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The Impact of Digital Technologies on the Efficiency of Banking

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ABSTRACT

This article reveals the impact of financial technologies on the development of the banking sector. The purpose of the study is to identify key financial technologies in the banking sector, as well as the causes and prerequisites for the development of financial technologies in the banking sector of Kazakhstan. For this purpose, the essence of the concept of financial technologies and the definition of this term are considered. In the course of the study, a comprehensive analysis was carried out, which provides both quantitative and qualitative characteristics of the development of digital technologies and their impact on the development of the banking sector. The tasks set in the article were solved by analyzing the structure and dynamics, and methods of financial analysis. In the course of the study, a point-index method was used. To assess the penetration of digital technologies into banking, data from Kaspikz from 2021 to 2022 was used. A panel approach was also used, which allowed for analyzing data on various banks. As a result of our research, a conclusion has been made on the areas of banking activity that can first of all be replaced by fintech startups. These are consumer finance, microloans, and payment services. It is determined that a number of commercial banks can be transformed into fintech companies. We declare that no matter what institutional forms the development of new financial technologies takes, it is inevitable in any case, and the relatively near future will already show their content and configuration.

KEYWORDS: Financial Technologies, Fintech Startups, Big Data, Robo-adviser, Crowdfunding, Blockchain Technologies, P2P and P2B lending, Cryptocurrency

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Банк қызметінің тиімділігіне цифрлық технологиялардың әсері

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ТҮЙІН

Бұл мақалада қаржы технологияларының банк секторының дамуына әсері ашылады. Зерттеудің мақсаты Банк секторындағы қаржы технологияларын, банк саласындағы негізгі қаржы технологияларын дамытудың себептері мен алғышарттарын айқындау, сондай-ақ Қазақстанның банк секторындағы қаржы технологияларын дамыту болып табылады. Осы мақсатта қаржылық технологиялар ұғымының мәні және осы терминнің анықтамасы қарастырылады. Зерттеу барысында цифрлық технологиялардың сандық және сапалық сипаттамаларын және олардың банк секторының дамуына әсерін беретін жан-жақты талдау жүргізілді. Мақалада қойылған міндеттер құрылымы мен динамикасын, қаржылық талдау әдістерін талдау арқылы шешілді. Зерттеу барысында баллдық-индекстік әдіс қолданылды. Банк қызметіне цифрлық технологиялардың енуін бағалау үшін Kaspi.kz сайтының 2021-2022 жылдар аралығындағы деректері пайдаланылды. Әртүрлі банктер мен уақыт кезеңдері бойынша деректерді талдауға мүмкіндік беретін панельдік тәсіл де қолданылды. Деректер 2021-2022 жылдар аралығындағы стратегиялық пандемия және постпандемия кезеңдерін қамтитын уақыт кезеңі ішінде жиналды. Біздің зерттеуіміздің нәтижесінде банк қызметінің бағыттары бойынша қорытынды жасалды, оларды бірінші кезекте финтех-старттаптар алмастыра алады. Бұл – тұтынушылық қаржы, шағын қарыздар, төлем сервистері. Бірқатар коммерциялық банктерді финтех компаниясына айналдыруға болатындығы анықталды. Біз жаңа қаржылық технологиялардың дамуы қандай институционалдық нысандарға төгілмесе де, бұл кез келген жағдайда сөзсіз және салыстырмалы түрде жақын болашақ олардың мазмұны мен конфигурациясын көрсетеді деп мәлімдейміз.

ТҮЙІН СӨЗДЕР: қаржылық технологиялар, финтех стартаптар, үлкен деректер, робо-кеңесші, краудфандинг, блокчейн технологиялар, P2P және P2B несиелері, криптовалюта

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Влияние цифровых технологий на эффективность банковской деятельности

