Regional banking systems and their digitalization processes

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Abstract. Long-term tendencies in the economical development of specific regions determine the nature of digital transformations in their respective socio-economic systems. The global trend for digitization of economical and financial relationships affects the growth direction of national economies and their local components. This issue remains relevant for many countries, including Russia. The present study examines the specificity of digitization processes in regional banking systems and banking markets and the problems associated with them. The authors focus on digitalization and financial availability rates in the most economically depressed regions of the country. This article aims to identify barriers to the digitalization of banking markets in a specific category of Russian federal subjects demonstrating insufficient banking institutions and low banking activity. The authors hypothesize that the digitalization rate in banking markets depends on the availability of banking institutions in the region and the development of informational and communicational infrastructure. In order to achieve the stated goal, the authors used structural and dynamic analysis, method of coefficients, and index method. The paper considers the necessity and major factors of digital transformation in the separated regional economy. The authors provide definitions for digital finance and access to finance. Furthermore, they describe the relationship between these spheres in modern conditions. The conducted analysis covers digitalization rates in a group of economically lagging regions and digitalization outsiders. The authors assess whether the researched regions have satisfactory access to banking services and determine the extent to which the regional informatization indicators correlate with the overall digitalization of the banking sector.

1 Introduction

1.1 Digital transformation and factors conditioning its necessity

The digital transformation brought about drastic changes in business models that drastically transformed the consumers’ expectations and behavior. Given the described conditions, the authors see it fit to identify a set of factors conditioning the necessity of digital transformation. First and foremost, with the introduction of the Internet, the number of its

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supplementary technologies has constantly been growing (broadband Internet, smartphones, Web 2.0, Search Engine Optimization (hereafter [SEO]), cloud technologies, speech recognition, online payment systems, and cryptocurrency). The development of these technologies positively affected the state of digital commerce. In 2017, global sales of digital retail amounted to 2.3 trillion USD; in 2023, this figure is expected to reach 4.88 trillion [18]. Furthermore, these innovations can positively affect the company’s cost structure through the replacement of human resources with less costly robots or virtual agents and logistics optimization with AI and blockchain.

Moreover, the introduction of innovative technologies drastically alters the competition structure. In the retail sector, the digital transformation disturbed an established competition by shifting leadership to newer digitalized companies. The competition expanded globally and became more intensive due to large and information-rich companies from the USA (Amazon, Alphabet, Apple, and Facebook) and China (Alibaba and JD) dominating many industries. It is worth noting that these changes found reflection in the evaluation of companies. A decade ago, five of the most valuable companies in the S&P 500 included Exxon, GE, Microsoft, Gazprom, and Citigroup. Only one of these corporations provided and utilized digital technology. In May 2020, this list consisted exclusively of digital companies (Apple, Alphabet, Microsoft, Amazon, and Facebook).

Furthermore, consumers react to the digital revolution and behave accordingly. Market data indicate a shift to online purchases, while digital contact points play an important role in online and offline shopping. Social media and new searching tools enhanced customers’ awareness, connectedness, authority, and activity. The companies unable to adapt to these transformations lose their appeal for clients and are likely to be replaced by the organizations utilizing modern technologies.

1.2 Digital finance and finance accessibility

The rapid technological progress of the last decade brought drastic changes to financial services and the means of their provision. The financial sector promptly absorbs all kinds of innovation, from cryptocurrency to blockchain technology. A systematic combination of the Internet, digital technologies, and finance generates the online finance sector that has been actively growing during the past years.

In 2010, the Group of Twenty [G20] and the World Bank took an initiative to provide wider access to financial services in developing countries and countries with transitional economies to decrease poverty rates [7]. Nowadays, digital finance and its accessibility have become especially appealing for politicians and scientists due to their capacity to alleviate poverty issues. However, this area still presents many challenges. Solving them could enhance the digital finance system and make it more available for individuals, enterprises, and governments. Digital finance and access to it can benefit users of financial services and suppliers in various ways. Their advantages also apply to governments and national economies, for example, easier access to financial services for the poor, lower financial mediation prices for banks and financial technology suppliers, and increased total expenditure of governments.

