

DEVELOPMENT OF DIGITAL BANKING TECHNOLOGIES IN THE REPUBLIC OF BELARUS

ROZWÓJ TECHNOLOGII BANKOWOŚCI CYFROWEJ NA BIAŁORUSI

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Abstract. The purpose of the research is to determine the prospects and opportunities for digital transformation of the banking sector of the Republic of Belarus based on an analysis of the current state of bank informatization, current world trends to ensure a harmonious combination of interests of all participants in the country's banking system: the state, banks, firms and the public. The article analyzes the features of the current stage of development of the retail banking services market of the Republic of Belarus, which is characterized by dynamic development and widespread electronic and IT technologies. The expediency, necessity and timeliness of introducing such trend digital innovations of the retail banking sector of the Republic of Belarus as the development of the payment and settlement space, remote identification, including biometric, the development of the Open API, distributed registry technology (blockchain) are substantiated. Developed recommendations to improve the effectiveness of the proposed retail banking services through the modernization of existing and introduction of innovative ones. Identified key areas of innovation in the retail segment of banking services. Recommendations to improve the efficiency of retail banking services in the Republic of Belarus through the introduction of innovative digital banking technologies will enable Belarussian banks to gain strategic competitive advantages to achieve leadership positions in the financial market.

Keywords: banks, digital economy, digital banking technologies, innovation, e-banking system, Open API, blockchain, crediting by QR code

Streszczenie. Celem badania jest określenie perspektyw i możliwości cyfrowej transformacji sektora bankowego Republiki Białorusi. Badanie wykonano poprzez analizę aktualnego stanu informatyzacji banków oraz aktualnych światowych trendów w celu zapewnienia harmonijnego połączenia interesów wszystkich uczestników systemu bankowego kraju: państwo, banki, firmy i społeczeństwo. W artykule podjęto próbę analizy cech obecnego etapu rozwoju rynku usług bankowości detalicznej Republiki Białorusi, który charakteryzuje się dynamicznym rozwojem i rozpowszechnionymi technologiami elektronicznymi oraz informatycznymi. Celowość, konieczność i terminowość wprowadzania cyfrowych innowacji w sektorze bankowości detalicznej Republiki Białorusi takich jak: rozwój przestrzeni płatniczej i rozliczeniowej, zdalna identyfikacja, w tym biometryczna, rozwój Open API, technologia rozproszonego rejestru (blockchain) są uzasadnione. Opracowano zalecenia mające na celu poprawę skuteczności proponowanych usług bankowości detalicznej poprzez modernizację istniejących i wprowadzenie innowacyjnych rozwiązań. Zidentyfikowano kluczowe obszary innowacji w segmencie detalicznym usług bankowych. Poprawa efektywności usług bankowości detalicznej w Republice Białorusi poprzez wprowadzenie innowacyjnych technologii bankowości cyfrowej umożliwi białoruskim bankom uzyskanie strategicznej przewagi konkurencyjnej w celu osiągnięcia pozycji lidera na rynku finansowym.

Słowa kluczowe: banki, gospodarka cyfrowa, technologie bankowości cyfrowej, innowacje, system bankowości elektronicznej, Open API, blockchain, kredytowanie za pomocą kodu QR

Introduction

The relevance of the research lies in the lack of a comprehensive analysis of the state of information development of the banking sector in the Republic of Belarus and assessment of the impact of IT on financial services consumers.

Digitalization of the economy, based on a qualitatively new type of information technology, has become relevant due to the qualitative changes in the economy and society. Investigating the features of digitalization of economics, scientists mainly refer to the work of Canadian scientist Don Tapscott, who gives a general definition of the digital economy (A. Tapscott, D. Tapscott, 2017, p. 196). In Belarus,

M.M. Kovalev (2018), S.V. Kuznetsov (2017), B.N. Panshin (2016), M. Achapovskaya (2019) were engaged in the research of digitalization of the economy.