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АННОТАЦИЯ

В данной статье раскрывается влияние финансовых технологий на развитие банковского сектора. Целью исследования является определение ключевых финансовых технологий в банковской сфере, а также причин и предпосылок развития финансовых технологий в банковском секторе Казахстана. С этой целью рассматривается сущность понятия финансовых технологий и определение этого термина. В ходе исследования был проведен всесторонний анализ, который дает как количественные, так и качественные характеристики развития цифровых технологий и их влияния на развитие банковского сектора. Задачи, поставленные в статье, были решены путем анализа структуры и динамики, методов финансового анализа. В ходе исследования был применен балльно-индексный метод. Для оценки проникновения цифровых технологий в банковское дело были использованы данные из KSPI.kz за период 2021-2022 гг. Также использовался панельный подход, который позволял анализировать данные по различным банкам и периодам времени. Данные были собраны с учетом периода времени, который включал стратегический пандемический и постпандемический периоды с 2021 по 2022 год. В результате нашего исследования сделан вывод по направлениям банковской деятельности, которые в первую очередь могут быть заменены финтех-стартапами. Это – потребительские финансы, микрозаймы, платежные сервисы. Определено, что ряд коммерческих банков может быть трансформирован в финтех-компании. Мы заявляем, что в какие бы институциональные формы не выливалось развитие новых финансовых технологий, оно неизбежно в любом случае, и относительно недалекое будущее уже покажет их содержание и конфигурацию.

КЛЮЧЕВЫЕ СЛОВА: финансовые технологии, финтех-стартапы, большие данные, робо-эдвайзер, краудфандинг, блокчейн-технологии, P2P и P2B-кредитование, криптовалюта

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Introduction

In the modern world, digital technologies have become an integral part of our daily life and have significantly changed many industries, including banking. The development of information and communication technologies has led to the emergence of new opportunities and caused a revolution in banking. The introduction of digital innovations in the banking sector has led to an improvement in the efficiency and competitiveness of banks, as well as to the transformation of interaction between banks and their customers.

This article is devoted to studying digital technologies' impact on banking activities' efficiency. We will analyze how the latest technologies affect various aspects of the banking sector and pay special attention to their impact on customer orientation, operational processes and innovative banking business models.

Initially, we will consider digital technologies' essence and main characteristics. We will study what tools and solutions are included in the concept of digital technologies and how they are used in the banking sector. Then we will pay attention to the importance of digital technologies in increasing the customer orientation of banks. We will look at new forms of customer interaction, such as mobile applications, Internet banking and digital payment systems, and explore how these tools improve the availability of banking services and the level of service.

Next, we will turn to operational processes in the banking sector and study how digital technologies optimize banking operations. We will consider the introduction of automated systems and robotization of strategies that increase the efficiency and accuracy of operations and reduce costs and risks. We will also pay attention to using artificial intelligence and data analytics to make real-time decisions and predict customer behavior.

Finally, we will study innovative banking business models that arise under the influence of digital technologies. We will look at the development of fintech companies, their role in the banking sector and their interaction with traditional banks. We will also analyze the concept of open banking and the use of blockchain technology in the financial industry.

This article aims to provide a comprehensive overview of the impact of digital technologies on the efficiency of banking activities. We hope that the results of our research will better understand the current trends and challenges banks face and formulate strategic recommendations for the suc-

cessful adaptation and use of digital technologies in the banking sector.

Literature Review

Financial technologies (FinTech) are a relatively new industry not only in Kazakhstan but throughout the world. Currently, according to various estimates, there are about 10 thousand fintech startups in the world, the number of which is constantly growing. The growing popularity of financial technologies and the increase in the number of fintech startups are because they provide a cheaper alternative to banks in the financial market. Most investments in the development of the fintech industry are concentrated in the payments zone, where the level of competition with banks is the highest (Makhitarova et al., 2022).

The term "financial technology" arose in the early 1990s. However, interest in it and in the fintech sector itself on the part of regulators, industry participants and consumers manifested itself after 2014. To a large extent, the close attention of market actors was provoked by manifestations of the global financial crisis 2008 and its consequences. As a rule, financial technologies are defined similarly in all sources, with slight variations. So, for example, Filippov (2018) gave the following definition of fintech: "an industry consisting of companies that use technology and innovation to compete with traditional financial institutions represented by banks and intermediaries in the banking services market" Pshenichnikov (2018) somewhat clarified the composition of these companies (banks and other financial institutions), expands and specifies the markets for their activities (the financial services market, including payment systems, capital management, lending, insurance and foreign exchange transactions).

The Financial Stability Board (FSB) in 2017 gave a brief definition of fintech as "technological innovation in financial services", meaning a combination of products/services in the form of digital retail payments, digital wallets, fintech loans, robo-advisers (robotic advisor, robo-advisor), digital currencies, and their leading technologies. Obviously, the concept of "financial innovation" is much broader than fintech since not all financial innovations can be classified as financial technologies (for example, the creation of a new derivative). In addition, financial innovations can only partly be included in the "digital economy" concept, while the functioning of fintech without digital technologies is almost impossible (Alpatova, 2019).

