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REDUCING THE DIFFERENTIATION OF REGIONS' ECONOMIC SPACE BASED ON DIGITAL TRANSFORMATION: THEORETICAL, METHODOLOGICAL AND PRACTICAL ASPECTS

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The subject of the research is the processes of digital transformation of the economic space of the Russian regions. The aim of the work is to identify and analyze the key problems of implementing digital transformation at the regional level in Russia and assess its potential as a tool to reduce the differentiation of the economic space. The research is based on a comprehensive methodology that includes a comparative analysis of the international and Russian digitalization experience. The methods of analysis of regulatory legal acts regulating the digital economy in the Russian Federation, processing and interpretation of relevant statistical data were applied. The analysis of scientific publications on the topic is carried out. Spatial economics approaches were used to assess spatial aspects, which made it possible to analyze the level of digital connectivity of regions and the depth of regional differences in digital development. Theoretical approaches to understanding the digitalization of the economy are systematized. The relevant international experience of digital transformation has been assessed and compared with Russian practice, and adaptation opportunities have been identified. The features and gaps of the current legal regulation of the digital economy in Russia are presented. The best practices applicable for strengthening regional policy in the field of digitalization have been identified. The specific problems of digital transformation at the federal and subfederal levels, as well as the role of digital platforms and the need for their

effective institutional design are investigated. It has been established that the successful digital transformation of the Russian economy requires comprehensive and coordinated actions at all levels of government, from federal to municipal, to reduce inter-regional differentiation. The key obstacles, in addition to the imperfection of legal regulation, are the acute shortage of qualified IT personnel in the regions, insufficient digital infrastructure and limited financial resources of regional budgets. In this regard, it is necessary to develop and implement unified, consistent legislation in the field of the digital economy, strengthen the motivation and competencies of regional and local authorities, provide targeted support to small and medium-sized businesses in the context of digitalization, and implement programs to improve the digital literacy of the population and the level of digital maturity of the territories as a whole.

Digital economy, economic space, region, digital legislation, digital platforms.

Introduction

Globalization and the evolving nature of interregional connections call for a shift in focus from traditional material factors like logistics and capital to intangible assets. These include capabilities in data collection and processing, as well as the accumulated experience of regional collaboration.

The digital transformation of the public sector is now a worldwide trend. Data from the World Intellectual Property Organization[1] (WIPO), analyzing 248 countries, places Russia 59th in the 2024 Global Innovation Index. While primarily measuring innovativeness, this index also sheds light on related areas. It highlights scores for institutional quality (126), business environment (53), infrastructure (76), market development (57), human capital and research (39), and knowledge and technology outputs (52). Against this backdrop, this study therefore aims to identify and analyze the key implementation challenges of digital transformation at the regional level in Russia and to evaluate its potential for mitigating interregional economic disparities.

To achieve this aim, the study sets out the following objectives:

1) to explore the theoretical foundations of the "economic space" concept within the context of digital transformation, analyzing existing interpretations of this notion in digital economy research;

2) bto examine relevant best practices – both international and domestic – for strengthening regional digitalization policies, assessing their adaptability to the Russian context

3) bto identify the key obstacles and problematic areas hindering the advancement of digital transformation at the regional level.

In regional and sectoral economics, a region is defined as a territorial unit that concentrates distinct economic, productive, and technological processes inherent to a specific area or industry. Today, the digitization and digital transformation of regions are of paramount importance, driven by the integration of new technologies into production, governance, communications, and society. Digitization enhances economic efficiency, improves quality of life, and fosters deeper regional integration into the digital

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[1]   World Intellectual Property Organization (WIPO). Digital Technologies for Business: A Practical Guide. Geneva: WIPO, 2022. 40 p. Available at: https://tind.wipo.int/record/50181?v=pdf (accessed: 03.06.2025).

economy. Crucially, digital transformation also entails the development of data infrastructure, smart technologies, and digital platforms that underpin the growth of specific regions and sectors.

The scientific novelty of this research consists in its theoretical and methodological rationale for digital transformation as an instrument of regional economic policy that shapes spatial development patterns. Furthermore, it identifies the specific contradictions and constraints that define its impact on the level of interregional differentiation within Russia.

Theoretical research in spatial economics provides methods for optimizing regional development that consider territorial specifics, access to resources, and innovation potential. In the context of digitalization, new technologies can significantly improve interregional coordination and interaction, thereby enhancing their competitiveness within the economic space.

