klasiski šis kurss tiek sadalīts divos daļās:

Mikroekonomika I (pamati, *basic*):

- Ievads un pamattermini: tirgus, cena, piedāvājums un pieprasījums, līdzsvars.
- Pieprasījuma un piedāvājuma elastība.
- Patērētāja uzvedība: lietderība, budžeta ierobežojums, izvēles.
- Ražotāja uzvedība: izmaksas, peļņa, ražošanas funkcijas.
- Tirgus struktūras: pilnīga konkurence, monopols.

Mikroekonomika II (padziļināta, *advanced*):

- Nepilnīga konkurence: oligopols, monopolistiskā konkurence.
- Spēļu teorijas elementi.
- Ekonomiskā efektivitāte un labklājība.
- Ārējie efekti (externalities) un publiskās preces.
- Asimetriska informācija.

Avots: autoru izveidota tabula, pamatojoties uz Open AI 2025.

Analizējot 3. tabulā sniegto mākslīgā intelekta (MI) rīka piedāvāto mācību plānu mikroekonomikas kursa apguvei, redzams, ka tas ir strukturēts piecos skaidri definētos posmos, kas aptver gan pamatzināšanas, gan padziļinātu analīzi. Pirmās četras nedēļas veltītas teorētiskajai bāzei, izmantojot atzītu mācību literatūru (*N.G. Mankiw*), kā arī iesakot grafisko pieeju pieprasījuma un piedāvājuma līkņu analīzei. Nākamais posms pievēršas grafiskajai intuīcijai un matemātikai, ietverot funkciju analīzi un elastības aprēķinus, kas ir svarīgi mikroekonomikas kvantitatīvie aspekti. Trešajā posmā uzsvars tiek likts uz patērētāja un ražotāja teoriju, tostarp praktisko piemēru izmantošanu. Šeit MI demonstrē izpratni par mikroekonomikas pamata elementiem un to savstarpējo loģisko secību.

Otrajā kursa daļā, kas veltīta padziļinātai apguvei, MI piedāvā analīzi par dažādām tirgus struktūrām, piemēram, monopolistiskajiem un oligopoliskajiem modeļiem, kā arī iepazīstina ar spēļu teorijas pamatiem. Šī sadaļa liecina par MI spēju iekļaut arī sarežģītākas ekonomikas teorijas, piedāvājot piemērus no Latvijas ekonomiskās vides, piemēram, Latvenergo. Visbeidzot, kursa plāns noslēdzas ar īsu pārskatu un praktiskiem uzdevumiem, kas orientēti uz zināšanu nostiprināšanu un pielietošanu.

Kopumā šis kursa plāns apliecina, ka MI spēj izveidot didaktiski un loģiski strukturētu kursu, kura saturiskā uzbūve ir līdzīga tradicionālajām akadēmiskajām programmām. Tajā skaidri iezīmējas progresija no teorijas uz praksi, kā arī mērķtiecīga integrācija starp tekstuālo, grafisko un matemātisko informāciju.

Tālākajā analīzē (skat. 4. tabulu) autori pievēršas tam, kā MI skaidro jēdzienu “pieprasījuma elastība”, piedāvājot gan definīciju, gan formulas, interpretācijas un praktiskus piemērus.

4. tabula

Kā MI rīks skaidro jēdzienu “pieprasījuma elastība”

Skaidrojamais elements	Skaidrojums
Termiņa definīcija	Pieprasījuma elastība nozīmē to, cik jutīgi patērētāji reaģē uz kādu izmaiņu, piemēram, cenas, ienākumu vai citu faktoru izmaiņām. Tā ir mērvienība, kas parāda pieprasījuma procentuālās izmaiņas attiecībā pret kāda faktora procentuālo izmaiņu.
Galvenais jēdziens: cenas elastība pēc pieprasījuma (angļu val.: <i>Price Elasticity of Demand, PED</i>)	Tas ir visizplatītākais elastības veids, un to aprēķina šādi: cenas elastība pēc pieprasījuma = % pieprasījuma izmaiņas / % cenas izmaiņas Piemērs: - Ja cena palielinās par 10%, un pieprasījums samazinās par 20%, tad: $PED = -20\% / 10\% = -2$ Elastības koeficienta zīme parasti ir negatīva (cenas un pieprasījuma pretēja saistība), bet praksē izmanto absolūto vērtību.
Kā interpretēt rezultātu?	> 1 – Elastīgs pieprasījums – Patērētāji stipri reaģē uz cenu izmaiņām $= 1$ – Vienības elastība – Pieprasījums mainās tādā pašā proporcijā kā cena < 1 – Neelastīgs pieprasījums – Patērētāji maz reaģē uz cenu izmaiņām $= 0$ – Pilnīgi neelastisks – Pieprasījums nemainās vispār, neatkarīgi no cenas (piem., dzīvību glābjošas zāles) $= \infty$ – Pilnīgi elastisks – Patērētāji pērks tikai vienā konkrētā cenā, pretējā gadījumā – neko
Citi elastības veidi	Ienākuma elastība pēc pieprasījuma: % pieprasījuma izmaiņas / % ienākumu izmaiņas - Pozitīva vērtība → normālas preces - Negatīva vērtība → mazvērtīgas preces (angļu val.: <i>inferior goods</i>) Krustelastība (angļu val.: <i>cross elasticity</i>): % pieprasījuma izmaiņas A / % cenas izmaiņas B - Pozitīva → aizvietotājpreces (piem., Coca-Cola un Pepsi) - Negatīva → komplementārpreces (piem., kafija un cukurs)
Kāpēc elastība ir svarīga?	- Uzņēmumiem: palīdz saprast, vai cenu celšana nesīs lielākus ienākumus (ja pieprasījums neelastīgs) - Valstij: prognozēt, kā iedzīvotāji reaģēs uz nodokļiem vai subsīdijām - Ekonomiskajā analīzē: elastība ir pamats politiku ietekmes novērtēšanai

Avots: autoru izveidota tabula, pamatojoties uz Open AI 2025.

Analizējot 4. tabulu, redzams, ka MI rīks skaidri un precīzi strukturē jēdzienu “pieprasījuma elastība”, sākot ar terminoloģisko definīciju, turpinot ar formulām un beidzot ar interpretācijas iespējām un praktiskiem piemēriem. Definīcija atbilst klasiskajiem ekonomikas avotiem un ļauj studentiem saprast pieprasījuma reakciju uz cenu vai citu faktoru izmaiņām. Īpaši nozīmīgi, ka MI piedāvā ne tikai galveno – cenas elastību pēc pieprasījuma, – bet arī citus elastības veidus: ienākuma elastību un krustelastību. Katra elastības veida interpretācija ir papildināta ar piemēriem, kas balstīti reālās vai viegli saprotamās situācijās, piemēram, kafijas un cukura vai Coca-Colas un Pepsi cenu izmaiņas.

Šī strukturētā pieeja ne tikai veicina izpratni, bet arī palīdz attīstīt analītisko domāšanu, jo studentiem tiek piedāvāts skaidrs ceļš no formulas uz praktisko piemēru un ekonomisko interpretāciju. Lielu pievienoto vērtību dod arī interpretācijas skalas (piemēram, elastīgs, neelastīgs, vienības elastība), kas palīdz apgūt jēdzienu kvalitatīvi, ne tikai kvantitatīvi. Kopumā 4. tabula parāda, ka MI spēj radīt loģiski strukturētu, didaktiski pamatotu un satura ziņā atbilstošu skaidrojumu par vienu no mikroekonomikas pamatjēdzieniem.

Tālākajā analīzē (skat. 5. tabulu) tiek aplūkots, kā MI rīks skaidro krustelastību vienkāršotā formā “kā skolēnam” (lai izglītojamam bez iepriekšējām zināšanām būtu saprotami), fokusējoties uz intuitīvu izpratni un dzīves piemēriem.

5. tabula

MI rīka piedāvatais krustelastības vienkāršots skaidrojums – “kā skolēnam”

Skaidrojamā pozīcija	Skaidrojums
Kas ir krustelastība?	Tas ir veids, kā ekonomisti saprot, vai divas preces ir saistītas – vai tās ir aizvietotāji (piemēram, Coca-Cola un Pepsi), vai lieto kopā (piemēram, kafija un cukurs)
Piemērs 1: Aizvietotājpreces	Iedomājies, ka Coca-Cola kļūst dārgāka. Cilvēki var sākt pirkt vairāk Pepsi, jo tā ir līdzīga, bet lētāka. → Tātad, ja Coca-Cola cena ceļas, Pepsi pieprasījums palielinās → Šajā gadījumā krustelastība būs pozitīva Pozitīva krustelastība → preces ir aizvietotāji
Piemērs 2: Komplementārpreces	Tagad iedomājies, ka kafijas cena palielinās. Daudzi cilvēki dzer kafiju ar cukuru, tāpēc, ja mazāk cilvēku pērk kafiju, viņi arī pērk mazāk cukura. → Tātad, ja kafijas cena ceļas, cukura pieprasījums krīt → Šeit krustelastība būs negatīva Negatīva krustelastība → preces ir komplementāras (lieto kopā)
Formula (vienkāršoti)	$Krustelastība = \% \text{ izmaiņas cenā precei B} / \% \text{ izmaiņas pieprasījumā pēc preces A}$
Galvenais, ko jāatceras	Krustelastība ir pozitīva (> 0) – Aizvietotājpreces – Coca-Cola un Pepsi Krustelastība ir negatīva (< 0) – Komplementārpreces – Kafija un cukurs Krustelastība ir tuva 0 – Nav ciešas saistības – Maize un benzīns

Vienkārši sakot	Krustelastība stāsta, vai un kā viena prece ietekmē otru – vai tās konkurē, vai papildina viena otru
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Avots: autoru izveidota tabula, pamatojoties uz Open AI 2025.

