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## DIGITALIZATION OF FINANCIAL SERVICES AND CHALLENGES OF ADAPTATION OF CONTROL

**Abstract.** Recently, we heard much more about digitalization and related processes around the world. In other words, digitalization is already an important part of modern trends. The main aspects of digitalization, digital transformation and its impact on the financial services of the banks have been discussed and analyzed in this article. Along with the effect of digitalization on everyone's life, the influence on financial services of the banks and on their businesses are also important. It is noted that banks need to make changes in their approaches to financial services, business models and strategies in accordance with the new requirements. The paper also focuses on the start of a new digital age in financial markets and the need for the regulator to adopt a new approach over the course of its existence. Formation of the reality of regulators working with wider companies and areas, the need to analyze the larger databases, the importance of extensive use of digital opportunities for more effective run of their functions have been examined. It is stated that the supervisors should be interested in technological development, take the leadership in its application, have to consider possible development trends, new regulations with financial institutions, as well as large bigtech companies. In this regard, the measures taken by the European regulatory authorities, innovations have been analyzed, as well. Emphasizing the importance of defining a common framework approach by the ECB, aspects of the policy set by national regulators within that framework are examined. The obvious positive advantages of new technological solutions application are also discussed. Thus, possibility of modern technological development to create a fertile ground for concealing a number of criminal acts, such as money laundering, terrorism, fraud and tax evasion is noted.

**Keywords:** digitalization, digital transformation, financial supervision, digital finance, financial stability, financial services, risk management.

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## ДІДЖИТАЛІЗАЦІЯ ФІНАНСОВИХ ПОСЛУГ І ВИКЛИКИ АДАПТАЦІЙНОГО КОНТРОЛЮ

**Анотація.** Останнім часом ми все більше чуємо про цифровізацію і пов'язані з нею процеси у всьому світі. Іншими словами, діджиталізація стала важливою частиною сучасних тенденцій. Висвітлено і проаналізовано основні аспекти цифровізації, цифрової трансформації та їхній вплив на фінансові послуги банків. З'ясовано, що банки змінюють свої підходи до фінансових послуг, бізнес-моделей і стратегій відповідно до нових вимог. Крім того, йдеться про початок нової цифрової ери на фінансових ринках і необхідність регулятора застосувати нові підходи протягом свого існування. Було розглянуто формування реальності регуляторів, що працюють із більш широкими компаніями та сферами; важливість широкого використання цифрових можливостей з метою якомога ефективнішого функціонування. Зроблено висновок, що наглядові органи повинні бути зацікавлені в технологічному розвитку; брати на себе ініціативу в його застосуванні; урахувати можливі тенденції розвитку, нові правила щодо фінансових установ, а також великих технологічних компаній. Досліджено заходи і нововведення, ужиті європейськими регуляторними органами. Основну увагу приділено досвіду Азербайджану, зокрема крокам, здійсненим державою при переході до цифровізації; новелам, що започатковані органом фінансового нагляду; рекомендаціям і необхідним змінам, запровадження яких стало нагальним для успішного розвитку сучасної держави; загальним напрямом політики Європейського центрального банку, визначеної національними регуляторними органами. Обговорено безсумнівні позитивні переваги застосування нових технологічних рішень, проте застережено, що в умовах сучасного технологічного розвитку можуть виникнути сприятливі умови щодо приховування низки злочинних дій: відмивання грошей, тероризм, шахрайство та ухилення від сплати податків.

**Ключові слова:** цифровізація, цифрова трансформація, фінансовий нагляд, цифрові фінанси, фінансова стабільність, фінансові послуги, управління ризиками.