At the same time, numerous approaches to the very concept of economic space have emerged, covering its various aspects. For instance, A.G. Granberg, A.V. Suvorova, and several other researchers characterize economic space as a specific territory within whose boundaries object interactions occur. However, this approach has limitations in a post-industrial economy, as it fails to encompass the diverse processes of a globalized economy (Kirillova, Kantor, 2010; Tkachenko, 2010; Getmantsev, Atamas, 2021; Urunov, Morozova, 2024; Minakir, Dzhurka, 2018).

The resource-based approach to defining economic space, examined by V.V. Chekmarev, V.V. Radaev, and others, focuses on resources and addresses the source of economic interest (Pavlenko, Kireeva, 2020; Likhachev, Pushina, 2022; Savina, 2023; Bathelt, Glückler, 2005).

Other scholars, such as O.A. Biyakov, A. Kuklinski, and others, consider the resource-based approach incomplete, as it overlooks relations of joint activity. They view the processual approach as the economic space of a network of interactions among economic agents aimed at collaborative activity (Biyakov et al., 2004; Karimov, Chuvashaeva, 2014; Khuchiev, 2023; Lisichkina, 2015; Papulova, 2020).

The works of S.I. Parinov, E.Yu. Ivanov, and others focus on the informational approach, which frames the understanding of economic space through the lens of information flows between economic agents. This approach suggests that economic space is not confined by territorial boundaries but is created through the exchange of signals and information among participants (Parinov, 2002; Ivanov, 2003; Makar, 2012; Mitrofanov, 2013; Shibusawa, 2000).

Research by many scholars reveals the influence of institutional factors, such as laws, norms, and rules, on the development of economic space, its functional boundaries, and opportunities for growth. Thus, the institutional approach emphasizes the role of institutions in shaping economic space (Inshakov, Frolov, 2007; Tereshchenko, 2012; Khuzhakhmetova, 2021; Anam, 2024).

The spatial approach examines economic space through geographical location and interconnections between objects. The works of O.A. Bulavko and V.V. Chekmarev highlight that spatial organization and resource accessibility play a key role in the effective development of regional economies (Danilova, Rezepin, 2021; Bulavko, Chekmarev, 2022). Unlike the territorial approach, it investigates interactions that may extend beyond borders, considering a broader spectrum of connections and factors.

The essence of the program-targeted approach lies in transitioning an economic system from its existing state to a desired one, adapting it to changing conditions of the internal and external environment. It requires restructuring its internal architecture, linkages, and mechanisms of interaction among participants. Its proponents include V.A. Volkonsky, S.S. Shatalin, M.S. Syupova, K.Yu. Bagratuni, and others (Karkavin, 2014; Mazilov, 2019; Bagratuni, 2021; Panesh et al., 2022).

The systemic approach views economic space as an integrated system where elements are interconnected and form hierarchical structures. Its most important characteristics are the interaction of elements and the emergence of new properties that cannot be predicted by analyzing the elements in isolation. A.I. Tatarkin, A.N. Bubnov, and others emphasize that the systemic approach helps identify feedback loops and emergent properties in economic processes (Tatarkin et al., 2012; Grishin et al., 2020).

In our view, the informational-institutional approach is of the greatest interest, as it concentrates on information and digital interactions through various platforms, as well as their regulation.

Results

Building upon the aforementioned Global Innovation Index, we will analyze existing digital economy programs in other states with similar levels of GDP (PPP): the USA (3rd place), Germany (9th), China (11th), and Japan (13th). The goal is to examine their experiences in the field of digital transformation at the national level.

The experience of the USA and Germany is largely based on the significant influence of federalism. In both countries, a substantial share of initiatives originates from regional or state-level entities. However, their approaches to the legal formalization of digitalization differ markedly. In the United States, digitalization is regulated through specific acts that are often enacted after technologies or new domains have already emerged. These acts typically provide a framework of recommendations, while individual states adapt these principles to their own socio-economic conditions. Non-governmental institutions, such as consortia and industry alliances, play a crucial role. This enhances flexibility but can weaken centralized control.