The Consultant Group to Assist the Poorest defines digital access to finance as “digitally available formal financial services and their use by isolated and underserved population” [4]. To date, the technology of mobile financial services has been implemented in a minimum of 80 countries, thus allowing millions of poor people to use exclusively digital financing instead of cash operations.

The described conditions put special emphasis on the provision of access to finance in countries with unbalanced population distribution and highly polarized social and economic situations in different regions. Russia falls under these criteria. In this regard, the authors find...
it appropriate to discuss the current tendencies of access to finance and identify issues hindering the development of banking digitalization in the Russian regions. In this study, the authors focus on specific groups of economically depressed federal subjects.

1.3 Digitalization of regional systems

Scientific sources offer a range of studies focusing on digital and informational development in the Russian regions as a whole and economic outsiders in particular. For example, I. V. Mitrofanova points out several issues arising in the process of digital transformation in the Chechen Republic. In her work, the researcher compares the data on digital economical indicators to the objectives stated by the Program Development of Digital Economy in the Chechen Republic for 2019–2024. She considers low saturation of labor market with highly qualified IT staff and costly but slow Internet connection as the major obstacles to the development of the digital economy [11].

In the research on regional specificity of digital transformation, A. H. Tsakaev and Z. A. Saidov conducted a comparative assessment of developmental trends in human and innovative assets and information and communication technology development between the Chechen Republic and Moscow. The conducted analysis allowed them to identify distinctive regional features of the researched processes in the chosen territories and the extent of discrepancy between them [22].

G. P. Litvintseva and several other authors suggest a method of digitalization rate assessment through the regional index for the digital component of life quality in the Russian regions. The index considered 37 indicators characterizing digital transformation in the context of its influence on the life quality of the population in the region. The conducted analysis demonstrated a depressed economical state of the Chechen Republic and placed it among such federal subjects as the Republic of Dagestan, the Kabardino-Balkarian Republic, and Zabaykalsky Krai [9].

The North Caucasian Federal District demonstrates the lowest number of Internet users and the lack of Internet use in the daily life of its population. At the same time, the macro-regional level presents a mixed picture. In the Chechen Republic, the dynamics of Internet users are volatile with a slight downwards trend [14]. The human assets in the context of the digital economy also present low values in this region as a consequence of the imbalance between sources, mechanisms, and results of realizing the potential of human resources [10].

The review of Russian scientific sources on the issues of regional digitization processes in economies of the Russian federal subjects allows the authors to notice a low economic digitalization rate and insufficient availability of information and communication technologies [ICT] in the economically depressed regions of Russia [5; 12; 13; 17; 21].

However, despite the substantial number of publications on the topic of digitalization in regional economies, there is a prominent coverage of the digitalization tendencies in regional banking systems and the influence of available ICT on the digitalization of the banking market.

2 Materials and Methods

The digitalization strategies for regional financial systems in the Russian Federation are fully based on the estimation of current digitalization dynamics in the banking sphere and the problems inaccessibility of finance. Therefore, this study aims to identify the major issues of regional digitalization processes in the banking market by analyzing the regions with the least developed banking sector and digital accessibility. In order to achieve the stated goal, the authors formulated the following objectives: (1) to estimate the extent of informatization in the region in terms of availability of the Internet and ICT infrastructure; (2) to determine the
development stage of the banking market in the region; (3) to analyze the indicators of distant banking services in the region; and (4) to establish a correlation between the informatization and digitalization tendencies of the banking services market in the region.

In order to achieve the desired result, the authors established a group of target regions that were classified as depressed according to their major indicators of the banking system. This approach provides current trends in the regional digitalization of the banking sector in the least developed subjects and thus allows the authors to identify deeper country-wide problems.

In order to identify regions with unsatisfactory access to banking services, the authors utilized four indexes characterizing institutional and financial aspects of access to finance by individuals and businesses in the regions. This method serves to define the financial accessibility of regions within the country [15; 20].

The following research phase included an assessment of the regions and their digital activity indexes by the method of the Skolkovo Institute for Emerging Market Studies [8]. The indexes are calculated based on the following application spheres of digital technology: transportation, finance, commerce, healthcare, education, media, and governmental management.