The digitization of the economy in these works is defined as the modern innovative stage of economic development, which is based on the integration of physical and digital resources in the sphere of production and consumption, in the economy and society. It is characterized by new methods of generating, processing, storing, transmitting information in all spheres of human activity. The basic condition for expanding the digital segment of the economy is the growth of the transaction sector, which in developed countries accounts for over 70% of national GDP. However, the digital technology segment is a very modest component in the global and national economies. Its share in GDP is 6% in OECD countries and significantly less in developing countries. In the USA, where 8 of the 14 largest high-tech companies in the world in terms of income are operating, the contribution of digital technologies to GDP is 7% (World Bank. International Bank for Reconstruction and Development, 2016, p. 12).

The digitization of the economy determines a modern innovative stage of its development. According to the Global Innovation Index (GII) indicator, which is recognized worldwide as the most important source of information on innovation activity, and is calculated based on about 80 different variables, Belarus ranks 79th. At the same time, many post-Soviet countries in the Index have substantially overtaken Belarus. So, in this rating Russia is in 43rd place from 128 countries, Ukraine - in 56th, Armenia - in 60th, Georgia - in 64th. Our country was in the list between Iran (78th position) and Kenya (80th position) (Kolotukhin, Motorina, 2016, p. 50).

Ratings of the digital economy give some idea of the level of development of the digital economy in the country. First, this is the European Digital Economy and Society Index (Digital Economy and Society Index - DESI). According to DESI-2017, which ranked 28 EU countries, in the first five places are Denmark, Finland, Sweden, the Netherlands, Luxembourg, and the last Italy, Bulgaria and Romania. When calculating DESI, 5 subindexes are used: 1) connectivity - the share of households with stationary access to broadband, 2) human capital - the share of Internet users, 3) Internet use by the population - social networks, Internet banking, e-commerce, 4) integration of business with digital technologies - electronic document management, 5) digital public services.

A comparison of Belarus with the DESI index shows that the development of the digital economy in

our country is comparable in terms of IT infrastructure and human capital development with the average European (Figure 1).

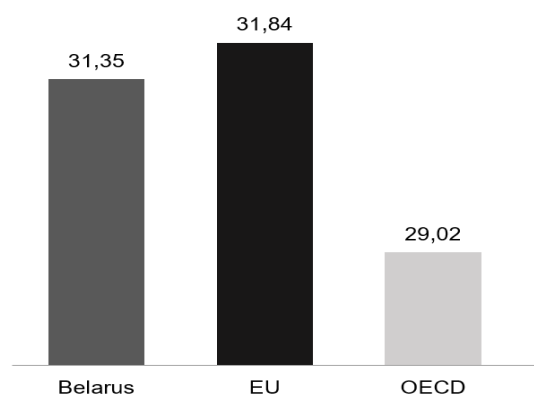


Figure 1. Fixed broadband access UNCTAD (2017)
Source: World Bank and EEC, 2017, p. 14.

The share of gross value added of the IT sector in the gross value added of the economy of the Republic of Belarus has increased over the last 5 years from 3.2 to 5.2%, and in the services sector - to 10.5%. From 2013 to 2017, the export of telecommunications services to Belarus doubled and in 2018 amounted to almost \$ 1.5 billion. Moreover, annually the export of ICT services increases by 18-20%. In 2017, the number of subscribers with access to the Internet amounted to 11.8 million, 74.4% of the population aged 6-72 years were Internet users, while 73.1% of them went online every day. Digitalization has equally deeply affected all spheres of the economy. Belarus ranks 32nd in the world ranking (176 countries) in terms of IT development, 21st in terms of the number of fixed broadband Internet subscribers (TIBO-2018, 2018).

The growing demand for banking services provided by innovative computer technologies and the latest communication tools should guide banks towards the introduction of innovations that make it possible to use new ways to promote services. Technologies that have been tested and are already used by foreign banks can be innovative for the Belarusian market, since they have not been used in the domestic market before. The use of such technologies allows banks to improve and increase the efficiency of services provided, to create competitive advantages and strengthen their position in the market.