5. tabulā analizēts, kā mākslīgā intelekta rīks spēj vienkāršot un ilustratīvi skaidrot jēdzienu “krustelastība”, piemērojot to skolēnu līmeņa izpratnei. Šāda pieeja atšķiras no akadēmiski sarežģītas terminoloģijas un pievēršas intuitīvajai izpratnei, kas balstās uz ikdienas piemēriem. Tiek izmantotas reālistiskas situācijas ar aizvietotājprecēm (piemēram, Coca-Cola un Pepsi) un komplementārprecēm (kafija un cukurs), lai izskaidrotu krustelastības pozitīvo vai negatīvo vērtību. Svarīgi, ka aprakstā uzsvērts ne tikai definīciju izklāsts, bet arī attiecīgās formulas vienkāršots variants, lai atvieglotu izpratni. Galvenā pedagoģiskā vērtība šeit ir spēja sasaistīt teoriju ar dzīves pieredzi, padarot sarežģītu jēdzienu pieejamu arī bez priekšzināšanām. Tas apstiprina MI potenciālu kā palīginstrumentam sākotnējās izpratnes veidošanā. Tomēr tabulā redzamā formula ir neprecīzi strukturēta (dalījums starp izmaiņām cenā un pieprasījumā ir apgriezts), kas liecina par nepieciešamību pēc cilvēka kontroles un korekcijas pat vienkāršotos skaidrojumos.

Tālākajā analīzē (skat. 6. tabulu) tiek pārādīts, kā MI rīks piedāvā testēšanas un aprēķinu uzdevumus, lai pārbaudītu zināšanas par krustelastību.

6. tabula

MI rīka piedāvatais jautājums un aprēķinu uzdevums zināšanu pārbaudei par krustelastību

Jautājums / uzdevums		Atbildes
Testa jautājums (izvēlies vienu pareizo atbildi)	Kāds būs krustelastības rādītājs, ja divas preces ir aizvietotājpreces? A) Pozitīvs B) Negatīvs C) Vienāds ar nulli D) Nevar noteikt	Pareizā atbilde: A) Pozitīvs Ja divas preces ir aizvietotāji, tad, vienas cenas kāpums palielina otras pieprasījumu. Tas dod pozitīvu krustelastību.
Aprēķina uzdevums	Kad sviesta cena palielinās par 20%, maizes pieprasījums samazinās par 10%. Jautājums: Kāda ir krustelastība starp maizi un sviestu? Un kāda ir šo preču attiecība (aizvietotāji vai komplementāri)?	$Krustelastība = \% \text{ cenas izmaiņas (sviestam)} / \% \text{ pieprasījuma izmaiņas (maizei)} = +20\% / -10\% = -0.5^*$ → $Krustelastība = -0.5^*$ → Tā kā tā ir negatīva, maize un sviests ir komplementārpreces (lietojamas kopā)

* Te MI rīkam ir kļūda aprēķinos, jo pareiza atbilde būs -2, kas tomēr nemana rezultāta interpretāciju: pētāmās preces ir komplementāras.

Avots: autoru izveidota tabula, pamatojoties uz Open AI 2025.

Analizējot 6. tabulā piedāvāto MI rīka veidoto testēšanas un aprēķinu uzdevumu, redzams, ka tas ietver gan konceptuālu jautājumu par krustelastības būtību, gan praktisku aprēķina piemēru, kas saistīts ar sviesta un maizes cenu un pieprasījuma izmaiņām. Testa jautājums ir formulēts vienkārši un precīzi, ar skaidri noteiktu pareizo atbildi, kas atbilst

ekonomikas teorijas pamatprincipiem – aizvietotājprecēm ir pozitīva krustelastība. Arī aprēķinu uzdevuma formulējums demonstrē MI spēju piedāvāt dzīves situācijā balstītu piemēru, kas ļauj studentam saprast preču savstarpējo ietekmi. Tomēr būtiski piebilst, ka aprēķinā pieļauta kļūda – pareizā krustelastības vērtība dotajā piemērā būtu nevis –0,5, bet gan –2. Šis aspekts vēlreiz uzsver nepieciešamību pēc cilvēka līdzdalības satura pārbaudē un precizēšanā, jo kļūda, pat ja nenojauc interpretāciju, var radīt nepareizu priekšstatu par metodoloģiju. Tajā pašā laikā šāda uzdevuma struktūra – apvienojot teorētisko jautājumu ar praktisku pielietojumu – veicina padziļinātu izpratni un ļauj novērtēt MI rīka potenciālu kā palīgā mācību procesa organizēšanā.

Tālākajā analizē (skat. 7. tabulu) tiek apkopoti mikroekonomikas studiju kursa apgūšanas kritēriji, kas ļauj noteikt, kādas prasmes MI rīks palīdz attīstīt – no jēdzienu izpratnes līdz analītiskai domāšanai un praktiskai pielietošanai.

7. tabula

Mikroekonomikas studiju kursa apgūšanas kritēriji

Iegūto prasmju grupa	Prasmju grupas saturiskais izklāsts
1. Izprast jēdzienus un principus	Spēt izskaidrot tirgus mehānismu, pieprasījuma/piedāvājuma principus, izvēles teoriju, efektivitāti u.c.
2. Analītiskas prasmes	– Spēt interpretēt un uzzīmēt grafikus (piemēram, līdzsvara punkts, nodokļu ietekme uz tirgu) – Atrisināt vienkāršus matemātiskus modeļus
3. Prasme pielietot	– Spēt analizēt reālas situācijas mikroekonomiskos terminos – Identificēt tirgus kļūmes (piem., ārējie efekti) un valsts lomu

Avots: ChatGPT (Open AI 2025) izveidota tabula saskaņā ar akadēmiskām programmām.

Noslēdzot šo pētījumu, ir būtiski atgriezties pie A. Baumeistera paustās refleksijas par MI tekstiem kā estētiski pareiziem, bet potenciāli “tukšiem”, jo tiem nepietiek cilvēciski eksistenciālās dziļuma dimensijas (Baumeister 2025). Veiktā salīdzinošā un saturiskā analīze liecina, ka šī kritika nav nepamatota – MI spēj piedāvāt strukturētus, tematiskus, pat pārsteidzoši precīzus studiju plānus, jēdzienu skaidrojumus un uzdevumus, taču tajos joprojām nepietiek dzīvas pieredzes klātbūtnes, kritiskas refleksijas un kontekstuālas pielāgošanās konkrētam mācību ceļam. Kā to parādīja mikroekonomikas kursa un krustelastības jēdziena piemērs, MI spēj strukturēt gan teoriju, gan piedāvāt uzdevumus un piemērus, bet kļūdainie aprēķini un dažkārt vienkāršojoša pieeja norāda uz cilvēka līdzdalības nepieciešamību.

Tajā pašā laikā ir svarīgi būt godīgiem attiecībā uz pašu augstākās izglītības realitāti. Autori, kuru pieredze tika izmantota šajā pētījumā, paši apliecina, ka, absolvējot ekonomikas bakalaura studiju programmu, ne visi no viņiem patiešām kļuva par profesionāliem ekonomistiem. Formāla kvalifikācija un diploms vēl automātiski nenozīmē profesionālu kompetenci ekonomikā. Iegūtā izglītība galvenokārt palīdzēja paplašināt redzesloku, uzlabot valodu un datorprasmes, iemācīja orientēties sarežģītos tekstos un uzlaboja akadēmiskās rakstīšanas iemaņas – tas ir vērtīgi, bet tas nav tas pats, kas padziļināta profesionālā kompetence. Šis aspekts ļauj godīgi novērtēt arī MI iespējas – ja tradicionālā universitāte ne vienmēr garantē profesionāla ekonomista sagatavošanu, tad MI rīku vadīta pašmācība nav nedz būtiski labāka, nedz sliktāka pēc

būtības, bet gan cita ceļa forma, kura rezultāts atkarīgs no mācīšanās stratēģijas un mērķa skaidrības.

Līdz ar to galvenā problēma MI izmantošanā izglītībā nav saistīta ar zināšanu “iegūvi”, jo šī pētījuma dati rāda, ka, lietojot MI, ir iespējams apgūt saturu, izprast jēdzienus, attīstīt prasmes – un pieļautās kļūdas ir salīdzināmas ar kļūdām, ko pieļauj arī cilvēki-pasniedzēji. Problēma, šķiet, ir kvalifikācijas “atpazīšana”, tas ir – sociālajā un institucionālajā aspektā. Kā sabiedrība var zināt, ka konkrētais cilvēks patiešām ir profesionāls ekonomists, ja viņš nav ieguvis diplomu klasiskā universitātē? Kā darba devējs var uzticēties MI rīku vadītā pašmācībā iegūtai kompetencei? Tieši šī “atpazīšanas” jeb kvalifikācijas validācijas problēma kļūst par centrālo jautājumu. Var teikt, ka augstākās izglītības iestādēm nākotnē būs arvien vairāk jākoncentrējas ne tik daudz uz zināšanu nodošanu, cik uz šīs zināšanu ieguves validēšanu – uz profesionālās ekspertīzes, kompetenču un kritiskās domāšanas līmeņa pārbaudīšanu. Citiem vārdiem sakot, universitātēm jāklūst par sava veida “kvalitātes pārbaudītājiem” vai “ogļu kalnrūpniecības laboratorijām”, kas palīdz sabiedrībai pārliecināties, ka individuāli iegūtās “ogles” nav tikai “smiltis vai pelni”.

Tādējādi pētījuma rezultāti ļauj secināt, ka MI rīki var būt efektīvs līdzeklis individuāli centrētai izglītībai un pašmācībai ekonomikā, ja tiek nodrošināta cilvēka refleksija, kritiska izvērtēšana un iespēja šo procesu rezultātus institucionalizēt – aplicināt profesionālajā un sabiedriskajā telpā. Baumeistera metafora par “dzīvības” trūkumu MI tekstos šeit transformējas par uzdevumu – piešķirt dzīvību zināšanām, integrējot tās dzīvajā pieredzē un profesionālajā sabiedrībā. Tas nozīmē, ka patstāvīgi iegūtās zināšanas būs nozīmīgas un “dzīvas” tikai tad, ja tās tiks atzītas, dalītas un iedzīvīnātas reālā profesionālajā praksē.