Therefore, the group of regions obtained as a result of selection constitutes a basis for the structural and dynamic analysis and the research method of coefficients and relative indicators.

The information provided by the Federal State Statistics Service, the Higher School of Economy, and the Bank of Russia served as a source of quantitative data.

3 Results

The number of banking institutions in the Russian economy has constantly been decreasing over the past 15 years. This issue became especially acute after 2013 when the Bank of Russia declared a reactivation policy in the Russian banking system. The mentioned policy consisted of active measures to reduce the number of financial organizations by revoking licenses from the organizations that failed to comply with the requirements of the banking supervisor and were frequently involved in money laundering. However, practical implementation of this approach led to plummeting institutional characteristics of the banking system that in turn influenced financial accessibility in regions all across the country.

By applying the stated formulas (1) – (4), the authors achieved the following results. Table 1 demonstrates the indexes of banking services saturation in the regions.

Table 1. The combined index of saturation with banking services in the federal subjects of the Russian Federation.

<table>
<thead>
<tr>
<th>Region/District</th>
<th>ISBS</th>
<th>FSBS</th>
<th>IDBD</th>
<th>CIRSBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Federal District</td>
<td>0.98</td>
<td>1.31</td>
<td>1.46</td>
<td>1.23</td>
</tr>
<tr>
<td>Northwestern Federal District</td>
<td>1.03</td>
<td>0.98</td>
<td>1.18</td>
<td>1.06</td>
</tr>
<tr>
<td>Southern Federal District</td>
<td>0.97</td>
<td>0.91</td>
<td>0.65</td>
<td>0.83</td>
</tr>
<tr>
<td>North Caucasian Federal District</td>
<td>0.39</td>
<td>0.63</td>
<td>0.31</td>
<td>0.42</td>
</tr>
<tr>
<td>Volga Federal District</td>
<td>1.13</td>
<td>0.88</td>
<td>0.78</td>
<td>0.92</td>
</tr>
<tr>
<td>Ural Federal District</td>
<td>1.11</td>
<td>0.69</td>
<td>0.82</td>
<td>0.86</td>
</tr>
<tr>
<td>Siberian Federal District</td>
<td>1.02</td>
<td>0.79</td>
<td>0.81</td>
<td>0.87</td>
</tr>
<tr>
<td>Far Eastern Federal District</td>
<td>1.14</td>
<td>0.84</td>
<td>0.66</td>
<td>0.86</td>
</tr>
</tbody>
</table>

Source: Compiled by the author as a result of calculations based on [2; 6].

Table 1 shows the averaged results of calculations distributed by the federal districts of Russia. The analysis on 85 regions revealed the highest CIRSBS values of 1.48 in Moscow and 1.28 in St. Petersburg. The average value for all the subjects amounted to 0.61 and
became a cutoff point. All the regions with the above-average performance can be seen in Fig. 1.

**Fig. 1.** The value of institutional saturation with banking services for the period of 2019–2021. *Source:* Combined by the author.

Among the 85 federal subjects, seven show low saturation with banking services. This group can be divided into the following notional subgroups: those in critical condition (the Chechen Republic, the Republic of Ingushetia, and the Republic of Dagestan) and those in a moderate state (Sevastopol, the Republic of Crimea, and the Republic of North Ossetia-Alania) (Fig. 1). In other regions, the value of the CIRSBS index exceeded 0.6.

The authors obtained the following results using the digital activity index of the Skolkovo Institute for Emerging Market Studies on the selected regions (Table 2).

**Table 2.** The digital activity index of the regions for 2021.

<table>
<thead>
<tr>
<th>Region</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Republic of Crimea</td>
<td>0.34</td>
</tr>
<tr>
<td>Sevastopol</td>
<td>0.38</td>
</tr>
<tr>
<td>Republic of Dagestan</td>
<td>0.24</td>
</tr>
<tr>
<td>Republic of Ingushetia</td>
<td>0.13</td>
</tr>
<tr>
<td>Kabardino-Balkarian Republic</td>
<td>0.23</td>
</tr>
<tr>
<td>Chechen Republic</td>
<td>0.20</td>
</tr>
<tr>
<td>Republic of North Ossetia-Alania</td>
<td>0.21</td>
</tr>
<tr>
<td>Russian Federation (average)</td>
<td>0.41</td>
</tr>
</tbody>
</table>

*Source:* [8].