Material and methods

In the course of the research, a theoretical analysis of the objects of informatization was used, this was carried out according to the rules of system analysis in accordance with the principles of optimality, hierarchy, integration and formalization.

Baseline data in the research process included official published statistics; primary information from the websites of the subjects of the banking sector of Belarus and IT companies; data from national and international registries and databases; the results of special studies of the banking sector conducted by the National Bank of the Republic of Belarus.

Results and discussion

Currently, there are 24 banks in Belarus, 3 non-bank credit and financial organizations, the Development Bank of the Republic of Belarus – a specialized institution that serves and finances state social programmes and investment projects, the Interbank Currency and Stock Exchange, the Central Securities Depository. It should be noted that there are no non-state investment and pension funds in the republic, insurance mechanisms are underdeveloped.

World and domestic experience shows that banks, which are an important segment of any economic system, are faced with digital technologies in their work every day. However, as Ernst & Young and Cisco researchers note, banks are not in a hurry with digital transformation: 85% of all banks in the world have included digital transformation in priority areas, but only 19% of them consider themselves mature enough to start “going digital”, from 7,200 surveyed bank customers in 12 countries, 43% said that banks poorly understood their needs, 37% did not believe that the bank would help achieve their financial goals, 28% did not trust the words “best interest rates”, 25% intended to go to another bank with more modern services (Shkvarun, 2018, p. 1, Cronk, 2015, p. 1).

The retail banking business in the Republic of Belarus is one of the priority activities of commercial banks, since it serves to ensure sustainable growth of the resource base and acts as a stable source of income. This is a very dynamically developing branch of the banking sector, in which modern electronic and IT technologies are widely spread. The legal framework for the strategic development of digital banking innovations has been created in the Republic of Belarus.

An important goal of the development of digital banking in the Republic of Belarus is the formation of conditions:

- a) to create new digital products and services provided by banks, digital sales channels, improve the quantity and quality of digital financial services for the public;
- b) to increase the number of active users of the e-banking system, as well as products and services available to customers for receiving through these systems;

- c) to implement global best practices in digital banking;
- d) to increase the transparency of banking operations;
- e) to reduce transaction costs for all market participants;
- f) to create and maintain the necessary level of stability and security of the operation of digital technologies in the financial sector of the economy, standardize security (Resolution of the Council of Ministers of the Republic of Belarus, 2017).

Digital transformation of banks allows to retain customers, expand your banking business through the use of modern channels, promotes closer cooperation with customers and a clear representation of their preferences, reduce operating costs and increase competitiveness through modern digital services that attract new customers to the bank. By this time, Belarusian banks are actively introducing e-banking system (Figure 2).

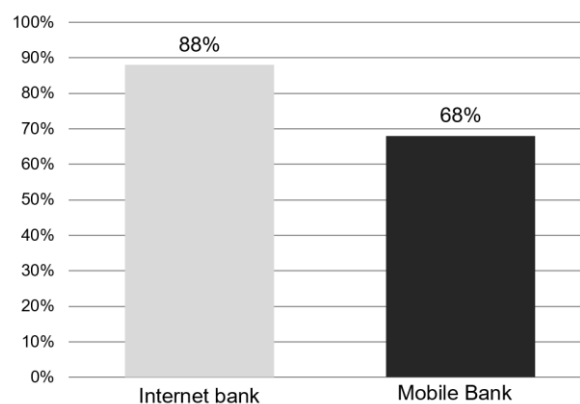


Figure 2. The use of e-banking system for servicing individuals in Belarusian banks
Source: Zyl, 2017, p. 51.

