Digital Development of Russian Regions: Prospects and Contradictions in a Period of Turbulence

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Abstract

This paper studies modern factors of turbulence and assessing ability of Russian regions to adapt to the changes by implementing accelerated digitalization. The research systematizes the factors of turbulence that influence on regions. The paper identifies turbulence factors as economic systems challenges, studies global turbulence at the stage of maximum manifestation of uncertainty and chaos, concludes and proposes options for managing regional economic systems during global turbulence. The expansion of turbulence factors requires measures to adapt to uncertain conditions. (1) The increase in demand from the population for online goods and services. (2) Ensuring opportunities for rural and urban areas to become a separate area of regional policy. (3) Improvement of the educational complex of the region in terms of creating digital platforms for training and retraining the population of regions. (4) Further stimulating the digitalization of public administration and the social sphere. (5) Strengthening the cybersecurity of regional economic entities. The paper lets to conclude that during the turbulence of 2019–2021, the digital development of Russia's regions accelerated the varying degrees of adaptation of regional economic systems to changing conditions. It is proved that the expansion of turbulence factors requires adaptation measures to uncertain conditions. The authors propose the directions of adaptation of Russian regions to the conditions of turbulence.

Keywords

Region • Turbulence • Pandemic • Economic system • Regional governance • Contradictions of regional development • Cybersecurity

JEL Classification

O33 • R11 • R13 • R58

1 Introduction

The years 2020–2022 have stepped up numerous turbulence factors that manifested themselves in almost one time period, including military-political conflict and destabilized the relatively stable and predictable Russian economy (Dmitrieva et al. 2021; Filatova et al. 2021; Ilinova et al. 2021). Traditional models of consumer behavior have been transformed in a significant way for public administration system. Many sectors of the economy have faced challenges that have undermined their former stability (Karpunina et al. 2021). Simultaneously, new horizons of activity and new directions of development have opened up. We are primarily talking about the digitalization of regional economies. During the period of the severe impact of external factors of turbulence, economic systems determine the most effective way to overcome them—expansion of digital infrastructure, provision of greater access to the Internet for subjects, organization of remote communication channels, and optimization of online services for the purchase of goods and services. This became possible during the interweaving of three turbulence factors. How did regional economic

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systems cope with the new challenges of turbulent times? What contradictions of digital development were revealed on their way? What are the prospects for further digitalization of Russian regions? These questions will be answered within the framework of this research.

2 Methodology

Economies turbulence is presented by Brenner (1998), Gladkov (2018), Karpunina et al. (2022b), Minakov and Minakova (2021), Polulyakh (2017), Shchetinina et al. (2016), Sheremet (2020), and Zhuravleva and Manokhina (2013). Readiness of regions to this turbulence is presented by Bychkova et al. (2020), Karpunina et al. (2020a), and Molchan et al. (2019). It helps to identify such factors as the lack of a well-formed regional digital infrastructure, the scale of territories and differentiation in territories, etc. Researchers pay attention to COVID-19 and focus on the intensification of digitalization during the global lockdown (Gorelova et al. 2021; Gukasyan et al. 2022; Karpunina 2022; Minakov et al. 2022). The paper objectives include:

1. To identify turbulence factors as economic systems challenges;
2. To study global turbulence at the stage of maximum manifestation of uncertainty and chaos;
3. To conclude and propose options for managing regional economic systems during global turbulence.

Methodology: Induction, deduction, systematization, comparative analysis, economic analysis, graphical method, and systemic approach.