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**Introduction.** In recent years, we often come across the definition of digitization, digital transformation around the world. Also, there are different approaches regarding the definitions of the «digital finance» among the scholars. A similar aspect of the approaches is that the concept of financial services is viewed via the internet, mobile phones, including payment cards [Manyka et. all, 2016, p. 4; Peterson, 2018, p. 329]. It has started to be applied to every area of our activity, from our personal lives to our business activities. The same situation can be observed in the financial sector, as well [Zeranski & Sancak, 2020, p. 312; Artemenko & Bychkova, 2020, p. 82]. Recent years customers started to prefer more personalized banking products or services. They expect from their banks to communicate with them through online channels rather than visits the bank offices. Banks need to change their business approaches to meet the growing and changing needs of their customers, and do it with a help of new technological solutions [Artemenko & Bychkova, 2020, p. 82].

**Recent research analysis and problem stating.** Not only in Azerbaijan, almost all over the world, since March of last year, digitalization has begun to accelerate incredibly. This process has

affected all aspects of our lives. Naturally, the financial services sector has also played an important role in the rapid expansion of digitalization. The main factor accelerating digitalization was the COVID-19 pandemic [Elderson, 2020]. At a time when the pandemic was spreading, banks were worried that they would not be able to deliver financial services effectively. However, subsequent processes have shown that this is not difficult at all [Moşteanu et. all, 2020].

Regulators must take into account the possible impact of the application of new technological solutions on banks' business models, the increased participation of large technology companies in financial services, new cyber and financial risks, the extensive algorithms used by banks, and proper assessment. At the same time, the supervisory authorities should have sufficient staff and legal regulation to investigate all the above-mentioned aspects, and social impact of the digitalization in terms of the financial service consumers. In general, regulators should try to identify new threats to financial stability and consumers rights [Elderson, 2020; Organization for Economic Co-operation and Development [OECD], 2020, p. 8; Hans Genberg, 2020, p. 9]. As a rule, in the activities and regulations the regulatory bodies are one step behind the innovations that exist in the market. This also poses certain challenges for regulators and market participants. Supervisors should be interested in technological development, take the leadership in its application, constantly discuss possible development trends, new regulations with financial institutions, as well as large bigtech companies [Elderson, 2020].

Along with public administration, important steps have been taken in Azerbaijan in the field of financial services. Regarding digitalization several legal acts, such as, Decree of the President of the Republic of Azerbaijan dated December 6, 2016 «On Approval of Strategic Roadmaps for the National Economy and Key Sectors of the Economy», Order of the President of the Republic of Azerbaijan dated September 26, 2018 «On Approval 2018-2020 State Program on Expansion of Digital Payments in the Republic of Azerbaijan», «Strategic Roadmap for the Development of Telecommunications and Information Technologies in the Republic of Azerbaijan» approved by the Decree of the President of the Republic of Azerbaijan dated December 6, 2016, Decision of the Plenum of the Constitutional Court of the Republic of Azerbaijan dated August 12 «On Interpretation of Article 407.2 of the Civil Code of the Republic of Azerbaijan» have been issued. According those new regulations several measures have been taken for the strengthening the infrastructure and digitalization of electronic payment services, payment systems, and opportunities for expanding the use of analog signatures. The Azerbaijan Supervisory Body have been and is still working to harmonize its regulation on the new technological transition in the banking sector. However, in the new digital transformation of financial markets, it is inevitable that a number of measures will be taken to fully adapt and make more effective supervision.

To this end, the financial supervisory authority should formulate a new specialized control strategy, taking into account the state's digitalization policy, the digitalization views of the controlled entities and possible future trends. This strategy should reflect the principles of artificial intelligence and other modern technological solutions, consumer protection, prevention of cyber threats, but the strategy should also support the creation of favorable conditions for digitalization.