Taking into account global trends, four key areas of digital transformation of the retail banking sector in Belarus can be distinguished: the development of payment and settlement sphere, remote identification, including biometric, the development of the Open API, distributed registry technology (blockchain).

a) Development of payment and settlement space

An integral part of the payment system of the Republic of Belarus is a non-cash settlement system for retail payments, a significant development, work of which was done by the National Bank together with the banks of the country. A single settlement and information sphere (SSIS) has been created and is successfully functioning, which in essence is a unique ecosystem in world practice for making

payments by both individuals and legal entities. Today, almost the entire population of the country receives wages in bank accounts to which bank payment cards are issued. The indicator achieved in Belarus in terms of cashless payments using bank payment cards is comparable to that of economically developed European countries.

Contactless technologies and payment services based on modern innovative solutions are being developed in the Republic. Currently, the Samsung Pay service, which allows payments to be made using mobile devices, has begun work in the country's payment market. 6 banks offer their customers the use of Samsung Pay mobile payment service with MasterCard payment system banking cards - JSC «ASB Belarusbank», JSC «Belagroprombank», JSC «BPS-Sberbank», CJSC «BSB Bank», CJSC «MTBank», JSC «Bank Moscow-Minsk», 3 banks – JSC «Belgazprombank», CJSC «VTB Bank (Belarus)», JSC «Bank Moscow-Minsk» - VISA payment system (Samsung Pay, 2019).

A service has been developed and implemented that allows using a QR code when making payments in favour of service providers connected to the "Calculation" automated information system (AIS). Using this service, the payer does not need to know the unique service number or look for it in the SSIS tree. It is enough to scan the QR code using the camera of the smartphone, enter the amount and press the payment button.

As of September 2018, 80 service providers are connected to this service, while the monthly number of payments increased by more than 3 times compared to January 2018 and the amount of payments - more than 6 times.

Further development of e-banking services continues. To date, 73% of banking products and services are remotely available for individuals (66.7% - as of January 1, 2018). Regarding customer use of the e-banking system, we can state moderate growth: in the banking system as a whole, the share of customers - individuals using remote channels is more than 53% (48.9% - as of January 1, 2018).

The need for cost-effective and convenient payment methods on world markets has led to the development of new and innovative technologies for mobile transactions and mobile applications. The sphere of mobile payments in recent years has been actively developing, the volume of payments for goods and services carried out through smartphones and other mobile devices is growing exponentially. Figure 3 shows the Global transaction value in the "Mobile Payment" segment.

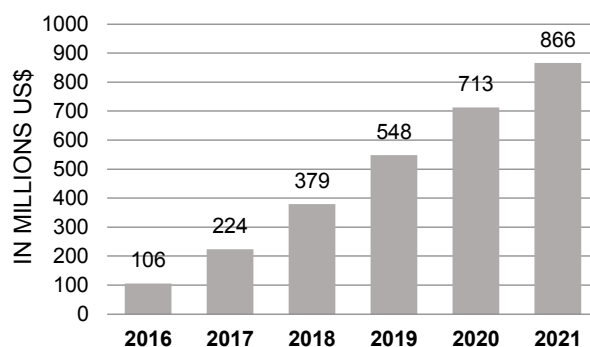


Figure 3. Growth expectations Global transaction value in the „Mobile Payment“ segment, in million US\$
 Source: Statista, 2019.

Taking into account the global trends in the development of mobile payments, it should be noted that the practice of the development by Belarusians of remote service channels using card accounts is rather inert. Studies were conducted (Croitor, 2016, p. 62, 68), which determined that in 2016 almost 37% of respondents used online banking in Belarus, which is about three and a half times more than in 2012. However, over 70% of the total number of respondents never made Internet payments (in 2012 there were 90%). Just over 21% of respondents pay for purchases or services via the Internet once or several times a month, and just over 5% use this service several times a year or less.