3 Results

Economic turbulence is considered a chaotic abrupt movement of the economic system with significant fluctuations in economic indicators and changes in the nature of the flow and development trajectories. The current factors of turbulence can be attributed to the COVID-19 pandemic, fluctuations in the energy market, and the military-political conflict between Russia and Ukraine. First, the coronavirus infection that has spread rapidly around the world has seriously impacted the stability of economic systems in various countries and regions. In 2020, an epidemiological threat was realized, which led to disruption of global value chains, the formation of conditions of large-scale uncertainty and changes in consumer behavior, and, as a result, the transformation of business models at all levels of the economy (Karpunina et al. 2020c, 2021; Nikitin et al. 2019). State policy (closure of cross-border movement, lockdowns and restrictions on the operation of enterprises, and quarantine measures for self-isolation) also contributed to the imbalance of economic systems. In such conditions, forecasting the timing and scale of a disaster becomes almost impossible. Therefore, the way out of the situation is to develop mechanisms for adapting economic systems to rapidly changing environmental conditions. Secondly, the decline in economic activity of economic entities under the influence of the pandemic. In turn, this has led to a change in global demand and prices for energy resources. The result was global economic fluctuations and disruption of the balanced development of the Russian energy market (Filatova et al. 2021; Samylovskaya et al. 2022; Vedomosti 2020). Quarantine restrictions affected, first of all, the transport sector; its reduction entailed negative consequences for the entire oil market. The reduction in oil demand to 30% in April 2020 caused a skew in the market due to an oversupply (Dudina et al. 2021). The result was a record fall in prices (3.5 times) for Brent oil and the sale of WTI futures at a negative price (Vedomosti 2020). Only thanks to the achievement by producers of a collective reduction in production by OPEC countries, as well as countries outside the coalition, it was possible to avoid the development of the most pessimistic scenario. However, this did not lead to a rapid stabilization of the market. Demand in the gas industry also decreased, with the fall in world gas prices to the level of domestic ones, the reduction was 3–5%. However, in this area, Russian companies have faced manifestations of a price war and a decrease in the supply of Russian pipeline gas to European countries. In general, changes in global demand and prices for energy resources caused the loss of 60% of export revenues and a reduction in Russian exports of oil, gas, and coal at the same time (about 7–8 trillion rubles in 2020 and 5.5 trillion rubles in 2021) (Ponomarenko et al. 2022). Since it is difficult to predict the further development of the situation in the energy markets, and given the aggravation of the military-political conflict with Ukraine, it does not seem appropriate to expect an increase in revenue from energy exports in the near future (Cherepovitsyn and Solovyova 2022; Karpunina 2022; Karpunina et al. 2022a). Third, another turbulence factor for the Russian economy is the aggravation of the military-political conflict with Ukraine. In itself, the development of the situation between the two countries resulted from the containment of public energy during the pandemic, the increase in the redistribution processes of global leadership, and the strengthening of socioeconomic uncertainty and chaos. Such global problems have caused significant changes of an economic and social nature. These changes manifested themselves in the form of breaking most international interactions and searching for new foreign partners, developing new ties and building production chains as a reaction to sanctions restrictions from the European Union

and the United States. In addition, there was a restructuring of traditional business models and a corresponding adjustment of management methods at the micro, meso, and macro levels (Karpunina et al. 2022a). The military-political conflict, which has taken on a protracted character, increases economic turbulence.

Turbulence can be measured by:

- digital infrastructure indicators;
- goods and services indicators;
- indicators of digitalization of public administration;
- regional security indicators (Korableva 2021) (Table 1).

Information transmitted over a fixed connection increased 1.9 times during turbulence. In other words, turbulence contributed to the intensive growth of the subscriber base and the volume of transmitted information. This is despite an increase in tariffs for providing a subscriber with a subscriber line for permanent use in some regions of the country by 1.2–2.3% from 2019 to 2021. In 2022, due to the relative recovery of population activity after the pandemic and the beginning of a special operation in Ukraine, mobile Internet consumption in Russia fell for the first time in history (by 2.5%) (Table 2).

All regions of Russia began to use digital goods and services more in 2019–2021. Growth in the number of organizations that have received orders for industrial goods through Internet services also confirms the assumption of expanding the areas of online activity and demonstrates the high adaptability of Russian organizations to the changes taking place.