Secinājumi

Pētījums pierāda, ka mākslīgā intelekta (MI) rīki, piemēram, ChatGPT, var strukturēt un piedāvāt akadēmiski līdzsvarotus studiju plānus, skaidrot jēdzienus un pat veidot testēšanas uzdevumus, tādējādi potenciāli kļūstot par nozīmīgu palīginstrumentu individuāli centrētā izglītībā un pašmācībā. Tomēr konstatētās kļūdas aprēķinos, virspusējība dažu studiju elementu izpratnē (piemēram, IT prasmju nozīmes neiekļaušana) liecina, ka šiem rīkiem nepieciešama cilvēka kontrole, refleksija un izvērtējums. Atgriežoties pie A. Baumeistera kritiskās pozīcijas, jākonstatē, ka MI rīki, lai gan spēj radīt estētiski un strukturāli pareizu saturu, paši par sevi vēl nerada “dzīvās” izglītības pieredzi – tie imitē izpratni, bet nespēj to pilnībā aizvietot.

Tajā pašā laikā būtiski ir atzīt arī pašas tradicionālās izglītības ierobežojumus – ne visi augstskolu absolventi kļūst par profesionāliem savā jomā. Daudzi iegūst tikai formālu kvalifikāciju, nevis reālas profesionālās kompetences, un bieži vien studiju gaitā uzlabojas galvenokārt vispārīgās prasmes, piemēram, valodu vai datoru lietošanas iemaņas. Šajā ziņā MI vadīta pašmācība nav automātiski mazāk vērtīga, bet prasa skaidru stratēģiju, mērķtiecību un papildināšanu ar dzīvu profesionālo praksi.

Turklāt MI rīku izmantošana paver iespēju patiesi individuāli centrētai izglītībai – katrs ieinteresētais indivīds var apgūt zināšanas savā tempā, pēc personalizētas programmas, kas pielāgota viņa interesēm, vajadzībām un kognitīvajām spējām. Šāda pieeja būtiski atšķiras no tradicionālās, visiem vienotas izglītības sistēmas, jo MI rīki ļauj ne tikai automatizēt saturu, bet arī pielāgot to individuālā līmenī, tādējādi padarot pašmācību efektīvāku un motivējošāku.

Galvenā problēma nav pašās zināšanās, ko MI palīdz apgūt, bet to atzīšanā – kā sabiedrība validē šādi iegūtās kompetences, ja nav formāla diploms? Līdz ar to universitāšu nākotnes loma varētu virzīties no tradicionālās mācīšanas uz kompetenču validēšanu – tās kļūs par institucionālajiem garantiem tam, ka individuāli iegūtās zināšanas ir patiesi vērtīgas un sabiedriski atzītas.

Tādējādi pētījuma galvenais secinājums ir šāds: MI rīki var kļūt par spēcīgu atbalstu individuāli centrētajai izglītībai, ja tos izmanto apzināti, ētiski un ar cilvēka reflektējošu līdzdalību. Turklāt MI tehnoloģijas var veicināt jaunu izglītības paradigmu, kurā individuāli pielāgota pašmācība kļūst par pilnvērtīgu izglītības formu. Šādas zināšanas kļūst “dzīvas” tikai tad, ja tās tiek iedzīvīnātas profesionālā praksē un sociāli atzītas kā kompetence.

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CULTURAL DIVERSITY IN PROJECT MANAGEMENT: A COMPARATIVE ANALYSIS OF EUROPEAN AND ASIAN APPROACHES

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Project management practices are deeply embedded in the cultural and institutional contexts in which they operate. This article presents a comparative exploration of European and Asian approaches to Agile methodologies, drawing on fundamental theoretical models that analyze key cultural dimensions such as power distance, individualism versus collectivism, uncertainty avoidance, masculinity and femininity, long-term orientation, and group cohesion, as well as insights into leadership and organizational behavior. The study constructs regional cultural profiles for North America, Europe, Asia-Pacific, Latin America, and the Middle East & Africa, considering how cultural values shape managerial frameworks. These profiles are correlated with market-share data for Agile services to examine the relationship between cultural predispositions and the adoption of flexible project management methods. In the interpretative phase, twenty-eight detailed case studies of Scrum and Kanban implementation are coded for key rituals, communication patterns, and adaptive strategies. The analysis reveals that regions with lower power distance indices demonstrate significantly greater readiness for flexible project management, while hierarchical cultures encounter more institutional limitations. European teams typically operate under horizontal decision-making structures with shared authority over resources and role rotation, fostering initiative and collective responsibility. In contrast, many Asian teams work within multilayered approval hierarchies, where changes require sequential authorization and role assignments are closely tied to formal status. Feedback processes in low-context societies favor open retrospectives and direct communication, while high-context cultures rely more on ritualized and indirect feedback. Temporal orientations influence method selection, with fixed-length Scrum sprints prevailing in Western environments and Kanban's continuous flow suiting more flexible time perceptions common in parts of Asia. The study demonstrates that Agile is not a universal solution, but rather a set of practices that must be adapted to local cultural logics and institutional frameworks. The article advocates for a socio-culturally sensitive paradigm in project management, emphasizing the need for flexible methodological adaptation to specific regional and organizational contexts. Future research directions include empirical validation of these patterns in various industries and a deeper analysis of institutional adaptation strategies in multinational environments.

Keywords: agile methodologies, Asia-Pacific context, comparative analysis, cultural diversity, European practices, institutional frameworks

Kultūras daudzveidība projektu vadībā: Eiropas un Āzijas pieeju salīdzinošā analīze

Projekta vadības prakses ir cieši saistītas ar kultūras un institucionālajiem kontekstiem, kuros tās tiek īstenotas. Šajā rakstā sniegta salīdzinošā Eiropas un Āzijas pieeju Agile metodoloģijām analīze, balstoties uz fundamentāliem teorētiskiem modeļiem, kas ietver galveno kultūras dimensijuvaras distances, individuālisma un kolektīvisma, nenoteiktības izvairīšanās, dzimumu lomu, ilgtermiņa orientācijas un grupas saliedētības–izpēti, kā arī organizatoriskās uzvedības un līderības aspektus. Tiek izveidoti reģionālie kultūras profili Ziemeļamerikai, Eiropai, Āzijas–Klusā okeāna reģionam, Latīņamerikai un Tuvajiem Austrumiem & Āfrikai, ņemot vērā, kā kultūras vērtības ietekmē vadības ietvaru veidošanos. Šie profili tiek salīdzināti ar Agile prakses tirgus daļas datiem, lai analizētu saikni starp kultūras nosliecēm un elastīgo projektu vadības metožu izplatību. Interpretatīvā analīzē tika kodēti divdesmit astoņi Scrum un Kanban ieviešanas gadījumi, identificējot galvenos rituālus, komunikācijas modeļus un adaptācijas stratēģijas. Analīze atklāj, ka reģionos ar zemāku varas distances līmeni ir daudz lielāka gatavība ieviest elastīgas projektu vadības metodes, kamēr hierarhiskās kultūrās ir vairāk institucionālu ierobežojumu. Eiropas komandas parasti darbojas horizontālās lēmumu pieņemšanas struktūrās ar kopīgu atbildību par resursiem un lomu rotāciju, kas veicina iniciatīvu un kolektīvu atbildību. Savukārt daudzās Āzijas komandās projektu vadība balstās uz daudzlīmeņu apstiprināšanas hierarhijām, kur jebkādas izmaiņas prasa secīgu apstiprināšanu, bet lomu piešķiršana cieši saistīta ar formālo statusu. Atgriezeniskās saites process zemā konteksta sabiedrībās notiek atklāti un tieši, kamēr augstā konteksta kultūrās dominē ritualizēta un netieša komunikācija. Laika uztvere ietekmē metožu izvēli–rietumu praksē dominē fiksētu sprintu Scrum, bet Āzijas uzņēmumos biežāk tiek pielietota Kanban nepārtrauktā plūsma. Raksta secinājums–Agile nav universāla recepte, bet gan metožu kopums, kas jāpielāgo vietējām kultūras un institucionālajām īpatnībām. Rakstā tiek piedāvāts sociālkultūri jutīgs projektu vadības modelis, uzsverot nepieciešamību pielāgot metodoloģiju konkrētam reģionālajam un organizatoriskajam kontekstam. Tiek izvirzīti arī nākotnes pētījumu virzieni–empīriskā šī modeļa pārbaude dažādās nozarēs un institucionālās adaptācijas stratēģiju padziļināta izpēte starptautiskā vidē.

Atslēgvārdi: agile metodoloģijas, Āzijas un Klusā okeāna konteksts, Eiropas prakses, institucionālie ietvari, kultūras daudzveidība, salīdzinošā analīze

Introduction

Project management is intrinsically linked to a system of social expectations, norms, and cultural codes that are shaped within a specific societal context. The particularities of how power, responsibility, time, and status are perceived are reflected in the organization of work, the structure of team interactions, and the logic of function distribution. Managerial actions do not exist outside of context—they depend on behavioral models accepted in society and are embedded in a system of persistent cultural notions of what is acceptable and appropriate. These differences become especially apparent when comparing European and Asian approaches.

In traditional management theory, a project was viewed as a universal tool, neutral with respect to the cultural environment. However, generalized models developed within the framework of Anglo-American management do not explain the differences that arise in real situations of international interaction. Researchers' attention is gradually shifting from applied schemes to interpreting project activities as a form of social and institutional interaction. Management is increasingly understood not as a set of procedures, but as a

process determined by the structure of social legitimacy, communication norms, forms of authority, and participants' expectations (Parsons 1951; Fukuyama 1995; Inglehart, Welzel 2005).

The cultural embeddedness of project practices has been systematically reflected in the concept developed by G. Hofstede, who identified stable parameters of intercultural differences, such as power distance, the degree of individualism, tolerance for uncertainty, and orientation toward long-term goals (Hofstede 2001). F. Trompenaars expanded this typology by emphasizing the distinction between universalistic and particularistic approaches, specific and diffuse forms of interaction, and different logics of time orientation (Trompenaars, Hampden–Turner 2012). E. Hall introduced the difference between high- and low-context cultures, focusing on differences in methods of information transmission and the role of tacit knowledge (Hall 1976). F. Fukuyama associated features of institutional stability with the level of internal trust, which affects methods of control and self-organization (Fukuyama 1995).