**The results of the research. Digitalization in banking services.** It is important to clarify some concepts in order to better understand the issue. Digitization is more simple process than digitalization or digital transformation, but it can be assumed as the first stage of the whole digital transformation. Digitization is the activity of the converting of analogue version of documents or information to a digital form. As an example, when the hard copy of the documents through computer technology scanning and switching to an electronic form is the process of digitization [Zeranski & Sancak, 2020, p. 312]. Digitalization can be explained as «the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business». As can be seen from the approach, digital transformation is a broader concept than digitization that is changing processes, the approach to business through new technological solutions. Digital transformation covers more aspects than digitalization, it encompasses everything from IT modernization perspective, and any optimization

through digitalization, and as a result of these process creates modern digital business models [Gartner Glossary-Information Technology (GGIT), 2021].

There are a number of advantages of digital financial services. For example, it increases access to finance and financial services for the non-banking sector and as well individuals [Gomber et. all, 2017, p. 539; Peterson, 2018, p. 330]. The provision of banking services with digital capabilities will continue to have a positive impact in the long run [Scott et. all, 2017, p. 985]. Current technological opportunities allow banks to consider more clients, investors, entities more consciously and responsibly [Forbes, 2020]. There is a need to ensure that development takes into account the key drivers of supply and demand chain in terms of services. In this regard, the driving force of the demand side is the change in the selection criteria (time, cost, documentation) of the service [Financial Stability Board [FSB], 2017, p. 11]. A study of 148 countries around the world found that the main reasons why people with the right to have a bank account are «unbanked» were cost, distance and documentation requirements [Demirgüç-Kunt & Klapper, 2013, p. 279].

Digitalisation was always attracting factor for the business owners, especially recent years it became more and more important. Fast development in the information technologies brings a lot of additional opportunities to spread the financial services through offering new products and make more incomes, develop the cost-efficiency [Zheng, 2018]. The introduction of new business approaches by other market participants has also accelerated the development of the FinTech industry [OECD, 2020, p. 7]. Digitalization, FIntech is changing its approach to financial intermediation and is continuing this process [Hans Genberg, 2020, p. 6].

After the 2007—2009 financial crisis, which began in the United States and then spread around the world, it was a difficult period for banks. Banks' loan portfolios, interest rates have fallen sharply, public confidence in banks has decreased to a minimum, and regulatory and supervisory requirements have been tightened. The following period was a tough recovery period for the banks. However, companies that have implemented giant technology solutions such as Amazon and Google have increased their technological competition. Banks began the process of transition from physical offices to digital reality [OECD, 2020, p. 7].

Each of us, regardless of position, had to take our work to our homes (to work in a distance mode), and the workplace approach changed completely. Since last year we are experiencing harsh consequences of the pandemic. At the same time pandemic illustrated advantages of the digitalisation and IT technologies for the financial services inclusion. IT solutions make available to use different products and services, to keep up our works while sitting at home because of lockdown. Almost all of our physical meetings started to take place through various apps from a distance. Realizing that this is inevitable and that the situation will take a long time, employees, employers and other parties quickly adapt to the process. The COVID-19 lockdown stimulated online banking services, especially payments, as well. Although the use of online banking services has increased significantly, there have been no serious problems with the continued operation of the systems. This shows that the rapid transition to digitalization is possible in banks and there is a desire for it. It is another evident that during the pandemic lockdown banks were open [Elderson, 2020].

Many banking and other financial services are now accessible simply by using mobile phones [Elderson, 2020]. Especially, if to take into account the fact that about 1.1 billion people or about 2/3 of the people who do not have a bank account have a mobile phone. Such a development could or would provide easy access to banking services for the general population who are unbanked. The use of mobile phones and other technologies in the banking sector also raises the interest of population in the use of services at a lower cost by spending less time and without having to go to bank offices [Demirgüç-Kunt et. all, 2018, p. 11; OECD, 2020, p. 7]. Financial institutions perform credit scoring based on payment history and determine the customer's characteristics as a borrower. One of the new approaches developed for other applications is the «smart contract» approach. According to this innovation, the participation of people by a financial institution is not required to initiate, conclude and execute a number of transactions [Zheng, 2018].