In Germany, by contrast, there is a framework of strictly prescriptive legislation[2]. Regulation is implemented both at the national level and within the framework of European Union legislation[3] (e.g., GDPR, AI Act, OZG). Germany actively coordinates digital initiatives among its states (Länder), striving for legal coherence and standardization of digital services, particularly in the realm of public service delivery (Hassel et al., 2024). It is also worth noting the European Digital Identity Wallet (EUDI Wallet), launched at the end of 2024. This wallet aggregates a wide range of personal data and official documents, allowing users to store them digitally and grant access at their discretion. It can hold foundational identity documents as well as other key credentials: driver's licenses, educational diplomas and certificates, medical records, and more. Consequently,

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[2] Europe's Digital Decade: Digital targets for 2030. European Commission. Available at: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade　　-digital-targets-2030_en (accessed: 01.06.2025)

[3] Digital Services Act. European Commission. 2024. Available at: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/ digital-services-act_en (accessed: 01.06.2025).

the wallet can be used, for instance, to rent a car by presenting a digital driver's license or to apply to a university without using physical documents. Crucially, users retain full control over their data and can share only the specific information required for a given transaction – such as verifying they are of legal age without disclosing their exact date of birth[4].

In China, the government leverages its broad authority to concentrate data control and exercise directive management over digitalization. It prioritizes national platforms while also adopting a proactive stance towards technologies that are not yet widespread. This allows the government to channel the development of digital industries in line with long-term state strategy (Huo, Liu, 2024).

Japan's experience shares some similarities with Russia's, particularly in terms of public service delivery and the aim to reduce administrative burdens through digitalization. Thus, Japan utilizes digitalization to reduce bureaucratic barriers, helping to integrate socially significant sectors into a unified database. Furthermore, emphasis is placed on the Society 5.0[5] concept, which fosters the integration of digital and physical spaces. The Digital Agency has consolidated a vast volume of disparate data into a single platform, unlocking opportunities for more efficient, data-driven management and decision-making. However, a reliance on foreign digital infrastructure persists.

An assessment of each country's experience in shaping institutional factors and establishing the legal framework for digitalizing their economies is presented in *Table 1*.

The Russian digitalization model is mixed but predominantly state-centric. The Ministry of Digital Development serves as both regulator and coordinator, with key decisions made at the federal level. Digitalization is implemented within the framework of national projects and strategies. The Russian market is characterized as state-oriented, yet it lacks a comprehensive, systematic approach. Existing acts regulate only isolated aspects of digitalization, due to the rapidly increasing complexity and specificity of the sectors involved.

Table 1. Approaches to digitalizing the economy

Country	Approach to digitalizing the economy	Regulatory nature	Legislative specifics
USA	Liberal, market-driven	Ex-post, modular	Sector-specific acts and strategies
Germany	Legally formalized	Strictly normative	OZG Act, GDPR, EU AI Act
China	Centralized, directive	Proactive and controlling	Three core laws: Cybersecurity, Data Security, Personal Information Protection
Japan	Managed modernization	Softly normative	Digital Government Act
Russia	Mixed, state-centric	Programmatic, fragmented	Strategies exist, but no systemic law
Source: own elaboration.			

[4] EU Digital Identity Wallet Home. Digital Building Blocks. Available at: https://ec.europa.eu/digital-building-blocks/sites/spaces/EUDIGITALIDENTITYWALLET/pages/694487738/EU+Digital+Identity+Wallet+Home (accessed: 12.09.2025).
[5] Riding the wave of digital transformation: Insights and lessons from Japan's journey. World Bank Group. 2024. Available at: https://documents1.worldbank.org/curated/en/099352305232428567/pdf/P177977145b03308b19ef61f321c4e404f4.pdf (accessed: 01.08.2025).

Digital transformation in public administration itself implies the development and implementation of six potentially promising areas, as outlined in the national project "Digital Economy of the Russian Federation"[6], aimed at enhancing the efficiency of state processes. The digitalization of public services is carried out through online platforms and involves the use of artificial intelligence and analytics in decision-making.

Strategic planning documents adopted in the Russian Federation in 2017 outline measures to stimulate the development of digital technologies and their application across various economic sectors. More importantly, they identified key constraining factors, including a shortage of qualified personnel, insufficient specialist training, and a limited number of world-class research initiatives.

Previous research on digitalization levels suffered from a significant flaw – an excessive focus on formal indicators, such as equipment provision, internet penetration, or economic efficiency. While these metrics are useful for cross-country comparisons, they fail to capture the multifaceted nature of the digital economy, which involves diverse actors, dynamic processes, and uneven project implementation, especially in the early stages. Furthermore, such data often becomes obsolete due to publication lags in official statistics, while the very concept of digitalization continues to evolve over time[7].

