



Regional Aspects of Ensuring Security and Development of Entrepreneurship in the Digital Economy

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Abstract

The paper aims to identify the main regional aspects of security and the development of entrepreneurship in the digital economy. The authors consider the main threats and risks of digital business transformation for the socio-economic stability of the region and find possible ways to determine them. The research methodology is represented by the analysis of statistical data, methods of comparative analysis, and economic and mathematical methods for calculating integral safety indicators. The research results will serve as an example for conducting such analytics in relation to studying the socio-economic sustainability of the region in the context of digital transformations of business entities.

Keywords

Digital economy · Regional security · Entrepreneurship development · Digitalization · Integral security assessment

1 Introduction

Intensive digitalization, the COVID-19 pandemic in 2020–2021, and globalization necessitated the development of business entities in the direction of expanding possibilities for introducing and using information and communication technologies (ICT). Simultaneously, the stability of the regional socio-economic system has become subject to new threats and risks from the negative consequences of technological breakthroughs and lagging behind global business development trends.

The study of K. Alam and co-authors confirms that, at present, business entities most quickly and effectively

respond to emerging internal and external threats through the elements of the digital economy (Alam et al., 2018).

The digital environment in the understanding of business entities implies not only the use of new tools in managing business processes (Karanina & Kotandzhyan, 2021) but also fundamentally new methods of running a business, overcoming geographic and informational barriers, cost reduction, expanding product distribution channels, and improving the quality of manufactured goods and services provided through the introduction of elements of artificial intelligence and machine learning into production (Kruglov & Amelchenko, 2020).

Effective development of digital entrepreneurship is possible only if there is an appropriate regional infrastructure that can withstand new challenges and threats to the stability and development of the region and is ready for fundamentally new directions for the development of entrepreneurial structures. The paper aims to analyze the main regional indicators of development in the digital direction on the example of the Kirov Region, as well as to prepare conclusions and recommendations for improving the regional infrastructure in the context of digitalization.

2 Materials and Method

The studies conducted by the following authors confirm the role of digitalization factors in regional socio-economic development, ensuring the security and competitiveness of economic entities and the region: Arbuzov and Arbuzova (2019), Denisenko (2018), Karanina and Kotandzhyan (2021), Klimentyeva and Ilina (2021), Kovalchuk et al. (2021), Nowak et al. (2021), Popov et al. (2020).

Determining the level of economic security and sustainability of regional development based on the indicator approach and comparing statistical indicators are also reflected in the works of Davydova (2019), Karanina and

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Vershinina (2016), Kozachenko et al. (2019), Shvaiba (2020), Yakovenko and Ten (2021).

Changes that have affected all subsystems of the socio-economic development of the region, indicated by the processes of digital transformation, bring new opportunities, prospects, risks, and threats to the system of economic security of the region, large cities, and business representatives. Simultaneously, sustainable development of the country's subjects depends on changing present conditions. The authors understand sustainable development of territories as the ability to stable functioning under external influences and adaptability to them (Surnina & Shishkina, 2020), which can also be correlated with ensuring economic security at the regional level.

The development of information technologies and their implementation in the infrastructure of regions largely determine the competitiveness of the regional economy and business entities and the level and quality of life of the population. The study by Dolbnya et al. (2021) showed that the digital transformation of regions contributes to effective regional development, the leading tool of which is digital innovation. Simultaneously, the researchers noted that regions characterized by active development of innovative processes most actively follow the path of digitalization.

State projects regulate the introduction of innovations in various areas of the socio-economic system of the region, goals, objectives and planned results of digitalization, and methods of legal regulation of project implementation.

Data on the positive impact of factors of digitalization of the regional economy on economic security was obtained by Vlasov (2020), who also pointed out a stable direct relationship between the following factors in the development of the digital economy:

- Costs for information and communication technologies;
- Investment in fixed capital for technical equipment;
- Number of organizations that use the Internet;
- Share of population who use the Internet to order goods, works, or services;
- GRP per capita.

Popov et al. (2020) substantiated the socio-economic effects of introducing digital technologies based on analyzing an impressive amount of data. They concluded that the digital transformation would lead to several positive socio-economic consequences, including the following:

- Implementing socially useful business processes;
- Improving the quality of services to the population;
- Improving access to and quality of medical and educational services;
- Increasing attractiveness of the city for investment;
- Ensuring migration influx of highly skilled labor force;

- Improving the ecological situation in the region and the city, saving natural resources;
- Increasing number of start-ups and science-intensive industries;
- Raising social self-awareness of citizens.