About 18% of respondents use mobile phones to make payments (two thirds of them do it actively and regularly), while 81.1% of respondents do not use this financial instrument. Compared with 2012, these figures have not changed significantly. According to Belarusian banks, the number of individuals who use the "mobile bank" service is less than 0.7 million, although the number of active SIM-cards of subscribers of mobile operators is more than 11.7 million, mobile Internet users - more than 4,5 million people, owners of smartphones and tablets - more than 3.2 million people, smartphones and tablets - more than 4.8 million units (41% of the total number of active SIM-cards subscribers). These data are presented in the Strategy of digital banking development in the Republic of Belarus for 2016-2020.

How have the preferences of individuals changed in the choice of services provided by banks through the e-banking system, the last year is shown in Figure 4.

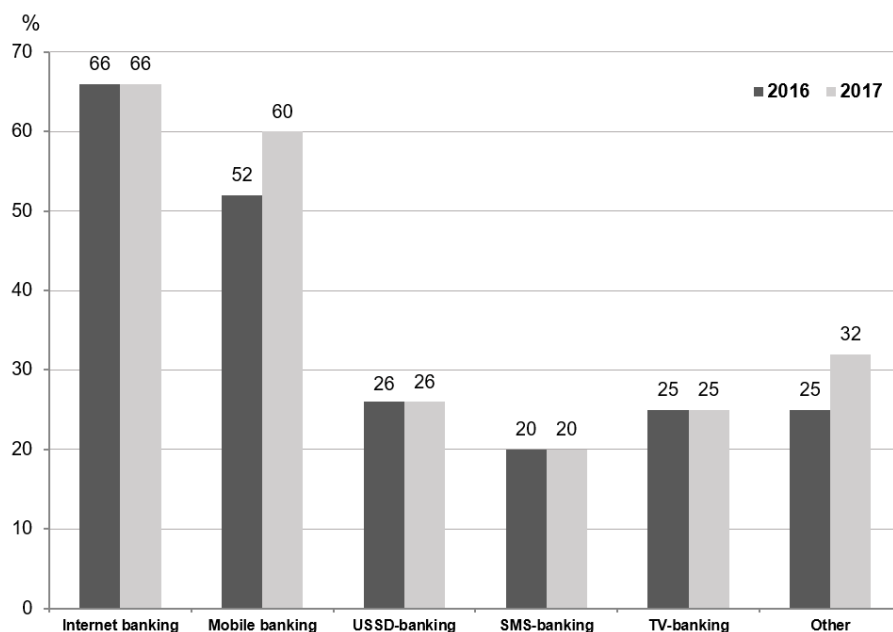


Figure 4. The Dynamics of change in the share of services provided by banks through e-banking system for individuals (%)
 Source: Sachkovskaia, 2018, p. 11.

Another major development trend of the payment system is the interaction of the banking system with other organizations in the direction of improving settlement customer service. The purpose of which is to create and offer potential users an innovative payment service that allows money transfer from the payer to the payee in a time mode close to real, so-called instant payments.

The National Bank has developed the Concept for creating an instant payment service available 24/7/365, as well as a draft regulatory legal act defining the procedure for making such payments (Ruskevich, 2018). The introduction of the system of instant payments into commercial operation is planned for July 1, 2019 (National Bank, 2019).

The National Bank is interested in developing cooperation with foreign payment systems. In 2018, the banking community, Payment System BELCARD together with National System of Payment Cards (NSPC), the operator of the Russian national payment system MIR, 100% of whose shares belong to the Central Bank of the Russian Federation, began work on the implementation of an inter-system project integration of the payment system BELKART with the payment system MIR. At the same time, work is underway to ensure the transfer of the issue of BELCARD cards to EMV standard cards, using specifications and applications developed by NSPC.

EMV is the main global standard introduced in 2010, according to which all bank cards issued since its adoption should have a special microchip. Microprocessor cards are used in almost every

corner of the world: they give bank customers maximum protection against encroachment on their money.