Based on the conducted analysis, the institutional environment remains a weak link. This is evident both in a weak institutional framework due to unstable business conditions and in the regulatory environment. According to a 2019 assessment by Global Business Consulting[8] (GBC), some of these issues persist to this day, with the normative quality of law in the Russian Federation remaining low. GBC identifies the legislative environment as the least developed component of doing business in Russia. In addition, there are problems of system obsolescence, international sanctions, and insufficient resources. On the other hand, advantages include developed digital infrastructure, strong private IT organizations, and sustained government focus on the digital economy.

A crucial element of digitalization is now the shift from digital services to platform-based models. Digital platforms play a key role in digitalizing economies, serving not only as a technological foundation but also as a catalyst for changes in business models, public services, and interregional interaction. In Russia, state-led platforms hold significant importance; however, the institutional formalization of these solutions remains underdeveloped (Lavrik, 2024).

The influence of digitalization, transport infrastructure, and institutional factors on the interregional connectivity of the economic space manifests in a complex manner. Digitalization helps reduce spatial disparities. Research in this field has already demonstrated that the development of Information and Communication Technologies (ICT) positively impacts economic growth, highlighting the benefits derived from digitalization. For instance, a World Bank report notes the formation of a specific understanding regarding the advantages gained

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from digitalization. However, another side of the issue emerges: since Russia is a transition economy, it faces a number of problems created by the development of the internet. Distortions are noted in the dominant positions of digital platforms relative to traditional methods of delivering goods and services. Nevertheless, Russian companies demonstrate that they operate in both digital and traditional markets. It is also noted that the share of digital revenue for most companies is growing significantly faster than traditional revenue, and hybrid business models are being utilized.

It has also been determined that the state fails to keep pace in forming the institutional environment in line with the dynamic development of the ICT sector. Summarizing the results of international research, it can be concluded that Russia possesses a substantial technological foundation for digitalization, yet a number of problems persist, requiring systematic changes[9].

One of the indicators for assessing the effectiveness of digital economy development is a set of specific metrics. According to research conducted by the Higher School of Economics[10] (HSE), from 2017 until 2022, the share of household and organizational expenditures on digital products has been growing. However, expenditures on digital economy development as a percentage of GDP, based on the same metrics, have remained roughly at the same level. These expenditures are primarily associated with the purchase of digital equipment and supplies, as well as payment for telecommunications services. Another issue concerns internal spending on ICT research – funds were mainly sourced from federal budgets, but over the last several years, starting from 2016, a trend toward research funded by organizations' own internal resources is visible.

Today, the level of regional digitalization is assessed using the digital maturity indicator. This is a metric that evaluates the level of digital transformation through the automation of public services, the implementation of cross-cutting technologies, and the development of digital infrastructure in key sectors. The calculation is performed by aggregating normalized data across key domains, where 100% corresponds to the complete digital transformation of processes (depicted with a darker color), while low values indicate fragmented technology use (shown in a lighter color; *Fig. 1*).

The analysis of data across 89 constituent entities of the Russian Federation revealed significant differentiation in the level of digital maturity of state and municipal governance, as well as key economic sectors and the social sphere. Regions were divided into three groups: those with low digital maturity (less than 80%), medium level (80–90%), and high level (above 90%). The group with the lowest indicators included 11 regions, encompassing the new territories (the Donetsk and Lugansk people's republics, Zaporozhye and Kherson regions), as well as the Republic of North Ossetia–Alania (64%) and the Jewish Autonomous Region (71.8%). This indicates the need for targeted support for these entities, taking into account the specific characteristics of the lagging territories.

The largest group consists of regions with a medium level of digital maturity (44 entities). This category includes regions demonstrating steady development of digital infrastructure with potential for further growth. Of particular note is the group of 34 leading regions with scores above 90%. This group includes the Belgorod Region and the city of Moscow

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9 Digital Transformation of Russian Firms. World Bank Group. Washington, D.C.: World Bank, 2024. 52 c. Available at: https://documents.worldbank.org/en/publication/documents-reports/ documentdetail/099101824180532047/bosib1 3bdde89d07f1b3711dd8e86adb477 (accessed: 03.08.2025).