In her study of the impact of the digitalization process on the development of the regions of Bulgaria, O. Mancheva-Ali notes two directions of the contribution of digitalization to the economy:

- Contribution to the production sector, export operations, and employment of the population;
- Growth of productivity and competitiveness of the region.

Simultaneously, the key indicators are also achieved as a result of new services that provide convenience and speed in obtaining necessary information and satisfying user requests (Mancheva-Ali, 2021).

However, in addition to positive effects, the digitalization of business structures in the region is characterized by several possible threats to sustainable development, including the following:

- Growing unemployment due to the disappearance of certain professions and even industries;
- Using ICT for tax evasion, illegal transactions, uncontrolled transfers using cryptocurrencies;
- Development of cybercrime; improvement of cyber fraud technologies.

The possibility of the realization of these threats suggests that the process of digitalization of the region and business structures should have a legal basis, be carried out under the control of state structures, and meet the needs of a particular subject of the country. Determining the readiness of the region's infrastructure for digital development and identifying declining indicators, potential threats, and risks are important elements in ensuring sustainable development at the current stage of the implementation of new strategies.

3 Results

Based on open data from federal statistics, the authors selected the indicators that characterize the digital maturity (readiness) of economic entities in the region to transition to new economic realities.

The authors analyzed and compared the data for 2016–2020 for the Kirov Region and the Russian Federation (Table 1).

Table 1 Indicators characterizing the digital maturity of the region

	2016	2017	2018	2019	2020	Growth rate for 5 years (%)
<i>K1 (%)</i>						
The Russian Federation	81.8	83.2	86.5	86.6	93	13.69193154
The Kirov Region	82.9	85.5	87.9	91.3	94.6	14.11338963
<i>K2 (%)</i>						
The Russian Federation	45.9	47.4	50.9	51.9	44.3	– 3.48583878
The Kirov Region	39.2	39.4	33.2	45.5	36.5	– 6.887755102
<i>Costs for implementing and using digital technologies (thousand rubles)</i>						
The Russian Federation	1,249,224,758	1487638589.10	1676161289.20	2316831416.50	2472598471.70	97.93%
The Kirov Region	2242436.40	3015506.10	2968743.20	4822968.30	4138576.30	84.56%
<i>K3 (%)</i>	–	2017 to 2016	2018 to 2017	2019 to 2019	2020 to 2019	
The Russian Federation		19.08494285	12.67261427	38,22,246,292	6.723279652	
The Kirov Region		34.47454296	–1.550747982	62.45825169	–14.19026536	
<i>K4 (%)</i>						
The Russian Federation	41.6	41.2	42.2	43.3	40.6	–2.40
The Kirov Region	35.1	35	34.2	40.2	37.9	7.98

Source: Compiled by the authors based on (Federal State Statistics Service of the Russian Federation, 2022)

One of these indicators is the “Share of organizations using broadband access to the Internet in the total number of organizations” (K1). The next indicator for analysis is the “Share of organizations that had a website on the Internet in the total number of organizations” (K2). An important characteristic of the digital readiness of economic entities and the region is the “Costs for the implementation and use of digital technologies.” For comparison with the average Russian indicator in terms of costs for the implementation and use of digital technologies, the authors used the indicator “Growth rate of costs for the implementation and use of digital technologies” (K3). The last criterion for the analysis was the indicator “Share of organizations using the Internet to place orders for goods (works or services) in the total number of organizations” (K4). The analysis of data is presented in Table 1.

According to the presented data, we can note that the vast majority of organizations in the Kirov Region have broadband access to the Internet, while their share in the total number of organizations grew by more than 14% over five years. According to this criterion, the Kirov Region is ahead of the average Russian indicator, although the average Russian indicator shows an increase of 13.69% over the reviewed period.

According to the presented data, it is seen that according to this indicator, the Kirov Region lags behind the national average. Simultaneously, the data for the region have a negative growth rate, namely, the share of organizations that had a website on the Internet in the total number of organizations decreased by 6.89%. In Russia, the indicator decreased by 3.48%. This fact can be partly explained by the fact that organizations currently prefer creating an official application for smartphones and similar gadgets to a website.