Advances in digital technology are changing the very nature of banking. Banks are now distributing services via mobile technology. A prolonged period of very low-interest rates is also having an impact. Brei et al. (2020) and Adrian et al. (2016) noted that many banks have increased their emphasis on fee-generating services to sustain their profitability.

Banks in the future will have to accept deposits and process transactions made in digital form, either Central Bank Digital Currencies (CBDC) or cryptocurrencies. Braggion et al. (2018) and Swankie & Broby (2019) consider whether these represent a threat to financial stability.

A review of financial technology and banking literature is provided by Takor (2020). He highlights that non-deposit-taking contenders are now providing financial service companies. This paper addresses one of the four research questions raised by his review, namely how theories of financial intermediation can be modified to accommodate banks, shadow banks, and non-intermediated solutions.

Physical changes are also being made in the delivery of services. Bricks and mortar branches are in decline. Mobile banking, or m-banking, as Liu et al. (2020) describe it, is an increasingly important distribution channel. Robotics are increasingly being used to automate customer interaction. As explained by Vishnu et al. (2017), these improve efficiency and the quality of execution. They allow for increased oversight and can be built on legacy systems as well as from a blank canvas.

In summary, financial technology has evolved to a level where online banks and banking as a service are challenging incumbents and the nature of banking mediation. Banking is rapidly transforming because of changes in such technology. At the same time, the solving of the double spending problem, whereby digital money can be cryptographically protected, has led to the possibility that paper money will become redundant at some point in the future (Broby, 2021). A theoretical framework is required to understand this evolving landscape.

Research Materials and Methods

In the course of the research, a comprehensive analysis was carried out, which provides both quantitative and qualitative characteristics of the development of digital technologies and their impact on the development of the banking sector. Quantitative data such as monthly transfers to an active consumer, sales through digital platforms, volumes of fintech startups, P2P and P2B lending are considered. The main research methods were:

analytical and synthetic, statistical, computational and analytical research methods. As part of the analytical method of the study, all the constituent elements of the economic and organizational foundations of digital technologies in the banking sector were analyzed separately. Within the methodology framework used, data for the strategic pandemic and post-pandemic period from 2021 to 2022 were used. The graphical representation of the generalized data made it possible to reflect the dynamics of the development of this industry.

The analytical method allowed to form a comprehensive vision of the current state of the application of digital technologies in the banking sector of the Republic of Kazakhstan. Based on the applied methodology, a scientific justification was given for the current stage of the formation and development of digital technologies in the country's financial industry.

The tasks set out in the article were solved by analyzing the structure and dynamics, methods of financial analysis. In the course of the study, a score, index method was applied. To assess the penetration of digital technologies into banking, data from Kaspi.kz research as of 2022 were analyzed.

Strengthening the role of the state in the transition of the country to a digital model of development will require a detailed analysis of the existing problems and results achieved in the priority areas for the population of Kazakhstan, because the importance of digitalization processes for socio-economic development of Kazakhstan and the simultaneous presence of problems in this area, limit the effectiveness of the country's transition to a digital economy and emphasize the relevance of the topic of research.

The study used a panel approach that allowed analyzing data on various banks and periods. Panel data provided an opportunity to take into account and evaluate the dynamics of digital technology development in the banking sector over several years. To do this, data was collected from various sources, including statistical reports, financial reports of banks, data from fintech startups and other relevant sources.

The data sample included both large and medium-sized and small banks represented in the market of the Republic of Kazakhstan. This approach made it possible to cover a variety of models and strategies for using digital technologies in banking. To form the sample, factors such as the size of banks' assets, their market share, geographical distribution and other characteristics that may affect

the effectiveness of digital technology implementation were considered.

Panel data analysis was carried out using various methods. In particular, statistical analysis was applied to identify the links and dependencies between the use of digital technologies and banking performance indicators. Financial analysis methods were also used to assess the impact of digital technologies on financial stability, profitability and other key indicators of banks.

An extensive sample of data covering several years was used to obtain reliable results for the study. The data were collected considering the period, including the strategic and post-pandemic periods from 2021 to 2022.