10 Indicators of the Digital Economy: 2023. Statistical Digest. HSE University. Available at: https://issek.hse.ru/mirror/pubs/share/892389163.pdf (accessed: 16.08.2025).
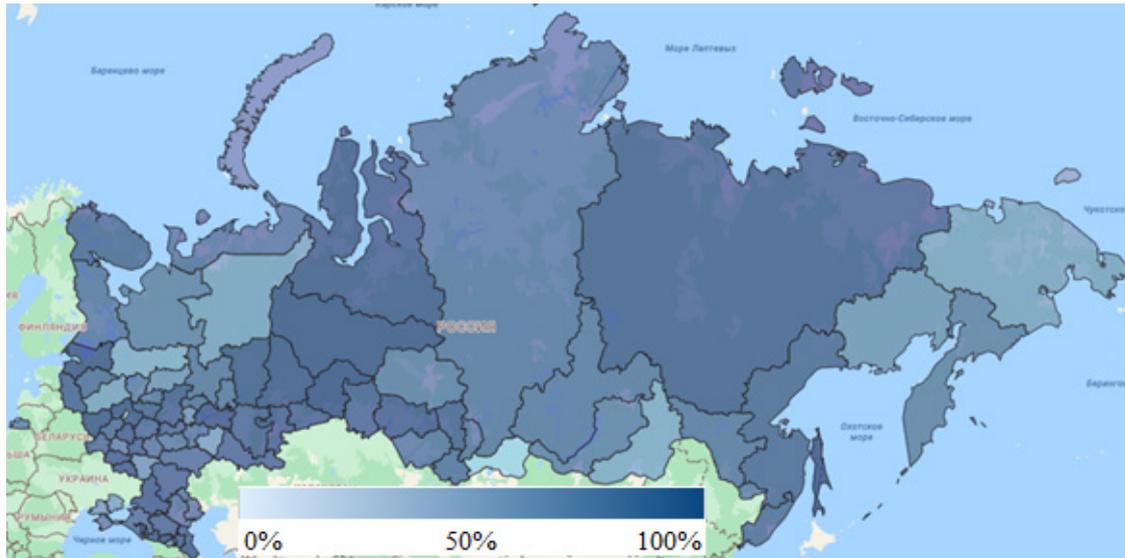
**Figure 1. "Digital maturity" of state and municipal governance, key economic sectors,
and the social sphere (including healthcare and education) for 2025**
Compiled from: Share of Russian software used in the activities of state authorities of the constituent entities of
the Russian Federation. Federal State Statistics Service (Rosstat). Available at: https://fedstat.ru/indicator/62815
(accessed: 20.10.2025).

(100%), the Republic of Tatarstan and the Moscow Region (99.7%), as well as the oil and gas autonomous areas – Khanty-Mansi (95.5%) and Yamal-Nenets (95%).

Regions are following the national trend and are utilizing various tools that can not only enhance governance efficiency but also reduce interregional differentiation through the adoption of successful solutions. For example, within the federal project "Smart City", a modern urban environment is being created in regions of the Volga Federal District, where technologies help improve the daily lives of residents and the work of municipal services. The project covers major cities and is implemented as part of the national projects "Housing and Urban Environment" and "Digital Economy"[11].

In the Nizhny Novgorod Region, the digital platform "Smart Region" is being used, which encompasses all municipalities in the region. It involves data integration, rapid response capabilities, and systematic management of municipal services[12].

Furthermore, many digital organizations, due to the specifics of their work and the large volume of information they collect and analyze, offer their solutions to regions and municipalities. This can involve various solutions to pressing issues. For example, providing a regional Utility Services Platform to make this process transparent, convenient, and efficient for all participants: citizens, managing companies, and authorities. Alternatively, it could be a Regional Situational Center created to obtain a complete and reliable picture of the region for decision-making[13]. Such problem-solving solutions are often first developed within one region as a pilot project and later scaled up for subsequent commercialization.

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[11] "Smart City" on the Volga: What Smart Technologies Are Being Implemented in the Volga Federal District. Volga News. Available at: https://pfo.volga.news/article/532056.html (accessed: 23.09.2025).

[12] NTA-Privolzhye. Access to the "Smart Region" Platform Granted to All Nizhny Novgorod Municipalities. Economic News. Available at: https://nta-pfo.ru/news/economy/2024/news_687317 (accessed: 21.10.2025).

[13] Tsifrobank (Digital Bank). Case Studies and Best Practices. Available at: https://cdo2day.ru/cases/ (accessed: 21.10.2025).