However, in 2020–2021, some regions of Russia saw a decrease in individual indicators associated with the return of subjects to normal modes of life after lockdowns and the resumption of opportunities for the offline. Sanctions by the EU countries and the USA (2022), as well as the inability to carry out banking transactions with a number of countries, reduced the volume of foreign purchases by the population of Russia to a minimum. Additionally, there were panic moods of buyers and excessive demand for some product categories (Skvortsov 2022).

Indicators of the digitalization of public administration and the social sphere are presented in Table 3 (Federal State Statistics Service of the Russian Federation 2022) (see the Data Availability section).

During sanitary quarantines, the demand of the population for online public services increased sharply. Thus, in 2020, attempts by the authorities to normalize the situation in society are manifested in the form of increased use of the Internet by state organizations (the growth rates in the regions by 15–30%). During 2021, the situation normalized, and the indicators of Internet use by regional authorities came to a typical growing dynamic (growth rate of no more than 20% per year).

Table 1 Digital infrastructure in Russian regions, 2019–2021

Region/indicator	Subscribers with fixed broadband Internet access			Subscribers with mobile broadband Internet access			Fixed-line information transmitted			Mobile information transmitted			The tariff for providing the subscriber with permanent use of the subscriber line, rubles per month		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
Central Federal District	26.8	27.9	28.9	109.5	110.7	120.2	14,828	18,038	22,585	4152	6088	7992	204.6	204.8	207.1
North-Western Federal District	24.2	24.8	24.9	106.5	110.8	122.7	6860	9465	12,157	1557	2277	3058	204.1	205.3	208.8
Southern Federal District	18.4	19.8	20.3	84.7	90.0	97.9	2814	4073	5177	1532	2213	2846	185.7	183.5	187.1
North Caucasus Federal District	9.2	10.2	10.8	70.3	70.8	73.4	911	1518	2245	820	1188	1517	161.3	160.2	159.4
Volga Federal District	22.0	22.7	23.5	91.0	96.1	103.2	7963	12,219	14,854	2757	4140	5486	184.6	184.7	186.9
Ural Federal District	25.3	25.6	26.7	98.2	100.9	108.4	3846	5166	6946	1365	2022	2544	206.3	207.1	204.0
Siberian Federal District	20.9	21.4	22.0	93.0	96.6	103.6	3852	5000	5978	1608	2376	3157	186.9	186.8	190.6
Far Eastern Federal District	18.5	19.0	19.0	95.0	98.7	104.2	2677	3681	4541	844	1221	1638	224.1	222.7	226.9

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

Table 2 Some indicators of the use of digital goods and services, 2019–2021, %

Region/indicator	Internet users			B2C e-commerce			E-government			Employees of organization who resorted to using Internet			B2B e-commerce		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
Central Federal District	82.1	85.1	88.4	41.9	49.0	57.7	67.0	74.2	79.4	38.7	46.0	47.3	26.6	27.6	28.3
North-Western Federal District	83.3	84.5	87.6	42.1	45.0	55.4	41.1	46.6	55.2	36.9	42.2	44.5	25.8	25.8	27.0
Southern Federal District	81.0	84.8	88.8	31.6	34.9	43.7	58.4	53.6	74.2	34.4	37.3	38.2	22.4	22.0	24.5
North Caucasus Federal District	82.7	86.9	90.1	22.3	36.9	35.4	38.5	48.2	51.7	30.2	35.8	36.5	13.9	16.4	19.4
Volga Federal District	80.4	81.7	85.1	33.5	36.3	40.6	64.6	61.3	71.2	34.4	38.1	39.7	24.6	25.3	27.0
Ural Federal District	82.7	86.1	88.5	39.0	44.6	45.7	56.9	56.9	69.2	31.7	35.1	36.7	25.3	27.4	29.2
Siberian Federal District	79.2	82.1	84.3	31.8	31.6	37.7	46.7	47.4	57.5	34.8	38.2	39.5	21.9	22.3	24.2
Far Eastern Federal District	79.9	83.8	87.2	29.0	31.4	37.9	40.0	44.0	53.1	32.7	36.0	38.2	19.3	20.9	22.2