European approaches are based on a normative model that presupposes horizontal interaction, clear distribution of responsibility, and a priority on formal procedures. In Asian societies, project activities are oriented toward hierarchy, contextual communication, role stability, and collective consensus. The structure of expectations in these models differs not in terms of effectiveness, but in the logic of social normalization of behavior (Lewis 2006; Inglehart, Welzel 2005).

The aim of this article is to identify the socio-cultural differences in management approaches formed in the European and Asian contexts. The task is to provide a comparative analysis of the institutional logic, cultural parameters, and behavioral attitudes that influence the implementation of project activities.

Cultural and institutional foundations of project management

Flexible approaches to project management (Agile) emerged as a response to rigid and document-oriented software development methodologies. In the “Agile Manifesto” of 2001, Agile was formulated as a set of values and principles based on the prioritization of human interaction over processes and tools, the readiness to respond more quickly to change, and the delivery of a working product instead of an abundance of documentation (Beck et al. 2001). Over time, Agile expanded beyond the IT sector and came to be understood as a philosophy of iterative improvement in all project practices: planning cycles, daily synchronizations, and review meetings are designed to provide constant feedback and a gradual increase in customer value (Highsmith 2009).

However, the success of Agile implementation is determined not only by the maturity of teams but also by deep-seated cultural characteristics. The most widely used model for quantitative analysis of such characteristics remains the model developed by Geert Hofstede, first formulated in the 1980s–1990s and refined in subsequent editions (Hofstede 2001). This model is based on six dimensions, three of which are critical for understanding project practices:

- **Power Distance Index (PDI)** reflects the extent to which less influential members of society are willing to accept unequal distribution of power and the adoption of authoritative decisions without opposition.
- **Individualism versus Collectivism (IDV)** indicates a tendency toward personal autonomy and independence, or toward group consensus and prioritization of collective interests.

- **Uncertainty Avoidance Index (UAI)** characterizes the degree of discomfort with uncertainty and risk, which manifests in a need for formal rules and detailed procedures.

The values of these indices for more than 70 countries are regularly published by the Hofstede Insights platform and have been revised in light of modern globalization trends (Minkov, Hofstede 2018).

Complementing this framework, the GLOBE project (Global Leadership and Organizational Behavior Effectiveness), initiated by House et al. (2004), introduced dimensions of long-term orientation and resistance to group norms, which make it possible to consider cultural differences in the perception of innovation and strategic flexibility. The relationship between these indicators makes it possible to explain why some macro-regions are more willing to embrace ongoing process transformation, while in others, Agile rituals become encrusted with additional layers of control.

To understand the role of technology and formal procedures in the project context, Bruno Latour's actor-network theory is useful (Latour 2005). In this approach, both people and digital tools (task boards, automated reporting systems) act as equal "actors," capable of influencing the distribution of power and the nature of communications. Where artifacts decentralize decision-making, Agile methods promote self-management; in other cases, they merely reinforce existing hierarchies.

The metaphor of "liquid modernity" by Zygmunt Bauman (Bauman 2000) emphasizes that contemporary projects represent a "liquid" network of social ties, which are constantly being reorganized under the influence of external changes (Geertz 1973). In societies with a low UAI, such fluidity is perceived as a resource that allows for seamless switching between Scrum, Kanban, and Lean, whereas in cultures with a high level of uncertainty avoidance, every innovation becomes formalized in order to mitigate risks (Hall 1976; Kostova, Roth 2002).

Finally, the concept of dynamic capabilities (Teece et al. 1997) views organizational culture as a "catalyst" for innovation: a combination of low power distance and a high degree of individualistic orientation accelerates the process of receiving feedback and adaptation, while feedback in collectivist structures requires more nuanced facilitation to overcome the "bottlenecks" of traditional regulations.

The integration of Agile philosophy definitions, Hofstede's and GLOBE's cultural dimensions, as well as the concepts of actor-network, "liquid modernity," and dynamic capabilities, creates a multi-layered foundation for analyzing how flexible methodologies are transformed in different socio-cultural environments.

Methodology of a comparative analysis

Culturally determined differences in management practices require approaches that allow project behavior to be interpreted as socially regulated and institutionally structured (Kanski et al. 2023). In addition to the previously described combination of typological, interpretative, and secondary approaches, the research methodology includes several interrelated stages, each aimed at ensuring the depth and reliability of the findings.

First, a typological analysis of cultural parameters was conducted. Six key indices were extracted from the Hofstede Insights platform (power distance, individualism/collectivism, uncertainty avoidance, masculinity/femininity, long-term orientation, and control over the unknown), and, based on the GLOBE Study, indicators of long-term orientation and inertia of group norms were added (House et al. 2004; Minkov, Hofstede 2018). The values for each country in the six macro-regions (North America, Europe, Asia-Pacific, Latin America, Middle East and Africa) were aggregated

using the arithmetic mean method, which made it possible to obtain representative regional profiles for each dimension (Meyer, Rowan 1977).

Regional shares, taken from the Digital.ai (2025), were transformed into adaptability coefficients (AR), calculated as the ratio of the percentage share of Agile services to the average value of power distance in the region. This approach provided a quantitative basis for assessing the extent to which deep-rooted hierarchy correlates with readiness to adopt flexible management methods.

In parallel, an interpretative analysis of Scrum and Kanban implementation cases was conducted. As a result of the selection, the final sample included 28 publications describing transnational projects (Hoda et al. 2011; Ayed et al. 2017; Stahl et al. 2010; Agarwal et al. 2021). The texts underwent staged semantic deconstruction: first, descriptions of key rituals (daily synchronizations, sprint reviews, and retrospectives) were recorded, then mentions of cultural barriers (multistage reporting, fear of "losing face"), and finally, adaptation strategies (hybrid roles, facilitation, visual management). To enhance coding reliability, two independent researchers performed annotation, and subsequent alignment of results showed an inter-coder reliability coefficient above 0.8.

A key element of methodological triangulation was the cross-comparison of quantitative AR coefficients with qualitative data from the interpretative segment. Thus, in regions with AR below 0.5, descriptions of reinforced control mechanisms in Scrum rituals prevailed, while with AR above 0.8, examples of independent team initiatives without external intervention were observed. To confirm the strength of the relationship between deep cultural indices and adaptability to Agile methodologies, Spearman correlation analysis was performed: $\rho = -0.72$ at $p < 0.01$.

The combination of aggregated typological analysis, conceptual case interpretation, and quantitative-qualitative validation through triangulation makes it possible to reconstruct stable cultural patterns in project management without involving primary field research, focusing instead on in-depth analysis of already documented practices.

Socio-cultural differences in the implementation of agile approaches

Based on the secondary analysis of data from Hofstede Insights and Agile market reviews (Gibson, Gibbs 2006), as well as the synthesis of descriptions from 28 Scrum and Kanban implementation case studies, both quantitative correlations and qualitative features of European and Asian project management practices were identified. First, aggregated values of PDI, IDV, and UAI for five macro-regions and their shares in the Agile services market are presented, demonstrating an inverse relationship between power distance and readiness for flexible methodologies. Next, five key differences are revealed—from team status to institutional frameworks—by comparing these indicators with the actual content of practices in specific cases.

Table 1 shows that regions with a lower PDI (below 50) account for a greater share of the Agile services market—60% of all flexible projects are found in North America and Europe. When the PDI exceeds 65, the share of Agile services does not surpass 20%, confirming the inverse relationship between cultural hierarchy and organizations' readiness for flexible methodologies.

First, the status of project teams in the decision-making system differs significantly: in European practice, teams often have the authority of independent units and can reallocate resources without additional approval. For example, in the Netherlands, groups working with sustainable technologies organize their activities based on horizontal consensus and collective responsibility (Stahl et al. 2010). In most Asian countries, a

project is embedded in a strict vertical power structure, and any change to the roadmap requires multilevel approval at all levels (House et al. 2004).

Table 1

Cultural indices and Agile services market share by region

Region	PDI	IDV	UAI	Share of Agile Services, %
North America	40	91	46	35
Europe	35	67	65	25
Asia-Pacific	68	33	70	20
Latin America	70	30	80	10
Middle East & Africa	75	30	75	10

Source: elaborated by the authors based on the data from Hofstede Insights and Agile market reviews.

Second, the approach to feedback reflects differences in communication culture. In Germany, retrospectives and open metrics serve as real tools for improvement: teams freely exchange criticism and suggestions (Hoda et al. 2011). In Japan, however, feedback is delivered mainly “indirectly”–through hints and formal agreements, which reduces the effectiveness of problem identification and turns meetings more into a ritual than a source of transformation (Lewis 2006).

Third, perceptions of time and cyclicity predetermine the choice of framework. In Scandinavian IT companies, clear Scrum planning with fixed sprints makes it possible to synchronize distributed teams and quickly respond to changes (Ayed et al. 2017). In India, where time frames are less rigid, Kanban ensures a smoother distribution of tasks and accommodates contextual fluctuations without violating participant status (Bastiaansen, Wilderom 2021).

Fourth, autonomy and role rotation are perceived differently. In Europe, it is common practice for the Scrum Master role to rotate within the team, which encourages experience sharing and the development of self-management skills. In South Korea, however, role allocation remains tied to formal status: key positions are typically filled by specialists appointed by management, rather than selected by the team (Fontaine 2023).

Finally, institutional frameworks impose their own constraints and provide different foundations for flexibility. In EU countries, Agile principles are enshrined in professional standards and the recommendations of national associations (IPMA 2023), which facilitates their dissemination. In large Asian corporations, on the contrary, flexible practices are “embedded” within existing production and bureaucratic mechanisms–the classic example of Kanban at Toyota is seen not as an external framework, but as an integral part of the philosophy of continuous improvement (Hall 1976).

These five key differences – team status, logic of feedback, perception of time, role rotation mechanisms, and institutional adaptation – demonstrate that the project as a form of management reflects not so much universal principles as the deep cultural and institutional patterns of each environment.

Discussion: the impact of culture on agile practices

Project management, being both an instrumental tool and a social practice, serves as an arena where universal methodologies encounter local meanings. Our analysis has shown that key cultural codes–ideas about authority, norms of communication, and acceptable forms of initiative–define the underlying logic for the implementation of flexible practices. It is important to understand that the success of such practices is determined not so much by the characteristics of the methods themselves as by the degree of their socio-cultural embeddedness (Scott 2014).