To assess the level of business digitalization in the regions, a composite index was formulated, combining seven key technological domains: the use of cloud services, big data processing and analytics technologies, digital platforms, ERP systems, the Internet of Things (IoT), geographic information systems (GIS), and artificial intelligence technologies. All index components carry equal weight (1/7), ensuring a balanced assessment without the predominance of any single technological direction *(Fig. 2)*. The results are visualized using a gradient scale where the shading intensity of the territories corresponds to the values of the resulting indicator, ranging from minimum (light tones) to maximum (saturated tones). Three autonomous areas – Khanty-Mansi, Yamal-Nenets, and Nenets – were excluded from the analysis due to a lack of data at the regional level; therefore, the study covers 82 constituent entities of the Russian Federation.

The analysis of business digital activity in Russian regions revealed a significant gap in this indicator among the constituent entities.

Values range from 8.98% in the Republic of Tyva to 30.17% in the Chechen Republic. Regions are divided into three groups: 20 entities with low activity (less than 16.56%), 43 regions with average indicators, and 19 leaders where more than 20% of businesses use digital technologies. Notably, Moscow and Saint Petersburg fell into the average group, while the Chechen Republic showed a high result.

The geographic distribution reveals distinct clusters: regions with high activity are concentrated in Central Russia and the Urals, while the underperformers are located predominantly in the south and east of the country. This points to a persistent digital divide between central and peripheral regions, requiring targeted support measures. The data underscore the necessity for a differentiated regional policy that considers the specifics of each entity. Studying the experience of leading regions can help develop effective digitalization programs, while the 12 regions with indicators below 15% require priority attention and targeted business support to reduce the technological gap.
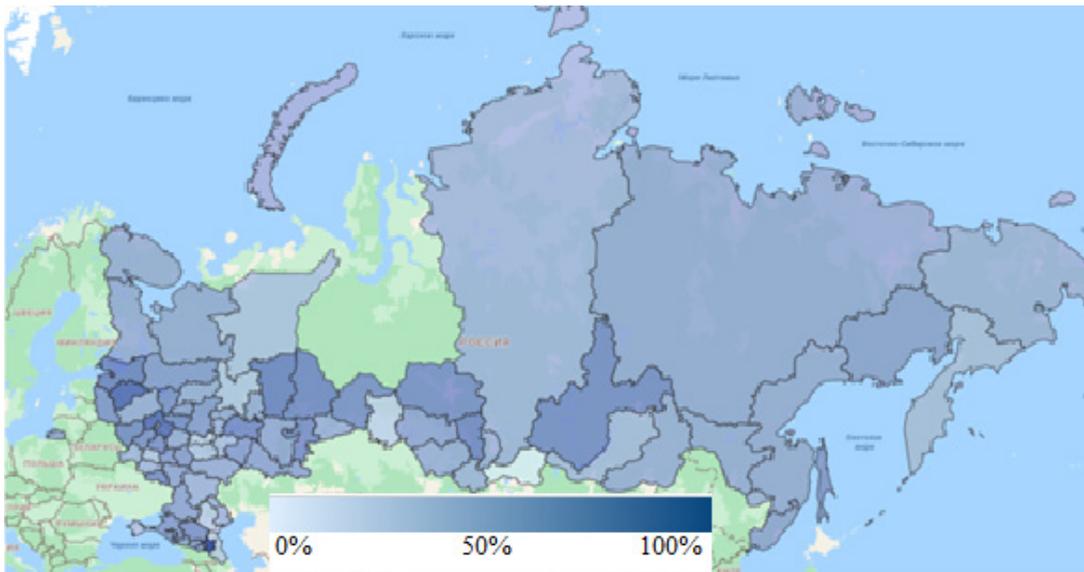

Figure 2. Overall business activity in using digital technologies for 2022
Calculated based on: Mendeley Data. Russian regions in the context of digital transformation: ESG-management for sustainable business development, Mendeley Data, V1. DOI: 10.17632/53msftm56j.1. Available at: https://data.mendeley.com/datasets/53msftm56j/1 (accessed 23.10.2025).

Despite the measures applied by both national governments and regional authorities, the question of methodology for assessing regional digitalization remains pertinent. The existing indicators do not capture the entire multifaceted process of economic digitalization. Furthermore, data are collected and processed unsystematically, and there is a limitation inherent in formal indicators, which were primarily associated with assessing the level of informatization.