Currently, the Ministry of Communications and Informatization is working to create a Belarusian integrated service and accounting system. The basic components of this system will be the Belarusian electronic card (ID-card) and the Unified system of identification of individuals and legal entities. In addition to the main applications (identification and cryptographic) on the ID-card, it is planned to implement a payment service for the payment of electronic services, allowing payments for electronic services provided (IdPay). The National Bank proposed the Ministry of Communications and Informatization to develop a payment service for electronic services IdPay based on the payment application BELCARD. The implementation of this project will serve as a new impetus for the development of the internal payment system BELCARD, taking into account the existing technological solutions.

b) Remote identification, including biometric

New opportunities for clients are opened by the Interbank Identification System (IIS) implemented in Belarus, which is intended for banks to identify individuals, including individual entrepreneurs, notaries, lawyers and their representatives without personal presence using remote service channels when making deals in the framework of banks services, created from October 1, 2016.

The development of the system was started with the download of data from individuals.

Using this system, the client gets the opportunity to access the services of any domestic bank and carry out a number of operations, including opening settlement and deposit accounts, issuing bank payment cards, applying for a loan, which contributes to the development of competition and banks' desire to promptly introduce innovative products.

The National Bank launched a pilot project "Authentication of individuals in the IIS and banks of the Republic of Belarus using biometric data of individuals", within which biometric characteristics of the face and voice. At the same time, authentication using such biometric characteristics will not only increase the level of security when carrying out financial transactions performed using the IIS, but also greatly facilitate their implementation for end users. One of the results of the implementation of this project will be the possibility of obtaining bank services without providing identity documents (Non-cash payments, 2019).

c) Open API development

Open Application Programming Interface (Open Application Programming Interface, Open API) is one of the most important areas of digital transformation, transforming banks and forming a new ecosystem of players in financial markets. The main task of Open API is to create tools for data exchange between software applications as part of the interaction between the data owner and third parties. In this interaction model, the data owner (a bank or a participant in the non-banking financial market segment) may also be able to obtain data from third parties. Such cooperation gives a synergistic effect when the data of one organization is enriched with the data of another organization, the result is a more complete array of data, analysis of which will expand the banking market for the end user (Kalechits, 2018, p. 10).

The world is actively promoting Open API projects. Central Banks of the European Union, the UK, Singapore, India and other countries have already implemented a number of initiatives aimed at creating standards for open banking APIs.

In the Republic of Belarus, according to the Digital Banking Development Strategy for 2016–2020, the introduction of application programming interfaces into the financial sector is one of the areas of strategic development of digital banking technologies (Resolution of the Board of the National Bank of the Republic of Belarus, 2016).

The National Bank is working on the implementation of Open API technology in three areas:

- a) in order to protect the rights of consumers, improve financial literacy - provide access to information about banking and financial products, about the conditions for providing them to customers, regarding commissions and fees - *information APIs*;
- b) in order to increase the share of non-cash payments, speed up their implementation, increase the availability of payment services for customers - provide access to payment information - *payment APIs*;
- c) in order to obtain more reliable and timely information for state bodies, reduce the costs of forming, receiving and processing statistical data - provide access to information on the activities of banks and participants in the non-banking segment of the financial market - *statistic APIs*.

The introduction of open APIs in the financial sphere of Belarus will allow:

- a) customers of banks to expand ways to obtain timely reliable financial information;
- b) to increase the number of customers to banks and participants in the non-banking segment of the financial market, reduce the cost of developing their own financial applications through the use of products and services provided by other banks and commercial organizations;
- c) developers of software and hardware solutions to obtain a convenient infrastructure and platform for developing innovative financial technologies and additional services for banks.