First, organizations whose social institutions rely on consensus mechanisms and informal channels of influence tend to view Agile rituals as a space for collective knowledge construction. Under these conditions, each sprint cycle becomes an opportunity for “social learning,” as participants master new roles through the practice of joint conflict resolution and compromise–building. This aspect of group reflection–the rejection of the dominant role of formal rules in favor of situational agreements–ensures a high degree of adaptability in processes. The theory of cognitive deliberative leadership emphasizes that collective reasoning helps not only to harmonize opinions, but also to accelerate the introduction of innovations (Stacey 2012).

Second, cultural expectations concerning risk and uncertainty shape the architecture of communication channels. In societies with low tolerance for uncertainty (high UAI), each new iteration is accompanied by detailed planning and documentation, and the facilitator’s role extends beyond that of a moderator–he or she acts as a guarantor of compliance with the “rules of the game.” Such an approach lends stability to project processes, but at the same time slows down the response to unexpected events. Understanding this compromise is important for managers, since in volatile markets, delays in decision-making can prove critical.

Third, the institutional support infrastructure becomes significant. This dynamic is particularly evident in the implementation of Agile in human-machine interaction domains, where institutional standards both constrain and stimulate socio-technical adaptation (Komarova et al. 2021). For example, the initiative of national digitalization agencies in several European countries stimulates the dissemination of Agile through grant programs and specialist certification (European Commission 2025; Kumar, Goudar 2023; Ruohonen, Timmers 2025), while in regions with more formalized bureaucracy, such initiatives are often slowed down by conflicts with trade union and administrative structures (Khatri, Tsang 2003).

The fourth aspect concerns deep-seated models of motivation and reward distribution. In cultures dominated by individualism, personal recognition of work results serves as a powerful driver of engagement and enhances the effect of rapid feedback. In collectivist environments, however, motivation is linked to the group’s assessment of success, so the reward system should take into account the contribution of each participant to the overall result, rather than focusing solely on individual metrics. Ignoring this nuance can lead to demotivation and a formal adherence to Agile requirements without real engagement–the mechanism of “internal legitimation” helps explain why some projects receive support from above while others sink in formal reporting (Deci, Ryan 2000).

Finally, it is necessary to take into account the dynamics of cross-cultural interaction within transnational teams. The merging of different “missions” and narratives gives rise not only to synergies but also to hidden conflicts of meaning. In such contexts, the success of Agile depends on the manager’s ability for “cultural facilitation”: the capacity to build metaphors and translate key methodological concepts into a language understandable to

representatives of different cultural traditions. This skill, often underestimated in management standards, becomes critical for building trust and forming a shared project identity (Earley, Mosakowski 2004). Similar conclusions have been drawn in sociological analyses of artificial sociality, where adaptive coordination between human and digital agents also relies on culturally embedded facilitation strategies (Menshikov 2020; Menshikov et al. 2024). At the same time, the communication environments in which such coordination occurs are increasingly shaped by platform-mediated structures. Digital platforms do not merely transmit information—they actively configure social expectations, behavioral patterns, and role hierarchies through algorithmic design and mediated interfaces (Couldry, Hepp 2017).

Our analysis shows that a comprehensive understanding of Agile requires not only a technological perspective but also an interdisciplinary approach that integrates insights from sociology, psychology, and institutional theory. Progress in research and practice will depend on developing flexible methodologies capable of accommodating multi-layered cultural contexts, thereby enabling the creation of sustainable and adaptive project management ecosystems.

Conclusion and future research directions

A comparative analysis of project management approaches in Europe and Asia has revealed that cultural diversity is not an external background factor, but rather an internal structural element that shapes the logic of project activities. Flexible methodologies—Scrum, Lean, and Kanban—prove to be deeply dependent on the institutional and cultural conditions in which they are applied: differences affect not only procedures, but also the fundamentals of interaction, including perceptions of hierarchy, acceptable formats for initiative, feedback norms, and the degree of team autonomy.

In European countries with low power distance and a high level of institutional trust, flexible practices are adopted more quickly and take deeper root. Here, the project team is perceived as an independent entity endowed with the right to take initiative and collective responsibility, while horizontal forms of work align with both organizational and cultural norms (Ayed et al. 2017; Hofstede et al. 2010). In contrast, in Asia, despite the formal adoption of Agile frameworks, multilevel approval procedures and the “masking” of flexible rituals within traditional hierarchical schemes persist, reducing the effectiveness of the “pure” Agile model (Fontaine 2023; Bastiaansen, Wilderom 2021).

Special attention should be paid to the Indian hybridization, where Western methodologies are adapted through institutional mediation and rethinking of roles within the team. Here, Agile tools are integrated into the national cultural matrix, maintaining vertical channels of decision-making while simultaneously creating new models of collective self-determination (Stahl et al. 2010; Stray et al. 2018). This example demonstrates that abandoning universal management recipes in favor of a culturally sensitive approach not only increases effectiveness but also reduces socio-cultural friction in transnational coordination.

Thus, a sociological perspective becomes key to understanding project management in the context of globalization. A project should be viewed as an institutional platform where local cultural norms are reproduced and transformed, rather than simply as a mechanism for coordinating tasks. This opens the way for the development of transnational management models that take into account not only economic and logistical parameters, but also the diversity of communication styles, forms of decision legitimation, and mechanisms of trust (Komarova et al. 2021).

Further progress in research and practice will require the development of flexible methodologies that take into account the complexity of multi-layered cultural contexts, as well as analysis of the institutional mediation strategies employed by global corporations to harmonize project practices with local regulations (Lappi et al. 2023; Scott 2014). This will help to clarify the socio-cultural configurations of project management and develop practical recommendations for effective work in conditions of cultural diversity and organizational uncertainty.

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JAUNO ZINĀTNIĒKU TRIBĪNE

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NECESSARY CONDITIONS FOR CARRYING OUT BUSINESS ACTIVITIES IN THE FIELD OF DEEP TECHNOLOGIES IN THE CONTEXT OF THE BLUE ECONOMY OF BULGARIA

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This article introduces the “Necessary Condition Analysis” (NCA) as an innovative methodological tool for environmental and economic research. NCA is employed to identify the minimum conditions that must be in place for a desired outcome – such as sustainable growth, technological advancement, or effective innovation integration – to occur. The study focuses on applying this methodology in the context of two emerging and strategically significant domains: the Blue Economy and deep technologies. It presents a comprehensive review of theoretical frameworks and applied perspectives, incorporating insights from leading researchers, economists, and innovation theorists. The research explores the intersection of the Blue Economy and deep technologies within the Bulgarian economic context, highlighting strategic opportunities for sustainable development, digital transformation of traditional sectors, and the creation of competitive advantages. Specific sectors – such as maritime transport, fisheries, renewable marine resources, and associated technological innovations (e.g., artificial intelligence, blockchain, robotics) – are analyzed to determine the necessary conditions under which the convergence of these systems produces positive economic outcomes. The article proposes an analytical model applicable both nationally and internationally, demonstrating how stakeholders (institutions, investors, entrepreneurs, and researchers) can utilize NCA for proactive and evidence-based decision – making. The study includes comparative insights and best practices from other countries, offering a foundation for adaptation to local economic and institutional realities. The conclusions contribute to the broader discourse on the transformative role of deep technologies in the development of Blue Economy sectors, while also providing strategic recommendations for future policy design and innovation initiatives in Bulgaria and beyond.

Keywords: blue economy, deep tech entrepreneurship, necessary condition analysis, blue lobbyist, communication.

Nepieciešamie nosacījumi uzņēmējdarbības veikšanai dziļo tehnoloģiju jomā Bulgārijas zilās ekonomikas kontekstā

Raksts iepazīstina ar “Nepieciešamo nosacījumu analīzi” (Necessary Condition Analysis – NCA) kā inovatīvu pieeju, ko izmanto vides un ekonomikas izpētē, lai noteiktu minimālās prasības, kas jāizpilda, lai varētu notikt vēlamais vai labvēlīgais rezultāts. Pētījumā tiek apskatīti teorētiskie un praktiskie aspekti divās perspektīvās jomās – zilajā ekonomikā un dziļajās tehnoloģijās, uzsverot to savstarpējo mijiedarbību un nozīmi ilgtspējīgas ekonomiskās attīstības veicināšanā. Analīze balstās uz mūsdienu vadošo pētnieku un ekspertu pieejām, ietverot gan teorētisku ietvaru, gan reālus piemērus. Īpašs uzsvars likts uz šo koncepciju pielietojumu Bulgārijas ekonomikas kontekstā, identificējot iespējamus ieguvumus un izaicinājumus, kas saistīti ar dziļo tehnoloģiju izmantošanu tradicionālajās jūras nozarēs – piemēram, kuģniecībā, zivsaimniecībā, atjaunojamo jūras resursu pārvaldībā un digitālajās inovācijās, kā mākslīgais intelekts, blokķēdes un robotizācija. Tiek izstrādāts analītisks modelis, kas ļauj noteikt nepieciešamos nosacījumus veiksmīgai uzņēmējdarbības attīstībai šajā jomā. Pētījums sniedz ieskatu, kā ieinteresētās puses – uzņēmēji, investori, politikas veidotāji un pētnieki – var izmantot NCA metodoloģiju, lai proaktīvi analizētu un plānotu tehnoloģisko integrāciju zilās ekonomikas sektoros gan Bulgārijā, gan starptautiskā mērogā. Rakstā arī salīdzināti piemēri no citām valstīm, kas ļauj novērtēt labās prakses piemērus un to pielāgošanu vietējiem apstākļiem.

Atslēgvārdi: zilā ekonomika, dziļo tehnoloģiju uzņēmējdarbība, nepieciešamo nosacījumu analīze, tehnoloģiju integrācija, ilgtspējīga attīstība.