One of the modern technological innovation is crypto-assets. Crypto-assets have been growing rapidly in popularity recently. Their total value is already 100 billion dollars. Such assets

bring with them new investment and earning opportunities [Zheng, 2018]. The term digital currency is used as a synonym with virtual money, as well as crypto currency expressions. This type of currency is also used as means of payment as ordinary money, but the main difference is that it exists in electronic form and is used more through electronic channels [based on the European Central Bank (hereinafter — ECB) virtual currency]. Virtual currency is a type of unregulated currency, controlled and regulated by those who issue it, as a rule, has a decentralized network [Gomber et. all, 2017, p. 544].

The approach of traditional banking and payment systems will also be affected by the new digital currency. The share of cash turnover decreases over time. Even so that there is no any government guarantee those digital currencies are used or will be with high popularity. In addition to payments and settlements, which are the most used areas of banking, where information exchange is used, the impact of new technological developments will be significant in the study of big data that can be used to analyze lending and deposit acceptance processes [OECD, 2020, p. 11].

The above-mentioned ideas and facts suggest that digitalization will deepen and expand over time. This process, as in all areas, will lead to serious and visible changes in the banking and other financial sectors. Therefore, banks need to redesign their business approaches and strategies and adapt them to the new environment.

**International approach on regulation and supervision in digital age.** To be short, there are two main points, the first is the developing technology, and the second is the changes in financial regulation. New appropriate demands by the supervisory side, and new players and changes in the approaches of the officials are related to the changing financial regulations [OECD, 2020, p. 11]. A number of researches show that the views and prospects of financial market regulators indicate that they will focus on technological solutions as a tool of control [Zeranski & Sancak, 2020, p. 313]. However, technological innovations alone are not enough to ensure the development and transparency of financial services, beside of ensuring well-established infrastructure, payment systems, appropriate regulation and protection of consumer rights should be in place [Demirgüç-Kunt et. all, 2018, p. 10; Global Policy Leadership Alliance (GPLA), 2011, p. 3]. As a result, new technological developments can be a convenient mean of concealing a number of criminal offenses, such as money laundering, terrorism, fraud, and tax evasion [Zheng, 2018].

The regulatory and supervisory approaches of financial market regulators lag behind the application of modern technological solutions in the market. Regulatory risk is a serious threat regarding the application of new technologies as it is difficult to formulate a regulation that can fully cover the rapidly evolving technological solutions that can be applied in many different forms. That is why even many FinTech companies use modern and sophisticated technological solutions to exploit regulatory gaps in their businesses [Peterson, 2018, p. 337].

Regulators must be flexible, inventive and cooperative in order to be effective in the new technological age. A new regulation should not prevent development, it should just mitigate possible risks. That is, any new regulation must save space for future and further development, because it is not realistic to see all possible directions of development in advance [Elderson, 2020]. But areas of activity that remain unregulated increase operational risks associated with outsourcing services and cybercrime. Maintaining a balance between high confidentiality and transparency is one another key topic of discussion in regard of regulation. Application of new technologies and involvement of third parties may negatively affect that balance. A study by Facebook-Cambridge Analytica also showed the importance of clear regulation of transparency and the right to privacy [Zheng, 2018].

Supervision of the financial system is accompanied by writing numerous documents, reports, off-site control, face-to-face dialogues and etc. By nature, they cannot be done independently by technology easily and that is why it needs a human involvement. But it should not exclude possible advantages of the digital or IT solutions of the supervision [Hakkainen, 2020]. For more clarity it is important to understand different supervisory technology generations. In this regard the Bank for International Settlements identifies four generations: First: depends on manual

work in terms of the analysis and identification of the big data. Second: semi-digitisation of some manual actions or paper work, that gave an opportunity for further analysis of big data. Third: more digitalisation and automation made available using of huge data architecture. It made available of the deliberate data base analysis and new approach in modelling. Four: further automation of supervision processes. At this stage automation gives an opportunity through the use of natural language processing that connects and integrates different sets of data, carry out some supervisory actions employing technology, applying artificial intelligence for getting an opinions for decision making [Elderson, 2020].