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

The education system turned out to be the most adaptive to the conditions of turbulence. In 2020, distance education programs growth trend (by an average of 1.5 times) continued throughout 2021 in all regions of the country. The situation is worse in the healthcare system. Thus, in the active stage of the pandemic there was excessive load on the healthcare system (on average from 4 to 10%). Healthcare system demonstrated its adaptability by increasing this indicator in all regions of the country (2021). This makes it possible to improve the interaction of healthcare organizations with patients through the introduction of electronic document management, create secure databases, simplify data management, and increase productivity. In 2022, the trends of digitalization of the healthcare system continued their development. In particular, digital transformation in the healthcare sector aims to ensure the prediction and prevention of the development of diseases and the personalization of therapy and participation on the part of the patient. It should also guarantee accessibility and high standards of medical care (Zdrav Expert 2022). During the turbulence of 2019–2021, the problem of ensuring the intensification of their digital development increased information openness (Federal State Statistics Service of the Russian Federation 2022) (Table 4) (see the Data Availability section).

However, Russian regions are taking measures to ensure information security, which may have negative consequences in the form of real economic and image damage from the implementation of cyber risks (Karpunina 2022; Karpunina et al. 2020b; Molchan et al. 2019) (Table 4). Despite the significant expansion of the population's presence in the online space during the pandemic, their use of information security tools in 2019–2021 decreased in all regions of Russia. This also poses a serious problem and increases the population's vulnerability to data leakage and cybercrime. For example, with the beginning of the special operation in Ukraine, Russia faced unprecedented external aggression in the information space (the number of cyber-attacks on Russia in 2022 increased by 80%); the lack of preventive information protection measures can lead to large-scale negative consequences (Regnum 2022).

The expansion of turbulence factors requires measures to adapt to uncertain conditions. (1) The increase in demand from the population for online goods and services, which occurred during the lockdown period and transformed numerous consumer habits, has become a regular trend. However, the readiness of Russian organizations to switch to the online trading format remains low. Currently, it is necessary to improve the requirements of their access to digital infrastructure. Regional authorities can create effective mechanisms for motivating organizations to solve this problem. (2) Ensuring opportunities for rural and urban areas to become a separate area of regional policy (Minakov et al. 2020). (3) Improvement of the educational complex of the region in terms of creating digital platforms for training and retraining the population of regions. During the pandemic, released workers need to update their existing skills for future employment in an unbalanced labor market. Universities and professional educational institutions of the regions can take over this function. (4) Further stimulating the digitalization of public administration and the social sphere. (5) Strengthening the cybersecurity of regional economic entities. To do this, it is necessary to focus on improving the digital literacy of all participants in online interaction through the organization of educational courses based on educational institutions in the region, as well as in an online format. The state authorities should support the developers

of Russian analogues of information security systems. The rapid movement of economic activity to the Internet requires the development of its institutional foundations and the creation of specialized regulatory structures to maintain the security of all participants.

4 Conclusions

The article examines the factors of regional economies turbulence. The paper describes the peculiarities of oil and gas market, military and political conflict digitalization of public administration and the social sphere, and indicators of information security. The conclusion is made about the Russian regions acceleration during turbulence of 2019–2021 and the varying degrees of adaptation of economic systems of regions to changing conditions. The directions of adaptation of the regions of Russia to the conditions of turbulence through the improvement of regional management systems are determined.

Data Availability

Table 3 data is available in https://figshare.com/ with DOI https://doi.org/10.6084/m9.figshare.21908838. Table 4 data is available in https://figshare.com/ with DOI https://doi.org/10.6084/m9.figshare.21908898.