Introduction

The blue economy is in the sights of the United Nations (UN), in connection with the initiative “UN 2030: Agenda for Sustainable Development” (UN 2015), which aims to create sustainable economic solutions for the planet and for humanity, through its 17 goals, 169 targets and 300 indicators. Goal 14 of this initiative, called “Life Below Water”, is particularly important in the context of the issues discussed in this article. This is because, through this goal, the United Nations (UN) is committed to building sustainable solutions in the field of the so-called “blue economy”. Moreover, the organization declares the years from 2021 to 2030 as years of research on the “blue economy”, under the title “Decade of Ocean Science for Sustainable Development”. In this sense, this article is relevant because it contributes to the great efforts to find sustainable economic solutions for the blue economy.

The subject of the article is the conditions of the blue economy in Bulgaria, examining the suitability of these conditions for carrying out entrepreneurial activity in the field of deep technologies. The main goal of the article is to examine in one scientific paper various current studies concerning the blue economy, the field of deep technologies and entrepreneurial models suitable for work in both sectors. The specific objective is to study the effect of the interaction of these three topics in the real economic reality of Bulgaria.

The research tasks that the article sets are:

- (1) systematizing the views of leading world researchers in the field of blue economy and deep technologies;
- (2) providing recommendations for improving the conditions for the development of an entrepreneurial process in the field of deep technologies in the conditions of the blue economy of Bulgaria;

- (3) indicating models for communication between stakeholders to achieve sustainable solutions in the field of deep technologies in the field of the blue economy.

What exactly is the blue economy?

If something is big and blue, there is a huge possibility that the same thing is also deep. This assumption is probably not always true in the real world, but when it comes to seas and oceans, the colour blue and great depths often have a connection. Large bodies of water, with their depths, sizes and colours, have been occupying the human imagination for millennia and have led researchers to discover more and more new spaces and objects in Plato's magical “World of Ideas”. This article uses Plato's approach in reverse and forward directions. First, we will take out known, researched and established ideas and invisible objects from there, compare and examine them, and later we will return proposals to the shelf of the world of ideas, proposing new such ideas and objects based on the research conducted.

Although we can very easily assume that if something is blue, big and wet, it means that the same thing is deep, this logical connection often does not correspond to the truth, because in the real economic environment of Bulgaria, the issues we will consider are not quite well combined, if at all. This article will occupy the reader not with depths of a geographical nature, but with the depths of technologies in the conditions of the Blue Economy, which a number of researchers convince us that they will be of key importance in the future. These depths are somewhat Platonic, because very often they are found in the world of imaginary objects or are waiting to be added there by researchers, talents, entrepreneurs and others. Often, we do not even suspect that they are there. In order to obtain them, we must create the necessary conditions for creativity and invest mental efforts of a high order. How? We will try to understand in the study below, considering a world example.

Let's start with the conceptual apparatus with which various researchers work in the field of the Blue Economy. According to the study by Lee et al. “The Blue Economy and the UN Sustainable Development Goals: Challenges and Opportunities”, the concept of the Blue Economy originated from the UN Conference on Sustainable Development held in Rio de Janeiro in 2012 (UNCTAD 2014). It was at this conference that the concept of the Blue Economy was adopted by the world community. The idea of development and observations of the world ocean and the marine economy can be traced throughout human history, with the first serious scientific reports on the topic being written throughout the 20th century, as we see from the article by Eikeset and her colleagues “What is Blue Growth? The Semantics of “Sustainable Development” of the Marine Environment” (2018). However, the UN conference in Rio de Janeiro is particularly important for understanding the current issues in the development of the global economy, because it raises the question of the sustainability of the economy in the long term. The sustainability of the Blue Economy is essential because the challenges it faces are enormous. In the study “Ocean Research and the Blue Economy” we read the following:

In its report on the ocean economy, the Organisation for Economic Co-operation and Development (OECD 2016) estimates that ocean-related economic activities amounted to around US\$1.5 trillion in 2010. The Organisation for Economic Co-operation and Development (OECD) predicts rapid growth in ocean-related economic activity, with ocean industries having the potential to outpace the growth of the global economy, both in terms of value added and employment. Their projections show that between 2010 and

2030, the ocean economy could double its contribution to global value added, reaching over US\$3 trillion per year.

Before the proposed passage, the authors clarify that a healthy and functioning ocean ecosystem provides human society with resources that are vital for its existence. Starting with the fact that the ocean is the largest carbon dioxide filter, we move on to the forecast made again in the same study, namely that in 2030 they (the sectors of the Blue Economy) are expected to employ approximately 40 million full-time equivalent jobs in a business-as-usual scenario. From the study, we understand that it is important to collect adequate, verified and verifiable data on the sea and the maritime economy, so that the different end users of this data can handle data that is equally accurate and meaningful. Subsequently, in the study we also read who the end users of this data are:

End-users of ocean data and information fall into four main types:

- (1) scientific end-users, who conduct research activities that are wholly or partly dependent on continuous ocean measurement and observation;
- (2) operational end-users, who use ocean data and information to support operational needs related to safety, economic efficiency and environmental protection;
- (3) policy end-users, who require sustainable ocean data and information to support policy formulation, monitoring and evaluation of policy effectiveness;
- (4) public end-users, who have a general interest in the ocean or use ocean data and information to support their recreational activities or pursuits.

The question arises, what will we measure in terms of economic activity? According to information entitled “What are the sectors of the blue economy?” on the website of the Caribbean Maritime University, citing the “European Union Annual Report on the State of the Blue Economy 2018”, in the maritime economy we have established and emerging sectors. The information makes it clear that according to the institute, established sectors are: Fishing; Maritime transport and ports; Shipbuilding; Marine construction; Maritime and coastal tourism; Maritime passenger transport; Maritime transport services; Marine research and development; Activities to expand, clean and increase the depth of sea routes, channels and water areas of ports and roadsteads.

From the same information, we understand that the Caribbean Institute considers the following sectors as emerging: Marine aquaculture and biotechnology; Offshore and wind energy; Ocean renewable energy; High-tech marine services; Seabed mining; Safety and surveillance; The Caribbean Maritime University also indicates in the information on its website that the general idea of the Blue Economy includes the sectors: Fisheries and aquaculture; Maritime transport, shipping/ports; Coastal tourism and cruise ship industry; Marine biotechnology; Seawater desalination; Deepwater mining, offshore oil/gas; Renewable energy; Shipbuilding and small vessel construction; Marine construction; Defense and security; Research and education.

Approximately the same sectors are shown in the already cited study by Rayner et al. (2019) “Ocean Observing and the Blue Economy” in its table predicting the growth of the sector in the period up to 2030. The jump in added value to the planet's gross domestic product promised by the article is extremely high for the period from 2010 to 2030. In the field of offshore wind farms, this growth is expected to reach 1257%. But the question remains what is the Blue Economy and is what has been cited so far enough to explain the Blue Economy?

The answer is provided by various reports prepared by various institutions around the world such as the United Nations, the European Union, the World Bank, but also by the work of various researchers such as Ki-Hoon Lee et al. (2020), Anne Maria Eikeset et

al. (2018), Rosa María Martínez-Vázquez et al. (2021). Many other noteworthy works, such as Gunter Pauli's book “The Blue Economy - 10 Years, 100 Innovations, 100 Million Jobs” (2010) and Jivanta Schoettli's “The Blue Economy 3.0: The Marriage of Science, Innovation and Entrepreneurship Creates a New Business Model That Transforms Society”, also help in understanding the topic. Below we will summarize the ideas that the aforementioned authors and institutions offer to describe the sector and the issues of the blue economy.

In short, according to the UN, the blue economy is an economy that:

- comprises a set of economic sectors and related policies that together determine whether the use of ocean resources is sustainable;
- the challenge for the Blue Economy is to better understand and manage the many aspects of ocean sustainability, ranging from sustainable fishing to ecosystem health to pollution prevention;
- the Blue Economy challenges us to realize that sustainable management of ocean resources will require cooperation across borders and sectors through diverse partnerships, which has not been achieved on such a scale before. This is a difficult task, especially for Small Island Developing States (SIDS) and Least Developed Countries (LDCs), which face significant constraints;
- the UN notes that the Blue Economy will help achieve sustainable development, including the UN Development Goals, such as Goal 14 – “Life Below Water”.

According to the World Bank, the Blue Economy is the sustainable use of ocean resources for economic growth, improved livelihoods and jobs, while preserving the health of the ocean ecosystem.

According to the European Commission, the Blue Economy encompasses all economic activities related to the oceans, seas and coasts, encompassing a wide range of interconnected established and emerging sectors.

In his book “The Blue Economy - 10 Years, 100 Innovations, 100 Million Jobs”, author Gunter Pauli develops the concept that the potential of the Blue Economy is 100 million jobs, provided that the emphasis is on technological innovations that change the environment for doing business and living habits.

Ki-Hoon Lee et al find that the Blue Economy is situated in two competing realms – opportunities for growth and development, and threatened and vulnerable spaces in need of protection. The inherent conflicts between these two debates require solutions to embrace the opportunities associated with the ocean economy while recognizing and addressing its threats. In the context of the Blue Economy, the United Nations Sustainable Development Goals (SDGs) suggest that economic development should be both inclusive and environmentally sound, and emphasize the need to balance the economic, social and environmental dimensions of sustainable development with respect to the oceans.

Anne Maria Eikeset et al, in their article “What is Blue Growth? The Semantics of “Sustainable Development” of the Marine Environment”, believe that the Blue Economy is linked to the concept of “blue growth” and recommend seeking solutions to the problem caused by the misunderstanding between interested groups. They propose to move to a concept of “speaking the same language”, emphasizing the need for a separate mechanism that is unilaterally understandable to all interested parties. In general, it is proposed, through the concept of “blue growth”, to measure the sustainability and contribution of the Blue Economy to the global gross domestic product.

Rosa María Martínez-Vázquez et al. examine the concept of the Blue Economy through the prism of the concepts of “Blue Economy”, “Blue Growth”, “Marine Economy”, “Ocean Economy”, clearly showing in a table the following conclusion: The central point (regarding the understanding of the Blue Economy) is the promotion of the development of the ocean as a sign of progress and economic, political, social and cultural growth, without losing focus on sustainability.