Results and discussion

Financial innovations in the banking sector include the following technological components:

- cloud technologies and big data (Bigdata). Cloud technologies provide access to data without installing special applications on the device, which allows banks to offer their products anywhere in the world by centralizing the service on the network. Big data, in turn, provides customers with personalized, targeted offers based on the analysis of heterogeneous and rapidly incoming digital information, the sources of which are the Internet, corporate document archives, readings from sensors, devices, etc.;

- API (Application Programming Interface, i.e. application programming interface, application programming interface), integrated into customer interaction systems. An API is a set of predefined classes, procedures, functions, structures, and constants provided by an application, service, or operating system for use in external software products.

- social media and mobile communication with particular applications. The integration of the banking business with social networks makes it possible to obtain information about customer preferences in order to use it when offering new financial products, establish trusting relationships with each bank customer, and accelerate the implementation of blockchain technologies in customer relationships. Examples of successful implementation of such relationships in retail are Amazon, in banking - Deutsche Bank.

The COVID-19 epidemic contributed to the acceleration of the digitalization of the banking system, gave an additional incentive to increase the level of use of innovative financial technologies by customers, which significantly simplifies customer access to information about various banking services and products; facilitate the transition from one bank to another, in general, develop interbank competition.

In recent years, the demand for digitalization of the activities of banks in Kazakhstan has increased, related to the provision of remote services and the creation of compelling digital infrastructure.

During the coronavirus pandemic, banks had to switch to remote interaction channels with customers. Currently, banks that have captured the maximum allowable space for communication with customers and providing quality service have gained a competitive advantage.

Amidst ongoing uncertainty around the world, Kaspi.kz, Super App business model keeps delivering fast and profitable growth (Figure 1).

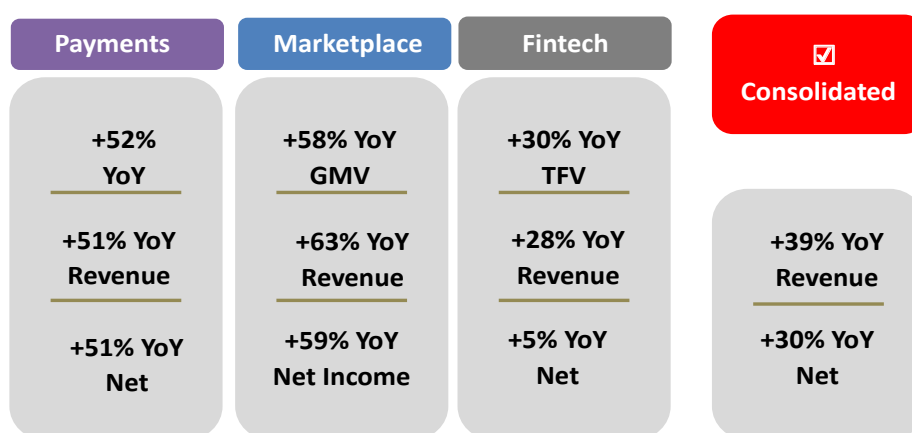


Figure 1 - Kaspi.Katz's Super App model keeps delivering growth

Source: compiled by authors

The underlying growth drivers of business remain strong. Merchant onboarding to Kaspi Pay, m-Commerce and e-Commerce increased 126% year-over-year to reach 413K active merchants. Average monthly transactions per active consumer reached 58 per month, with revenue-generating payment transactions (RTPV) and Marketplace purchases up 53% and 76% year-over-year, respectively, during the third quarter. With the relevance of our Super App to consumers and merchants continuing to increase, we are well-positioned to deliver fast growth into 2023. Having reached 57% of net income in the first nine months, we expect our Payments and Marketplace Platforms to continue contributing to a growing share of future profits.

KZT 600/GDR dividend recommended, subject to shareholder approval Two GDR buyback programs completed YTD, worth \$51M and \$45M, respectively. New GDR buyback program of up to USD 100M.

In the first half of 2022, we deliberately took a more cautious approach to Total Finance Value (TFV) origination. However, in the third quarter, we once again pushed down on the accelerator, growing origination by 30% year-over-year. Accelerating TFV momentum and improving risk in the final quarter of this year puts our Fintech Platform in great shape to deliver faster net income growth next year.