The obtained data on the lagging regions in the banking sector enabled the author to analyze the digitalization tendencies in their banking systems to determine the most prominent problem areas in the process of digitalization in the regions of Russia.

Sufficient infrastructure and potential transition from offline to online banking services are crucial factors in the digital transformation of regional banking systems. This can be achieved through further development of Internet networks and the provision of common access to them [1].
Table 3. The availability of the Internet to the population by regions for 2021.

<table>
<thead>
<tr>
<th>Region</th>
<th>Broadband Internet users per 100 individuals, units.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stationary</td>
</tr>
<tr>
<td>Republic of Crimea</td>
<td>13.4</td>
</tr>
<tr>
<td>Sevastopol</td>
<td>15.8</td>
</tr>
<tr>
<td>Republic of Dagestan</td>
<td>3.2</td>
</tr>
<tr>
<td>Republic of Ingushetia</td>
<td>1.5</td>
</tr>
<tr>
<td>Kabardino-Balkarian Republic</td>
<td>10.2</td>
</tr>
<tr>
<td>Chechen Republic</td>
<td>4.9</td>
</tr>
<tr>
<td>Republic of North Ossetia-Alania</td>
<td>16.7</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>22.3</td>
</tr>
</tbody>
</table>

Source: Compiled by the author as a result of calculations based on [6].

The numbers of stationary broadband Internet users per 100 people reinforce the demonstrated earlier system of two groups with the only exception being Sevastopol and the Republic of Crimea with the lowest access to mobile Internet connection (Table 3). Nevertheless, all the regions demonstrate subpar results compared to the country-average values.

Fig. 2. The performance of telecommunication infrastructure in the regions for 2021. Source: Compiled by the author as a result of calculations based on [6].

The representation of the telecommunication infrastructure in the discussed regions is also uneven in comparison to the country-average results. For example, Dagestan, Ingushetia, and Chechen republics fell below the common average value for Russia. The Republic of Crimea, Sevastopol, and the Kabardino-Balkarian Republic achieved higher results, indicating a better state of telecommunication infrastructure in these regions. However, all the selected regions except for Sevastopol show a preference for online government services over goods and services purchase despite the latter being the most demanded sphere of distant banking.

The provided data on the ICT performance in the regions indicates the low level of Internet accessibility in them. This condition hinders the process of digital transformation in their respective banking systems. Such a poor state of the infrastructure may present the main obstacle in stimulating banking activity.
The digital transformation of regional banking is only possible if the traditional banking system is stable, shows satisfactory development rates, and provides sufficient points of offline access to banking services. The critical performance group follows the pattern and demonstrates the lowest institutional saturation with finance organizations (Fig.3). The dynamics of finance organizations during the period of 2019–2021 are also negative. Digital transformation regards such processes as a necessary step in the transition to distance online services. In this context, the decrease in the number of finance organizations is justified.

The data demonstrated in Fig.4 points out the increase in monetary transactions per the
population during the period under review. The per capita correction stems from significant
differences in the researched regions and ensures the smooth comparison of the data between
them as the absolute values will disturb the interpretation of the results. Despite yearly
increases in completed monetary transactions in every region, the transactions in rubles show
a mixed dynamic. While the Republics of Crimea and North Ossetia-Alania experience a rise
in transaction volumes, the changes in respective rates in Dagestan and Ingushetia are
neglectable during the whole period under research. In Sevastopol, the Chechen Republic,
and the Kabardino-Balkarian Republic, there is a decrease in rouble equivalent transactions.
At the same time, all of the examined regions fall behind the common dynamics for Russia
as a whole.

Despite most regions under consideration experiencing an increase in the number of
distant bank accounts, the Republic of Crimea demonstrates the highest results (Fig. 5).
However, in other subjects of the Russian Federation, the dynamics are less acute, and the
number of digital accounts grows more gradually. In Sevastopol, this indicator is strikingly
low in comparison to any other Russian region, which directly correlates with the data
provided by Table 1, where Sevastopol is indicated to have the poorest access to the mobile
Internet connection. The indicators in Dagestan, Ingushetia, and the Chechen Republic
remained low, similar to their results in other statistics.