We will conclude our review of scientific studies on the topic of the Blue Economy with the report of the Organization for Economic Cooperation and Development, entitled “The Blue Economy 2030”. This study advocates the thesis that in the period up to 2030, the main factor for sustainable economic development will be innovations based on science and technology. To some extent, the study looks at the so-called deep technologies, which we will use to make a smooth transition to our next sub-topic, namely these same technologies and what is needed to get to them.

The term “deep technology” was coined by Swati Chaturvedi, CEO of Propel(x) in 2014. In her post “So, what exactly is “deep technology”, Chaturvedi defines it as companies based on scientific discovery or significant engineering innovation. She distinguishes between conventional technology companies, such as Uber, for example, and those based on deep tech, which she points out are more based on “tangible scientific research or engineering innovation.” The term has undergone a transformation, and according to Siegel and Krishnan in 2020, it provides an opportunity for interpretation, as future technologies may not be understandable or described with today's thinking and language.

In the same publication, they add that the term “deep technology” is increasingly understood as a means to justify significant time, economic, and intellectual capital expenditures to cultivate new business lines. According to the World Bank, deep technology includes technologies based on scientific or engineering breakthroughs with the potential for commercialization. They encompass areas such as artificial intelligence and machine learning, materials, advanced manufacturing, biotechnology, nanotechnology, drones and robotics, photonics and electronics, clean technology, space technology, and life sciences. Deep technology companies are research and development (R&D) intensive and multidisciplinary.

Others, such as Nicolas Harlé et al. (2017), argue that deep technologies are different in several ways: they involve a strong research base, a challenging business model, and require large investments. Because of their ambition and often their complexity, disruptive deep technologies can require significant development time before they are brought to market.

Deep technologies, according to Günter Schuh et al. (2022), are capable of significant technological advances compared to established technologies and have the potential to radically change existing markets or create entirely new ones.

The latter definition will be the one that this study will adhere to in formulating its conclusions.

In their publication, titled “From Tech to Deep Tech”, Arnaud de la Tour et al. argue that a particularly important factor in the success of deep technologies is the ecosystem that supports them.

A series of questions arise here, such as: What are the necessary and sufficient conditions for entrepreneurial activity in the field of deep technologies? How can we determine these necessary and sufficient conditions with the greatest precision? What should be the behaviour of entrepreneurs working in the field of deep technologies? The following authors attempt to answer these questions in their publications:

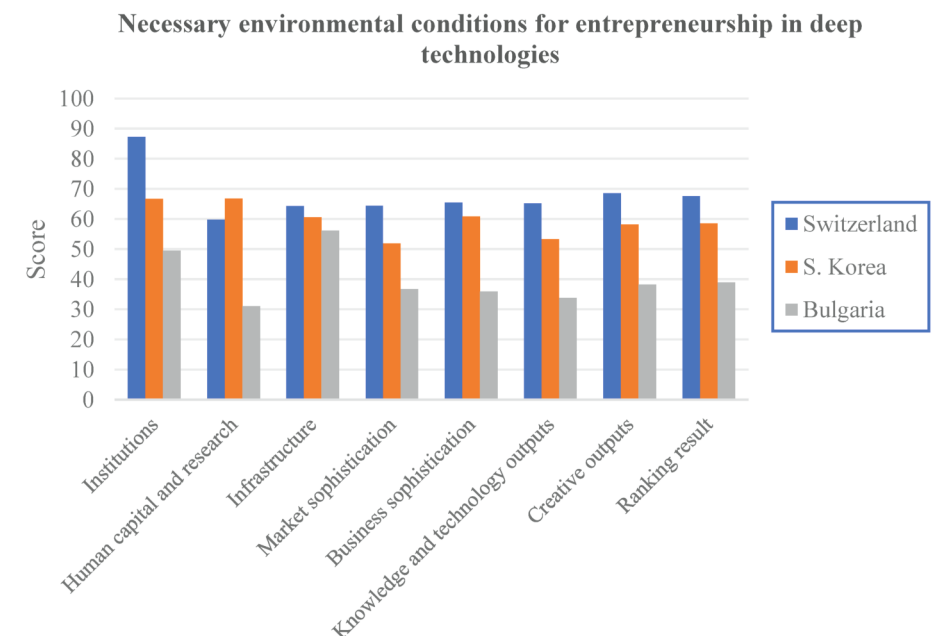
Eduardo Avancei Dionisio and his co-authors in the publication “Identifying Necessary Conditions to Deep-Tech Entrepreneurship” state that: “The necessary conditions are related to the political and business environment; education, research and development; general infrastructure; credit; trade; diversification and market size; and capacity to absorb knowledge”. Thus, they answer the question “What are the necessary conditions for carrying out entrepreneurial activity in the field of deep technology?”

To the question “How to determine with the greatest accuracy the necessary conditions for the occurrence of a given event and by what tool?”, the publications of Jan Dul (2016a, 2016b) and the tool “Necessary Conditions Analysis” provide an answer, where a bottleneck graph is used. This graph shows the necessary level of conditions for a given level of outcome. Bottleneck graphs are particularly useful for interpreting multivariate necessary conditions and identifying necessary configurations.

For the purposes of our research, we will work with the indicators provided in the World Intellectual Property Organization's annual report on global innovation, showing the Global Innovation Index for 2023 (Dutta et al. 2023).

It is important to note that this study is based on the financial principle that no individual sector of an economy can have a higher credit rating than the overall country. By transferring this principle to sectors in economic reality, we can argue that each sector automatically receives the values of the national economy. In terms of research and international comparisons, the country's results are transferred to each individual sector, with clarifications made about the sector's capabilities when the country's rating changes.

Figure 1
GII 2023 indicators for Switzerland, South Korea and Bulgaria



Source: the author's own elaboration based on Dutta et al. 2023.

Below we will describe the opportunities of Bulgaria's Blue Economy, using the country's national result from the GII 2023 study. We will also make clarifications about the sector to determine the level of development potential in the field of entrepreneurship in the field of deep technologies.

The graph presents the results of three countries – Bulgaria, Korea and Switzerland, in the GII ranking for 2023 in various areas: Knowledge and technology; Creativity; Business environment; Market environment; Human capital; Infrastructure; Institutions; Ranking result.

The selected countries – Switzerland and Korea, occupy first and tenth place respectively in the ranking of the study. It is assumed that the indicators between them are a “necessary and sufficient condition” for the presence of innovations in the national economy, according to the same study. These indicators can be considered as “bottlenecks” according to the methodology of Dul.

The graph visually shows what the Bulgarian economy should do to improve the likelihood of creating innovations and deep technologies on its territory, or at least how to extract optimal economic effect from them. The goal set to improve the indicators of the index is a good guideline for action, but this fact alone is not enough. Bulgaria should direct its efforts towards entering the top ten places in the ranking, which, given the current 38th place, seems like a task of medium difficulty – difficult, but not impossible.

Bulgaria's blue economy and entrepreneurship in deep technologies

According to a World Bank report entitled “Bulgaria: Towards the Development of a Blue Economy” from December 2020, the blue sector in Bulgaria is represented by the following sectors: coastal tourism, maritime transport, shipbuilding and ship repair, port activities, marine non-living resources, marine living resources. The largest share is coastal tourism (with a 70% contribution to GVA), followed far behind in percentage terms by shipbuilding and ship repair (9% contribution to GVA), marine non-living resources (with a 9% contribution to GVA) and port transport (8% contribution to GVA). The data are for 2018. It is worth adding to the above the conclusions made by Anastasia Nedayvoda and colleagues on deep technologies in a study entitled “Financing Deep Technologies”. This study draws attention to the fact that most companies based on deep technologies arise in developed countries, but their solutions are applicable worldwide. According to the study:

Many of these solutions are particularly important for emerging markets, as the intractable challenges of climate, health and connectivity, among other issues, disproportionately affect these nations.

Bulgaria's blue economy, according to the World Bank, is in the process of being created and strengthened. The framework within which this group of economic sectors is being pursued by the European Commission is as follows:

- integrated spatial and participatory approach to territorial development;
- defining priorities with stakeholders;
- negotiating trade-offs;
- developing a future “Vision” for the ocean space.

The framework includes several other very important prerequisites: (a) knowledge management; (b) governance, fiscal reforms and public investments that help create a favourable environment for sustainable private sector growth (risk-free growth); and (c)

the promotion of private investment. All these aspects should be supported by a number of key considerations based on a cross-sectoral analysis.

The framework for the development of the blue sector in Bulgaria also takes into account the protection of the ecosystem of the region, relying mainly on a multi-faceted approach, where different activities are carried out simultaneously to achieve multi-directional results.

On the other hand, deep technologies require specific conditions to arise in a certain place, and these conditions can be seen as a kind of economic barrier to entry into the business with them.

For deep technology entrepreneurship to be possible in the context of the blue economy, there must first be a sustainable blue economy. A blue economy must be either an economy whose state changes insignificantly under the influence of external factors, or an economy that does not have negative environmental impacts. At the present time, as the World Bank report states, Bulgaria's blue economy is in the process of being created and strengthened, i.e., it is not sustainable, but rather unstable and developing. In this context, we can conclude that deep technologies in the blue economy cannot yet be expected to emerge easily. Based on the nature of these technologies, we should not exclude the possibility of a new sector that we cannot yet imagine, and we must open our minds to its possible emergence. At the very least, we should accept that such a possibility exists, and not deny it completely.

Despite the rather negative findings that we have indicated so far, we can point to the logical connection of the favourable conditions upon the occurrence of which the Blue Economy of Bulgaria can reach a state in which free entrepreneurship with the tools of deep technologies is possible.

First, we must be sure that the Blue Economy of Bulgaria is well developed and realistically positioned. An economy is well developed when a large part of its sectors are growing and are well positioned throughout the various economic cycles – 5-year, 10-year, 30-year and more.

The second thing that we must have as a necessary condition is a favorable national environment for innovation, which, as we show in Figure 1, is a distant, but not impossible prospect for Bulgaria.

To specify what Bulgaria needs to achieve in order to increase its position in the Global Innovation Index ranking, we must consider the pillars that the index examines to determine the general state of a given economy. For this purpose, we need to return to Figure 1. From which it is clearly seen that the Bulgarian economy has the biggest problems in the field of human resources and talents, and in the field of infrastructure it is rather approaching the benchmark countries.