At a time when many leading internet technology companies worldwide are lowering their earnings expectations, we are pleased to increase our guidance once again. Stark proves just how powerful our Super App strategy is and that the Kaspi.kz team knows how to deliver.

Payments and Marketplace 57% of net income in 9M22 Payments Marketplace Fintech High growth, high margin Payments and Marketplace driving profits (Figure 2).

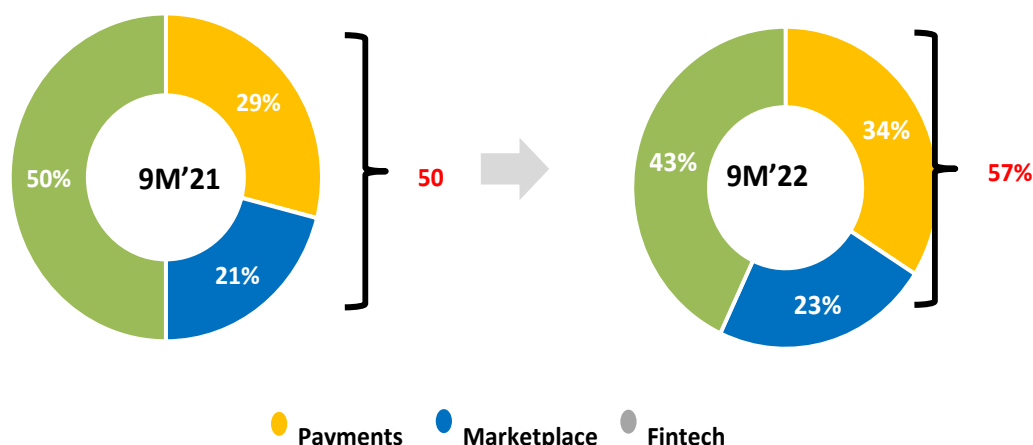


Figure 2 - High margin Payments and Marketplace

Source: compiled by authors

In our Payments Platform, we expect higher RTPV growth of above 50% year-over-year in 2022. In Marketplace, the success of Juma leads us to expect a higher, above 8% take rate and in our Fintech Platform, superior loan quality leads us to upgrade our cost of risk assumption to below 2%. Taking this all together that we're upgrading our 2022 Kaspi.kz consolidated adj. net income growth guidance to above 30% year-over-year. As we inevitably start to think about what 2023 holds, Kaspi.kz strategy remains unchanged. We were innovative in developing products and services

that improve the everyday lives of our large and engaged user base. Kaspi Pay and Kaspi Travel are good recent examples of how this creates real value for all our stakeholders.

In 2023 we will add package holidays, an approximately \$1 billion market opportunity, with highly attractive economics. Over the same period, Kaspi Pay has become the payment platform of choice for consumers and merchants in Kazakhstan. B2B Payments are a natural evolution and another massive opportunity for us. B2B is already up to 3% of RTPV in a short period, which given

the absolute scale of our payments volume is a significant achievement. e-Grocery continues to scale at a phenomenal rate and can be transformative to our relationship with consumers over the next couple of years. All in all, we're on track for a good 2022 and are as upbeat about our mid-term growth

outlook. As is now the custom, we will provide detailed 2023 KPIs and financial guidance at our full-year 2022 results, early next year. Subject to shareholder approval.

Kaspi QR and Card transactions accounted for 76% of RTPV (Figure 3).