However, it should be understood that the coming changes will be felt not only by consumers. No less serious consequences will be for the banks themselves, both in terms of working with payment technologies, and in terms of changing market positioning. In addition, banks should be aware of the protection of customer information, as well as monitor and verify the developers and the applications and programmes they have created. Banks need to develop rules for security, confidentiality of information, responsibility for risks.

d) Distributed registry technology (blockchain)

The blockchain information technology has become widespread since 2008. The information stored on the blockchain network is transparent, since the common database simultaneously exists on all computers in the network. The records stored in it are public and easily verified. The blockchain network cannot be destroyed, since changing even a unit of information requires the need to replace information in the entire network. The owners of certifying nodes of the blockchain information

network ensure the functioning of the network. All have equal rights, create blockchains for each certifying node of the network and ensure its reliable and uninterrupted operation. The criterion for verifying the accuracy of information entered into the blockchain network is set at no less than 75% of the number of certifying nodes registered in it.

On the basis of the blockchain technology, in 2017, the applied tasks of keeping registers of issued bank guarantees, as well as the formation of a register of securities transactions, were implemented (Resolution of the Board of the National Bank of the Republic of Belarus, 2017).

Currently, using the blockchain technology in the country, the problem is being solved in terms of transferring from documentary exchange to digitizing the process of performing executive notes by notaries. By 2020, the enforcement authorities will join this process. Taking into account the above, we can say that the banking system of the Republic of Belarus is one of the first in the world to apply a fully digitized process of retail business - from online lending to the execution of the executive inscription and its enforcement (if necessary) (Podgorny, 2017, p. 57).

In addition, the technology of automated execution and execution of contracts in the information network of the blockchain, which ensures the conclusion and execution of the contract in the form of an electronic document, is being tested in the Republic.

Conclusions

The analysis established a natural, positive development of digital transformation of the banking sector in the world and in the Republic of Belarus. The digital transformation of the banking system is inevitable. Research allows to make a conclusion about the readiness and feasibility, both in technical and organizational plans, of the banking system of the Republic of Belarus for transformations within the framework of digital transformation.

1. It has been determined that the Republic of Belarus, at this stage of its development, is characterized by a relatively low degree of prevalence of financial services among the population. Most of the country's citizens are consumers of basic financial services. The obligatory nature of the service for a significant part of the country's population is the main reason for using a current account, on which salaries and social benefits are charged; debit card for the purchase of policies for compulsory insurance of vehicle owner liability or in some cases property insurance. The main digital channels of interaction with customers

that are actively developed by Belarusian banks are Internet banking and Mobile banking.

2. A survey of the current state of the banking sector of the economy of the Republic as an object of informatization indicates that the Republic of Belarus has created a legal field for the development of digital banking technologies: a number of regulatory legal acts have been adopted, appropriate changes in legislation have been prepared.

3. Based on the analysis of innovative areas of digital transformation of banking systems of foreign countries, the most promising areas of digital transformation of the retail banking sector of Belarus were identified: the development of the payment and settlement space; remote identification, including biometric; Open API development; distributed registry technology (blockchain).

4. Identified innovative products and technologies that determine the development direction of the retail banking market in the Republic of Belarus:

- a) the creation and successful operation of a single settlement and information sphere (SSIS);
- b) development of contactless technologies and payment services based on modern innovative solutions;
- c) the introduction of a service that allows the use of a QR code when making payments in favour of service providers connected to the AIS «Calculation»;
- d) further development of e-banking services;
- e) development of the Concept for the creation of an instant payment service available 24/7/365;
- f) introduction of a new type of bank payment - direct debiting of an account;
- g) the start of work on the implementation of the project on the intersystem integration of the payment system BELCART with the payment system MIR;
- h) implementation of measures to create the Belarusian integrated service-accounting system, the basic components of which will be the Belarusian electronic card (ID-card) and the Unified system of identification of individuals and legal entities;
- i) implementation of the Interbank Identification System (IIS);
- j) qualitative change in the portfolio of cards issued by banks, the number of contactless cards, as well as cards equipped with a microprocessor, is growing.

The above priorities for the digitalization of the retail banking business require the organization of close substantive interaction of the National Bank with all financial market participants, IT companies and consumers of banking services.

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