References

Brenner R (1998) The economics of global turbulence. New Left Rev 229

Bychkova N, Tavbulatova Z, Ruzhanskaya N, Tamov R, Karpunina E (2020) Digital readiness of Russian regions. In: Proceeding of the 36th IBIMA conference, Granada, Spain, pp 2442–2461

Cherepovitsyn A, Solovyova V (2022) Prospects for the development of the Russian rare-earth metal industry in view of the global energy transition—a review. Energies 15(1):387. https://doi.org/10.3390/en15010387

Dmitrieva DM, Solovyova VM, Rutenko EG (2021) Novel approaches to the mining projects' sustainability in a view of current challenges. Bull South Russ State Techn Univ Ser Soc-Econ Sci 14(6):170–186. https://doi.org/10.17213/2075-2067-2021-6-170-186

Dudina A, Nikolaichuk L, Shabalov M (2021) Increasing the efficiency of Russian uranium mining enterprises in conditions of excessive supply. E3S Web Conf 266:06006. https://doi.org/10.1051/e3sconf/202126606006

Federal State Statistics Service of the Russian Federation (2022) Monitoring the development of the information society in the Russian Federation. Retrieved from https://rosstat.gov.ru/statistics/infocommunity. Accessed 12 Dec 2022

Filatova I, Nikolaichuk L, Zakaev D, Ilin I (2021) Public-private partnership as a tool of sustainable development in the oil-refining sector: Russian case. Sustainability 13(9):5153. https://doi.org/10.3390/su13095153

Gladkov NI (2018) Strategic management in conditions of uncertainty and high turbulence. J Econ Bus Theory Pract 6:47–49

Gorelova I, Savastano M, Dmitrieva D, Dedova M (2021) Antecedents and consequences of digital entrepreneurial ecosystems in the interaction process with smart city development. Adm Sci 11(3):94. https://doi.org/10.3390/admsci11030094

Gukasyan ZO, Tavbulatova ZK, Aksenova ZA, Gasanova NM, Karpunina EK (2022) Strategies for adapting companies to the turbulence caused by the COVID-19 pandemic. In: Popkova EG (ed) Business 4.0 as a subject of the digital economy. Springer, Cham, Switzerland, pp 639–645. https://doi.org/10.1007/978-3-030-90324-4_102

Ilinova A, Dmitrieva D, Kraslawski A (2021) Influence of COVID-19 pandemic on fertilizer companies: the role of competitive advantages. Resour Policy 71:102019. https://doi.org/10.1016/j.resourpol.2021.102019

Karpunina EK (ed) (2022) Modern approaches to ensuring the economic security of the state and regions in the era of uncertainty. Ruscience, Moscow, Russia

Karpunina EK, Okunkova EA, Sazanova EV, Gubernatorova NN, Tishchenko ES (2020a) The ecosystem of the digital economy: a new approach to the study of structural features and content. In: Popkova E, Sergi B (eds) Scientific and technical revolution: yesterday, today and tomorrow. Springer, Cham, Switzerland, pp 497–508

Karpunina E, Shurchkova J, Kochetkova E, Ponomarev S, Tretyak V (2020b) Cybercrime in the system of economic security threats. In: Proceeding of the 35th IBIMA conference, Seville, Spain, pp 2679–2690

Karpunina E, Zabelina O, Galieva G, Melyakova E, Melnikova Y (2020c) Epidemic threats and their impact on the economic security of the state. In: Proceeding of the 35th IBIMA conference, Seville, Spain, pp 7671–7682

Karpunina E, Butova L, Sobolevskaya T, Badokina E, Pliusnina O (2021) The impact of the COVID-19 pandemic on the development of Russian national economy sectors: analysis of dynamics and search for stabilization measures. In: Proceeding of the 37th IBIMA conference, Cordoba, Spain, pp 1213–1226