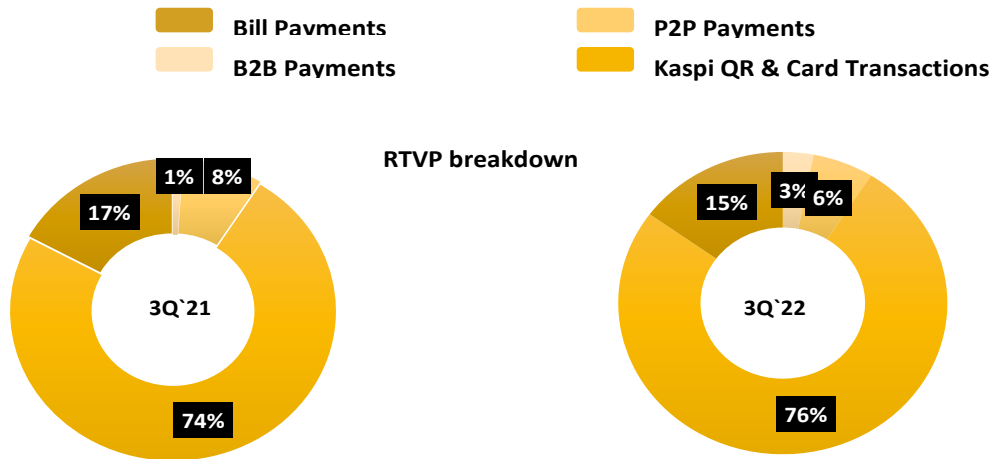


Figure 3 - Kaspi QR and Card transactions

Source: compiled by authors

A large merchant base creates more monetization opportunities. Kaspi QR now, next B2B. This follows a dividend payment of KZT500/GDR based on our second-quarter financials. While we will always prioritize investments in growth, in the event of excess capital we will return this to our shareholders.

keep taking steps to narrow the valuation discount upon which our GDR's trade. In April 2022 we started to buy back our GDRs and although stock liquidity has been a constraint, we have completed two buyback programs (Figure 4), worth \$51 million and \$45 million respectively.

Nothing has changed in terms of our long-term approach to capital allocation. We will also

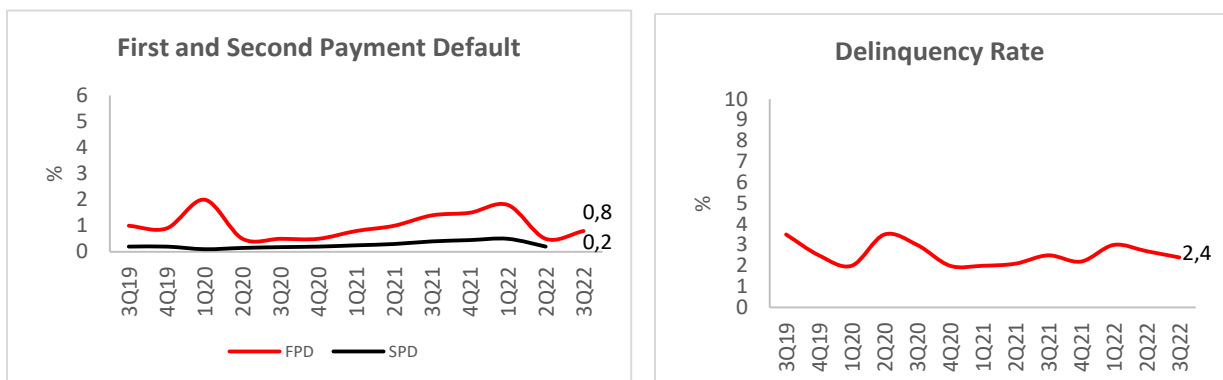


Figure 4 - Buyback programs

Source: compiled by authors

Board has once again allocated up to \$100 million for a new 4-month buyback program. Given our valuation and growth outlook, we believe buybacks have the potential to be substantial earnings and dividend accretive over the medium term. As we have said multiple times before, we remain committed to taking steps to ensure Kaspi.kz is listed on the most appropriate exchange. Admittedly the timing of this event is difficult to predict but hopefully, market conditions will be right in 2023. Kaspi.kz is at the forefront of the new digital revolution, redefined by Super Apps. The combination of our scale with consumers and merchants, reinforced by our Super App strategy, puts us in a completely unique position to capture the multi-year structural growth opportunity offered by digitalization in Kazakhstan and over time across the broader region.

Conclusion

Thus, the processes of digitalization of the economy most actively affect both all financial and credit institutions in general and the activities of banks in particular, which determines the tasks of a qualitative rethinking of the consequences of introducing banking innovations, manifested in the creation of modern banking technologies and innovative banking infrastructure. The noted data mediate the need to form a theoretical and methodological basis for studying the development of banking innovations in the digital economy.

Data and technology-driven risk management. We now expect Cost of Risk to be below 2.0% in 2022. Previous guidance was around 2%. The economic content of the heuristic model lies in the possibility of assessing the empirical verification of the consequences of introducing elements of a cross-channel banking infrastructure into the activities of a credit institution. The foregoing makes it possible to argue that the introduction and development of a cross-channel banking infrastructure actualizes and accelerates the transition of the banking sector to advanced technologies to ensure regular control and make timely and effective management decisions.

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