Conclusions

Summarizing the findings of the conducted research, two main vectors can be identified that contribute to interregional integration, leverage the advantages of the digital economy, and mitigate challenges arising from the new operational mode of the economic system. Accordingly, the key issues requiring comprehensive resolution are as follows.

The first vector is the state. Let us examine in detail the findings concerning the Russian state, its legislative activity, and the conditions for conducting favorable operations in the ICT sector.

Underdeveloped legislation. An assessment of other countries' experiences revealed that the Russian Federation lags behind the pace of digitalization. A legislative foundation for the new realities needs to be established. The current state and characterization of the digital economy, digital data, as well as the legal elaboration of programs, do not fully align with modern trends. This manifests in fragmented approaches, weak linkages and coordination across all levels, and the absence of a systemic law defining the relationship between public and private sectors in the ICT field.

Insufficient legal grounding and weak regulation of digital platforms. Platforms of any kind lack a specific legal status as objects of public infrastructure and, at the same time, pose challenges to Russia's economic security.

Activities of private digital platforms. Marketplaces play a significant role in facilitating interstate economic activity. Small businesses are almost entirely unprotected from unfair practices by these platforms. This typically manifests in discriminatory search results, the imposition of unfavorable terms, unfair competition within the platform, and influence over product pricing. Imperfect legislation in this area negatively impacts small businesses.

Insufficient oversight over the quality and circulation of digital data. Although regulators and supervisory agencies exist, their focus is generally directed at large organizations such as banks and IT companies with well-funded security measures, while small and medium-sized enterprises largely remain unattended. This leads to systematic data leaks and a low level of information security. In addition, government bodies are severely constrained by limited resources and cannot fully execute their duties in this direction.

Lack of mechanisms for interregional digital cooperation. Despite the existence of federal platforms and services, mechanisms for interregional interaction and solutions developed at the federal level are not fully integrated and adapted at the level of the constituent entities. This leads to fragmentation, a decline in the quality of digital services, and creates barriers to data exchange. Furthermore, some regions engage in duplicated activities without coordinating with each other, resulting in inefficient resource utilization.

Now let us examine the challenges at the regional level.

1. *Human resources.* Regions face a shortage of specialists both in the ICT field and in interdisciplinary areas, leading to slow adoption of digital solutions in the public and private sectors.

2. *Competencies.* This point extends the previous one but is not a direct consequence

and represents a more profound issue. The insufficient level of digital competencies among civil servants and SMEs hampers regional development, thereby reducing the potential economic impact of digitalization. Furthermore, there is a noted inadequacy in accelerated training programs in this field, resulting in a market saturated with poorly qualified professionals.

3. *Resources and budgetary constraints.* A major issue concerns the fiscal autonomy of regions and the availability of discretionary funds for developing various electronic systems. As a rule, regions lack their own resources to fulfill requests from the federal center, and private investors show little interest in funding such projects.

4. *Local regulatory framework.* At the local level, there is an underdevelopment of regional legal acts regulating digitalization. The absence of model regulatory templates and outdated legislation further impede the decision-making process.

5. *Low level of digital maturity.* This remains a significant barrier to full-scale digitalization due to the use of outdated IT systems and non-automated processes. Additionally, regions vary substantially in their level of digital maturity, making standardized solutions an incomplete answer. An analysis of modern methods for assessing digitalization revealed that the existing indices and models used for such evaluation have notable shortcomings.

6. *Motivation and incentives.* Despite the large number of state programs, regional authorities lack motivation to address the problems listed above. There is an absence of initiative and engagement in implementing the planned programs. Digitalization is often perceived as a formal, compliance-oriented task rather than a driver of real change. A lack of understanding of the benefits, the additional workload for departments, and the absence of tangible incentives reduce the willingness to work on integrating digital solutions. A key problem remains the declarative nature of various programs and the limited operational measures aimed at sustaining them in the regions.

The digitalization of the Russian economy requires a comprehensive approach to solving current problems at both the state and regional levels. Issues related to the lack of clear legal regulation and infrastructural limitations must be addressed through a system of legislative and institutional measures aimed at simplifying and unifying digital processes. There is a need for the unification of standards and norms at all levels of interaction.