The average volume of the examined indicator for Russia amounts to 1.6, which greatly
exceeds the results shown by the regions in the studied group.

4 Discussion

The authors consider distance banking services and their indicators as desirable means of
assessment for the digitalization of regional financial activity. The results of the conducted
analysis and tendencies of banking digitalization in the depressed regions of Russia revealed
a strong correlation between the development rate of informational infrastructure in selected
federative subjects and the digitalization of their banking markets. The regions with
inaccessible digital resources show correspondingly low development of the banking market,
both offline and online. Various studies confirm this correlation and describe the direct
linkage between the digitalization of economical relations, the digital literacy of the
population [3], and low investment activity in the area of financial technologies [16].

However, the slow pace of digitalization in the regional banking sphere entails the stagnation of money circulation and the financial system as a whole. The Russian economy reflects this in continuously high rates of cash use, with more than one-fifth of the total money supply operating in cash [19].

The Russian banking system is faced with a variety of other issues, from lasting institutional degradation in the banking sector and centralized banking assets to increasing state regulation of the banking market and thriving monopoly. All these factors affect the digitalization dynamics in the banking sector both for the country as a whole and its separate regions. The high polarization of social and economic conditions in the regions and their financial imbalance pose a threat to the sustainable development of the national economy. The degrading state of financial and banking institutions in the regions, slow development of information infrastructure, and the group of digitally and financially depressed regions lead to a high level of cash operations and poor use of distance banking accounts.

5 Conclusion

The analysis of digitalization tendencies in the regional banking systems with the lowest development rate allowed the authors to identify the following issues in need of solving:

- The Republic of Dagestan, the Republic of Ingushetia, and the Chechen Republic are in a critical state in terms of the development of their banking systems;
- There is a direct correlation between the telecommunication infrastructure and the digital banking dynamics in the regions;
- The majority of the studied regions do not show the accelerated pace of inner banking market digitalization. Some regions demonstrate a tremendous backlog compared to the average figures for the country;
- Reduced institutional saturation in the regions is not offset by growth in Internet banking and online services.

The obtained results indicate the need to minimize the informational, infrastructural, and financial gap between the researched regions and country-average results. Otherwise, the polarization processes in the Russian Federation will deteriorate further. The digitization of financial assets and economical relations requires basic technological, informational, and communicative tools. The disruptions in the digitization process will further delay the social and economic development of the discussed federative subjects.

The conducted research identifies the fundamental problems hindering the sustainable digitalization of regional banking systems in the group of depressed subjects of the Russian Federation. Therefore, it contributes to the scientific theoretical basis on the complex assessment of digitalization tendencies in banking systems, which justifies its scientific novelty. The authors determine that in the current situation of financial digitalization, the issue of access to finance in the depressed Russian regions cannot be solved without addressing the problem of access to digital tools.

This research can be practically applied to the development of an efficient strategy of attenuating the discrepancy in the digitalization pace of the banking sector between the depressed regions and the rest of the country. This approach will enable economic and financial management authorities to overcome the issue of digitally and financially inaccessible ICT infrastructure and the banking sphere.

To gain a deeper understanding of the issue of digital transformation of the banking market, the authors feel the need to conduct further economic modeling of a correlation between the ICT infrastructure and the indicators of banking digitalization. This will allow predictions on the prospects of the low digitalization level in regional banking systems and ways to overcome this problem.
References

5. A.M. Chernysheva, V.V. Kalygina, Bulletin of the Academy of Knowledge 4, 235–239 (2019)
13. V.P. Oreshin, S.S. Reshiev, Conceptual approach to creating the necessary conditions for the successful development of the digital economy in the Chechen Republic. Development of the regional economy in the context of digitalization (Chechen State University, Grozny, 2018)
17. O.S. Smotrina, I.N. Korabeynikov, Directions for the development of the digital economy in the region. Cooperation between the Republic of Belarus and the Orenburg region in innovation (IPK Universitet LLC, Orenburg, 2018)
19. V.V. Strelnikov, Finance and Credit 9, 2054–2068 (2019)