This technological development is not a process that will end, on the contrary, it will continue. Supervisors must take this as a positive development and try to harmonize regulation and control mechanisms and overall works. Pentti Hakkarainen, Member of the Supervisory Board of the ECB in his speech at the Supervision Innovators Conference said: «In my view, there are two key elements in the digital future for European banking supervision. First, I see our supervisory judgement being widely supported by artificial intelligence-driven analysis, which will improve the speed, quality and richness of supervisory data analytics. It will also reduce repetitive tasks and consequently free up time and resources for more value-adding activities that require our supervisors' brain power. Second, supervisory reporting will be able to benefit from direct digital gateways to supervised entities and centralised, cutting-edge data architecture. Real-time data pulled from banks' systems in the form supervisors need will significantly enhance our assessment of the supervised entities and of the risks across the European banking sector as a whole» [Hakkainen, 2020].

By applying new modern technology supervisory bodies facilitate enhance capacities, simplify the management of complex operational processes, develop new analytical tools, help to preserve the supervisory agencies and the entire financial system from technology-related risks, including crises. The harmonization of the control of regulatory authorities in the new technological development also is an important factor in the development of financial services, which is essential development factor for the economy [Zeranski & Sancak, 2020, p. 312; FSB, 2017, p. 7].

However there are certain aspects that should be taken into consideration. While supervisory use new technological opportunities there must be some commonly recognized standards and they have to comply with those standards. It should be noted that from international standard point of view the frame supervision techniques have been reflected in the document of the Basel Committee. So as a 9th principle states: «Supervisory techniques and tools: The supervisor uses an appropriate range of techniques and tools to implement the supervisory approach Core Principles for Effective Banking Supervision 11 and deploys supervisory resources on a proportionate basis, taking into account the risk profile and systemic importance of banks» [Bank for International Settlements (BIS), 2012, p. 5].

Another source of international principles for the supervisory authority regulation regarding the implementation of innovative technological approaches by them and supervised entities is G20 principles. In 2010, 9 principles related to the G20's innovative financial inclusion were developed. These principles include the leadership of the state, ensuring free competition, diversity of services, application of modern technological and institutional solutions, consumer protection and empowerment, increasing cooperation between government and stakeholders, developing knowledge and skills, maintaining balance and frameworks took into account [GPLA, 2011, p. 2—5]. The eighth of the G20's principles for innovative financial inclusion is balanced regulation. The supervisory authority must ensure that the requirements they want to apply to financial institutions and consumers are appropriate in terms of risks. According to the ninth principle, regulatory authorities must take into account the following when determining the legal framework: take into account international standards; conditions of use of intermediaries (agents) as a consumer interface; flexibility, compatibility and risk-based approach in terms of AML / CFT; protection of national conditions and competition; clarity of the regime of protection of assets stored in electronic form; availability of market-based initiatives for long-term broad functional compatibility and connectivity. As a fifth principle, authorization includes three points. These

include ensuring that consumers are fully aware of the issues to be addressed, that they have the skills to apply the innovations, and that dispute resolution mechanisms are in place [BIS, 2012, p. 5].

Based on that principles it would be more effective to design more specific approaches, regulations. In this regards, «Ethics Guidelines for Trustworthy Artificial Intelligence» (Guidelines) of the «Independent High-Level Expert Group on Artificial Intelligence» set up by the European Commission is a very appropriate example. According to the Guidelines there are three principles (lawful, ethical, robust) to account Artificial Intelligence trustworthy. Beside that, there are seven requirements included into the assessment list of Trustworthy Artificial Intelligence. They are: «human agency and oversight; technical robustness and safety; privacy and data governance; transparency; diversity, non-discrimination and fairness; societal and environmental well-being; accountability» [European Commission (EC), 2019, p. 3].