As previously stated, platforms still lack a clear legal status as public infrastructure, and the responsibility for their proper functioning is not always transparent. In this regard, the European Union is the most advanced example; through interstate union, member states have ceded part of their sovereignty to form several departments dealing with mutual integration, harmonization of national legislations, and the creation of unified systems. A specific case in point is the Digital Single Market[14]. The relevant legislation limits the dominance of large services and formalizes criteria for the protection and transparency of algorithms presenting goods and services. It is necessary to create a register of systemically important digital platforms, analogous to the Central Bank of Russia's work with banks, and to tighten laws regarding data breach fines, similar to the GDPR. This would unify the rules for trade, tax systems, and services, significantly simplifying processes

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[14] The Digital Markets Act (DMA). Regulation (EU) 2022/1925. Available at: https://www.eu-digital-markets-act.com/ (accessed: 15.02.2025).

for businesses and improving cross-border and internal economic integration. The application of uniform standards will facilitate interregional cooperation and optimize business processes by reducing administrative barriers.

Furthermore, the European Union widely employs cross-border financing mechanisms, which fall under the competence of specific supranational departments. Less developed regions receive funds from cohesion funds to reduce the digital divide. Simultaneously, the EU aggregates best practices (such as a unified e-ID, e-health, and e-learning services) and establishes common metrics, like the Digital Economy and Society Index (DESI) indicators for digital skills and online services. This enables a consistent improvement in the level of "digital readiness" across regions – a contrast to current Russian practice (Nevskaya, 2020). However, since funding for the development of such programs remains a challenge, there is a need to scale up initiatives aimed at public-private partnerships, especially as practice shows such cooperation to be effective.

Another critical aspect is the development of legislation for gig economy workers. It is necessary to enshrine the concept of a "digital worker" in the Labor Code or to grant such workers rights equal to those of traditional employees. Currently, these workers are classified as self-employed or contractors, which allows companies to evade responsibility for their working conditions and leads to the infringement of their rights.

The use of big data and analytics is a crucial tool for enhancing the effectiveness of interregional economic integration. In the United States, digital platforms actively leverage analytical data to optimize sectors such as logistics, healthcare, and urban infrastructure management. Analytics improves decision-making at all levels, increasing the speed and accuracy of interaction between regions and government bodies, as applied within programs like the Broadband Equity, Access, and Deployment (BEAD) Program[15]. Furthermore, due to the development of private projects, the establishment of tech hubs is widespread, and individual states have broad authority in selecting digital initiatives. Another important aspect is that platforms for "smart cities" and other innovative solutions significantly contribute to the integration of regional economies. Smart city creation programs, similar to those in Germany, enable the integration of transport, energy, and communication systems.

Beyond creating regional educational programs and professional development initiatives, it is necessary to regulate distance learning platforms. The skill level of specialists graduating from such organizations fails to meet market demands and, moreover, negatively impacts the labor market. For instance, the Central Bank of Russia has been engaged in activities related to digital literacy for several years, publishing informational bulletins and conducting various events. Scaling such activities – along with those mentioned above – to other institutions, school curricula, municipal and state employees, and the general public will help reduce the impact of social engineering fraud. It will also foster a better understanding of the benefits and the ways modern technologies impact the economy, ultimately qualitatively raising the overall education level. Additionally, there is a need to establish certification in the digital economy and ensure regular knowledge updates.

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Additionally, it is necessary to strengthen the oversight of the Federal Antimonopoly Service (FAS) and the Ministry of Internal Affairs (MIA) over the activities of digital platforms. The FAS's competence includes controlling marketplace commissions charged to sellers, as well as combating and penalizing the abuse of a dominant market position. The jurisdiction of the MIA, meanwhile, encompasses control over information circulation and an increased focus on investigating cybercrimes. The creation of an interdepartmental independent data quality oversight body is a possibility, as is the development of national data standards to ensure their security, accuracy, and relevance. This body could be established on the basis of the MIA, the Federal Security Service (FSB), the Ministry of Digital Development, and the Ministry of Economic Development of the Russian Federation.

Summarizing the research findings, it can be concluded that the successful digitalization of the Russian economy requires comprehensive and coordinated actions at all levels – from federal to regional. Key challenges extend beyond legal regulation to include human resource, infrastructural, and financial constraints faced by the regions. For an effective digital transformation, it is essential to develop unified legislation, strengthen the motivation of local authorities, provide adequate support for small businesses, and enhance the level of digital maturity on the ground.

Future research should focus on analyzing the effectiveness of digital platforms, developing new models for assessing digital maturity, and evaluating the impact of public-private partnerships on the development of regional digital projects. It is important to continue monitoring interregional interactions with a focus on sharing experiences and implementing successful digitalization practices in regions with varying levels of maturity.

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