We see a decrease in the growth rate of costs for implementing and using digital technologies in the Kirov Region by 14% in 2020 compared to 2019. Nevertheless, the overall level of costs over the five years under review increased by 84.56%. According to the presented data, it should be noted that in 2017 and 2019, the indicators of the Kirov Region were ahead of the growth rate of costs for introducing digital technologies compared to the national level. However, in 2018 and 2020, there was a significant lag.

The presented data show that the share of organizations using the Internet to place orders for goods (works or services) in the total number of organizations in the Kirov Region lags behind the average Russian indicator, but their share increased by 7.98% over the period under review.

Table 2 Normalized indicators for the selected indicators for the Kirov Region and the Russian Federation

Criterion	Normalized indicator	
	The Kirov Region	The Russian Federation
K1	1	1
K2	0.27	0
K3	0.73	1
K4	0.61	0

Source: Compiled by the authors

The sum of normalized values is used to determine the integral indicator of the digital maturity of economic entities in the region (Karanina & Kotandzhyan, 2021).

Since all the found indicators of the information and digital development of the region are stimulating, the following formula will be used to determine the normalized values:

$$Y_n = \frac{x_i - x_{min}}{x_{max} - x_{min}} \quad (1)$$

where:

x_i —the value of the indicator for a certain year;

x_{min} —the minimum value of the indicator for the reviewed period in the region;

x_{max} —the maximum value of the indicator for the reviewed period in the region.

The normalized indicators for the selected indicators for the Kirov Region and the Russian Federation are presented in Table 2.

$$X_e = \frac{\sum_{n=1}^N Y_n}{N} \quad (2)$$

where:

$\sum_{n=1}^N Y_n$ —the sum of normalized indicators for all considered criteria;

N —the number of criteria.

According to the calculations, the integral indicator for the Kirov Region was 0.65; for the Russian Federation, it was **0.5**, which, following the scale of the level of the state of the digital maturity of the region (Fig. 1), corresponds to a satisfactory state and requires the organization of measures to increase and maintain the level of the regional security.

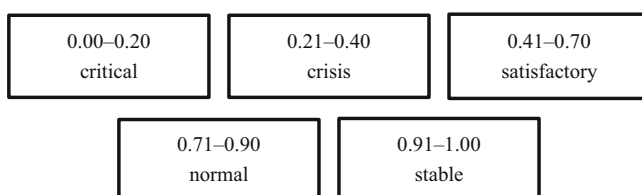


Fig. 1 Scale of the level of the state of digital maturity. Source: Compiled by the authors based on (Klimentyeva & Ilina, 2021)

The definition of the state of digital maturity of the region and the country as satisfactory corresponds to reality, given that the analysis was carried out for 2016–2020. This period is characterized by the entry of the country and its individual regions on the path of digitalization and the preparation and improvement of infrastructure to achieve the intended goals and programs. The active development and launch of the digital financial environment took place at the end of 2019 and 2020 due to the spread of restrictive measures, which served as an impetus for the transition to new realities of life and pushed business entities to digitalize business processes.

As of the end of 2021, the Russian Federation is one of the leaders in providing remote services to the population (as part of organizing the activities of state structures), on the digitalization of the banking environment, the emergence of new financial and technological institutions, the development of urban digital infrastructure, and the use of new technologies in education. Thus, it is necessary to expand the list of indicators of digital maturity. It is also necessary to conduct a deeper analysis at the present stage of development.

Thus, it is possible to analyze the indicators of readiness for digitalization of Russian regions, compare them with the average indicators for the country or within the districts, and derive an integral indicator that reflects the level of regional security in a digital aspect. The presented criteria can be expanded and supplemented with suitable indicators; normalized indicators can be derived based on data from federal districts.

4 Conclusion

The development of entrepreneurship in the direction of digitalization and the creation of new business models and methods of doing business should take place with the readiness of the subject of the country (region, district) for such transformations and ensuring the safety of innovations, as well as assessing the impact of digital processes on the socio-economic stability of the region. This research is the beginning of studying the relationship between the development of the digital economy of the region and its sustainable development. As a result, we can draw conclusions about the need for further transformations in the framework of the digitalization of business structures, solving practical issues of

realizing the digital potential in the regional economy, developing business activity of business entities, and identifying ways to stimulate digital processes in the economy.

Acknowledgments The article was prepared with the support of the grant of the President of the Russian Federation NSh5187.2022.2 for state support of the leading scientific schools of the Russian Federation as part of the research topic “Development and justification of the concept, the complex model of resilience diagnostics of risks and threats to the security of regional ecosystems and the technology of its application on the basis of the digital twin.”

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