If AI applies in a proper way it will enhance an effectiveness of the supervision. While the regulator is reluctant to employ the AI or delays its implementation, this does not mean that the similar approach will be followed by banks. Banks, as commercial entities, will rapidly and sustainably expand their use of the AI and other technological advances to increase their revenues. Therefore, the same approach should be applied to supervision in order to properly organize, analyze and take the necessary measures for the products and services that banks have formed or planned using AI and other technological advances. New smart technological solutions can support to maintain our competencies up-to-date and secure that supervised entities apply new generation technologies carefully and safely. Otherwise, supervisors may lose their ability of effective comprehensive supervision [Hakkainen, 2020].

All supervisory authorities have to develop their own specific strategy and regulation on digitalization for better preparation for the next generation technology. As it was done by the ECB member countries' national authorities and some of them have already applied different smart technological solutions (for example, the Banca d'Italia uses AI to investigate the complaints of consumers, the Banque de France is working on automation of evaluation of the reporting process of the banks) [Hakkainen, 2020]. De Nederlandsche Bank has created a special structural unit to coordinate issues related to its digital strategy and speed up the process of implementation. The goal of the strategy is to achieve the effective application of modern technological approaches in supervision processes, and ultimately to form a «smart controller» [Elderson, 2020].

Digital transformation is not an easy process in itself. It has many specific requirements that cover various areas, such as the organization of activities, infrastructure, and even political issues. But it must be taken into account that unlike many other areas of investment, investments in digitalization, digital transformation quickly turn into long-term and huge returns [Zeranski & Sancak, 2020, p. 327]. In order to meet the requirements arising from changing business models because of digital transformation the financial markets supervisors have to address relevant issues in their priority areas. For example, the ECB Banking Supervision has declared the priorities of core areas in banking supervision for 2020. These priorities had been designed based on the certain aspects, such as economic situation, supervision and regulation. In its approach the ECB Banking Supervision also identified some main areas that generate risks and one of those is sustainability of business models of the banks. That is why the ECB Banking Supervision has been changed a bit in its approach considering the priority areas in 2020. Supervisory have to promote the strengthening of the future resilience of the banks to ensure the sustainability of business models [European Central Bank (ECB), 2019].

Other main risk factors coming with the digitalization are cybercrime and shortfall in operational IT. As a result of the new technologies banks core IT systems are interconnecting with a lot of participants and other stakeholders of the financial services. In addition, more banks prefer to outsource their IT services in terms of cost-effectiveness and professionalism. This type of strategy demands appropriate and efficient risk management. The interesting side of the issue is that banks are aware of their management deficiencies on risks arising from the mentioned aspects. Moreover, digitalisation increases availability of cyber attacks that may cause a high financial and reputational

losses for the financial institutions [Peterson, 2018, p. 335]. This attacks may damage even whole financial system, as well [ECB (2), 2019].

Meanwhile, regulators should consider: to concentrate control to more active companies; to strengthen corporate governance requirements (especially in the field of risk management); licensing requirements need to be adjusted to increase competition; legal regulation, in particular clarification of the rights and responsibilities of the parties to the proceedings [The Central Bank of the Republic of Azerbaijan, 2021].

**Conclusions from the conducted research.** The development of information technology has a significant impact on all areas of our lives. We started to feel this effect more clearly over time. The innovation brought by new technological solutions is especially felt in the field of financial services. The global COVID-19 pandemic, which began in the first quarter of March 2020, has accelerated digitalization. Digitalization as a non-stop process can provide many advantages under the proper management and regulation.

The widespread application of new technological solutions in the activities of banks also results to changes in their business models. All these changes, new opportunities also can threaten the stability and security of the financial system. To prevent such risks, the oversight agencies should make use of modern digital capabilities to more effectively implement its operational objectives, making the necessary adjustments to its operational strategy.

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