Karpunina EK, Moiseev SS, Bakalova TV (2022a) Tools for strengthening the economic security of the state in the period of socio-economic and geopolitical instability. Drucker's Bull 5 (49):24–34

Karpunina EK, Ponomarev SV, Fedotova EV (2022b) Identification of pandemic risks during the analysis of economic security of regions. Proc South-West State Univ Ser Econ Sociol Manage 12(2):99–112

Korableva ON (ed) (2021) Technological trends and knowledge-intensive economy: business, industries, regions. Center for Scientific and Information Technologies "Asterion", St. Petersburg, Russia

Minakov VF, Minakova TE (2021) Scenarios of hype processes in the digital economy. In: Proceedings of the all-Russian scientific and practical conference "the main problems of informatization of business processes and education in the regions of Russia", Stavropol, Russia, pp 305–310

Minakov VF, Minakova TE, Shepeleva OY (2020) Convergence model in the digital economy. In: Zatsariny AA, Borisov DN (eds) Proceedings of the XX international scientific and methodological conference "computer science: problems, methods, technologies, Voronezh, Russia, pp 1504–1509

Minakov VF, Shepeleva OYu, Minakova TE (2022) Metaverse and cognitive technologies of the digital economy. In: Proceedings of the international scientific and practical conference "innovative aspects of socio-economic and information processes in the transition to a digital society". AGRUS, Stavropol, Russia, pp 309–313

Molchan A, Karpunina E, Kochyan G, Petrov I, Velikanova L (2019) Effects of digitalization: new challenges for economic security

systems. In: Proceedings of the 34rd IBIMA conference, Madrid, Spain, pp 6631–6639

Nikitin SI, Nikiforov ES, Feldsherov KV (2019) Modeling logistics processes in risk conditions. Theory Pract Serv Econ Soc Sphere Technol 1(15):191–199

Polulyakh D (2017) Turbulence as a characteristic of contemporary world order. Polit Sci (Spec Issue) 245–260

Ponomarenko T, Marin E, Galevskiy S (2022) Economic evaluation of oil and gas projects: justification of engineering solutions in the implementation of field development projects. Energies 15(9):3103. https://doi.org/10.3390/en15093103

Regnum (2022) The Russian Foreign Ministry cited statistics on the increase in the number of cyber attacks on the country since the beginning of a special military operation, 28 Dec. Retrieved from https://regnum.ru/news/polit/3765401.html. Accessed 12 Dec 2022

Samylovskaya E, Makhovikov A, Lutonin A, Medvedev D, Kudryavtseva RE (2022) Digital technologies in arctic oil and gas resources extraction: global trends and Russian experience. Resources 11 (3):19. https://doi.org/10.3390/resources11030029

Shchetinina ED, Kucheryavenko SA, Klimova TB, Kononova AV (2016) System factors and causes of turbulence as a measure of randomness and uncertainty of development of economy. Bull BSTU V.G. Shukhov 7:203–209

Sheremet AN (2020) The pandemic of inequality. Socio-economic aspects and consequences of COVID-19. Med Sociol Philos Appl Res 4:136–141

Skvortsov D (2022) Sanctions and parallel imports have accelerated the development of Russian online commerce. J Open Broker. Retrieved from https://journal.open-broker.ru/research/razvitie-rossijskoj-onlajn-torgovli/. Accessed 12 Dec 2022

Vedomosti (2020) The Russian fuel and energy complex between COVID-19 and the energy transition, 19 May. Retrieved from https://www.vedomosti.ru/opinion/articles/2020/05/18/830509-rossiiskii-tek. Accessed 12 Dec 2022

Zdrav Expert (2022) Digital medicine. Retrieved from https://zdrav.expert/index.php/Статья:Цифровая_медицина. Accessed 12 Dec 2022

Zhuravleva GP, Manokhina NV (2013) New rules of the game in conditions of economic turbulence. Bull Saratov State Soc-Econ Univ 3:23–28