It can be seen that the indicators “Business Environment”, “Market”, “Ability to Accumulate and Absorb Knowledge” and “Creativity” have almost the same values. In order to have balance and sustainable growth, however, a multifaceted approach is needed and all these indicators must be increased smoothly and simultaneously. Here, communication between stakeholders in the process plays a major role. In the conditions of the Blue Economy, according to Lee, this comes down to strengthening communication through various channels between the following several participants:

- state institutions;
- NGO sector;
- business (entrepreneurs);
- local communities;

– science.

In the conditions of Bulgaria, where we do not have a well-established Blue Economy, we do not have fruitful communication between these groups of stakeholders, any economic growth is greatly hampered. Communication here should be understood as processes of civil dialogue, in which each group, relying on information that is verified – that is, recognized by all others as reliable, demands and seeks support for its interests in a pluralistic public conversation.

It is a matter of leadership that extensive and full communication between stakeholders begins to take place. This task can be handled by a new type of professionals, whom we will call: blue lobbyists. They are a type of lobbyists who are more like consulting lobbyists according to the methodology of Ivka Tsakova (2010). People who know in detail not only the deep technology market, but also the Blue Economy and are authorities in the eyes of all stakeholders. They are able to provide information that all parties can trust, as recommended by a study by Friederike Welter, Nadezhda Veleva, Susanne Kolb entitled “Trust and Learning in Cross-Border Partnerships in an Enlarged Europe” (2008).

The results of this study show that the following conditions are necessary for entrepreneurial activity based on deep technologies in the field of the blue economy in Bulgaria:

- (1) the presence of an established blue economy;
- (2) the presence of a dialogue in the sector to create an ecosystem aimed at bringing the sector and the country to the market of new technologies and innovations, that is, to create a market environment;
- (3) a good start would be for Bulgaria to start issuing a report on the state of the Blue Economy, following the example of countries such as Ireland;
- (4) the country should increase opportunities for talent mobility and improve communication between the various participants in the process of creating a sustainable blue economy;
- (5) entrepreneurs in the country should be aware of the nature of deep technologies, which can transform entire market niches and provide new market opportunities unsuspected in the current economic context;
- (6) market openness and business freedom should also be improved;
- (7) communication both within the sectors of the country and beyond must be ensured with access for Bulgarian entrepreneurs and scientists to the global processes of creating deep technologies, but also to the opportunities for entrepreneurship based on these technologies.

As with all possible improvements, it is best to make them simultaneously.

A little more about the context of Bulgaria and the international controversy related to the topic

In order to develop entrepreneurial activity with the tools of deep technologies in the conditions of the Blue Economy of Bulgaria, the following important environmental prerequisites are necessary:

- strengthening the Blue Economy sector;
- improving the business environment;
- improving market opportunities;
- investments in human resources;

- institutions adequate to the global environment for doing business;
- promoting creativity in society;
- investments in human capital: attracting, creating and increasing capabilities.

The Bulgarian Blue Economy is developing, this process requires time, resources and understanding. Deep technologies, in turn, require developed markets, business dynamics, human capital, institutions to happen somewhere. All this makes it quite difficult to implement an entrepreneurial process and entrepreneurship in these areas.

Despite the difficulties, Bulgaria cannot afford to remain outside the best global processes and must pursue a strong policy of inclusion, talent transfer and creation on its territory, providing them with binding mobility, work in global networks, funding and assistance tied to results.

A good start is the conference held in the city of Burgas under the title “Blue Economy and Blue Development”, on June 1-2, 2018, concerning the Blue Economy sector. The conference in question is a good example in the direction of filling the white spots in the field of knowledge about the Blue Economy. The ideas presented in the conference reports do not differ significantly from the global trends in the sector. A clear approach to regionalization of the issue is noticeable, emphasizing the specifics of the different water basins.

Thematic areas of the conference were:

- innovation and investment in the blue economy;
- challenges for infrastructure and regional development with blue growth;
- development of tourism in maritime and river areas;
- the sea and aspects of blue development in public communications and philology;
- solutions in psychology, social work and pedagogy, stimulated by water, water spaces and environmentally friendly life models;
- legal and administrative aspects of maritime areas and regulations;
- engineering and transport solutions related to water spaces and routes;
- information technologies and use of alternative sources in blue growth.

It is noticeable that the texts and topics do not cover the issues of entrepreneurship in the blue economy. Recommendations are provided on “what to do”, but the question of “who should do” these actions is not addressed. The latter can be considered a knowledge gap and should be studied as a topic.

Discussions in the field of deep technologies are diverse and divided into four main directions, as Martínez-Vázquez and her colleagues argue (Martínez-Vázquez et al. 2021):

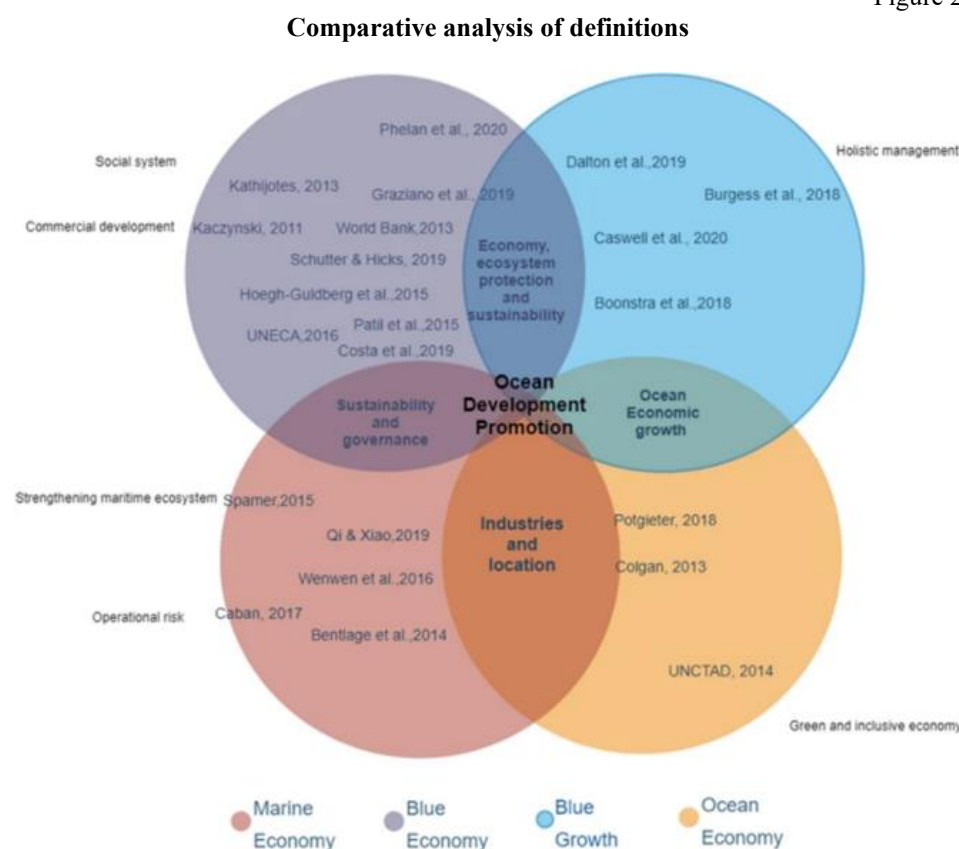
- (1) economics, conservation and sustainability of natural ecosystems;
- (2) ocean growth;
- (3) industries and locations;
- (4) sustainability and governance.

Discussions in the field of deep technologies are diverse. The main question that concerns researchers is what are the necessary circumstances for the emergence of deep technologies in a particular place and in a particular sector. Frank attempts at prediction are being made by various researchers. An example of such a search is the report of the Office of the Deputy Assistant Secretary of the US Army (Research and Technology), published in 201 and entitled: “Emerging Science and Technology Trends: 2017-2047 Synthesis of Leading Forecasts”. Where the following trends for the development of the world and deep technologies are clearly outlined:

- robotics, autonomous systems and automation;

- advanced materials and manufacturing;
- energy generation, collection, storage and distribution;
- biomedical science and human augmentation;
- quantum computing;
- mixed reality and digital mimicry (e.g., AR, VR, voice synthesis);
- food and water security technologies (e.g., water harvesting, lab-grown meat);
- synthetic biology;
- space technologies (e.g., asteroid mining, commercial space travel, anti-satellite weapons);
- climate change adaptation technologies (e.g., geoengineering, super carbon-absorbing plants).

Figure 2



Source: Martínez-Vázquez et al. 2021.

Again, the question “who will do them” is not considered, which we can consider as a white spot in knowledge. The entrepreneur and his characteristics are not visible and no prediction is made about them. The answer to the question “Who are the entrepreneurs using deep technologies in the Blue Economy of Bulgaria?” is part of the larger question

“Who are the entrepreneurs of the future in the world and what do they need to do to be successful in the new economic and deeply unknown, still, future reality?”.

Bulgaria can help promote the debate on the above issues by ensuring and encouraging global communication on the above issues. Moreover, in order to have sustainable success, Bulgaria must become a place for communication between the bearers of different ideas, as the country must provide better living and working conditions for talented people and be very well connected politically, culturally and economically with potential places around the world where new, yet unknown, technologies of the future are supposed to and are most likely to arise. Bulgaria's blue economy is no exception. Entrepreneurs in Bulgaria, including in the field of the Blue Economy, should strive for this goal.

Conclusion

Deep technologies could emerge in different places around the world and in different economic sectors, but it is more likely to happen where there are more prerequisites for this. Prerequisites are something that societies around the world, through their leaders, institutions, talent and a favorable environment, can control and create. By constantly monitoring the necessary and sufficient conditions for the emergence of deep technologies, hypotheses could be made about where and in which sector such an emergence is more likely. On the other hand, the study of the prerequisites for the emergence of deep technologies allows less developed countries, regions and sectors of the world economy to join this process through talent transfer, equity investment in new developments and other similar initiatives with the potential for development on a significant scale.

Let's jump into the deep end. It's very interesting, exciting, but also a little dangerous. If we are well prepared and realize what we are doing, we will cope.

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