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BANKING DIGITALIZATION DURING THE COVID-19 PANDEMIC*

This article studies the impact of the COVID-19 pandemic on the processes of innovative development and digital transformation of the banking sector. The authors analyze the COVID-19 pandemic as a factor in accelerating the introduction of innovative digital banking technologies. The key changes that took place in the banking sector under the influence of the coronavirus pandemic were considered, which allowed to identify main vectors of digitalization of banking processes in Ukraine and to develop criteria for classifying banks according to their digital development.

Keywords: digitalization, digital economy, distance services, digital sales channels.

Background. The financial market has changed dramatically in recent decades. It has transformed from a model of traditional corporate business of banks to entire ecosystems of banking and non-banking markets during this time. New challenges also dictate transformations that stimulate the active growth of digital transactions and form the demand for digital products and services in the financial sector. Domestic digital banking could still develop as a classic banking for a long time, but the COVID-19 pandemic changed all plans and became an impulse for the accelerated digital transformation of the banking business. The research "COVID-19. Sustainable" by the consulting group One Philosophy shows that the pandemic has become a catalyst for launching new products or services in 71 %

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of organizations, and 55 % have attracted new partners to create joint initiatives [1]. Therefore, the issue of digitalization in the domestic banking sector is quite relevant today and needs further investigation.

Analysis of recent research and publications. The study of the impact of the COVID-19 pandemic on the development of banking sector and the level of its digitalization is interesting for both domestic and foreign scientists and practitioners. J. Dovhan identified the main problematic aspects of the banking sector in the context of the COVID-19 pandemic and proposed measures to avoid the consequences of the crisis for banking institutions [2]; A. Zaverbny, N. Sokulsky studied the current state of the banking system digitalization and society experience of using banking services during the pandemic, and also considered the prospects for the future of the banking business [3]; L. Marichak, I. Masyk considered the accelerated development of electronic and mobile banking in the face of restrictions and the emergence of new opportunities for banks and their customers in connection with the transition to remote service in many areas of society in their work [4]; Lai Cao Mai Phuong studied the response of the banking sector to lockdown / blocking reports to prevent the COVID-19 epidemic in Vietnam [5]; V. Varzaba, T. Boru, N. Mosteanu, A. Faccia, L. Cavaliere, S. Bhatia, Z. Korzeb, P. Niedziolka and others also considered this issue.

It should be noted that scientists study the impact of the COVID-19 pandemic in the context of negative consequences for the financial condition of banks and their clients, deteriorating indicators of financial stability and the need to rethink the policy of state banking regulation and supervision. The research of the impact of the pandemic on digital processes in the banking sector deals with some papers of domestic authors who state only some facts of introduction of certain technologies. At the same time foreign scientists and large professional audit and consulting companies focus on European and American experience on digital transformation and its global aspect. It is necessary to study systematically the impact of the COVID-19 pandemic on the digital transformation of the banking sector of Ukraine and the development of criteria for classifying banks according to their level of digital development, taking into account national characteristics, experience and practice.

The **aim** of the article is to study the impact of the COVID-19 pandemic on the digitalization processes of domestic banks.

The tasks of the article are:

- to study the impact of the COVID-19 pandemic as a catalyst for the implementation of the digital banking technologies;
- to identify key vectors of the digitalization processes in Ukrainian banks;
- to develop a system of classification features for grouping banks according to the level of their digital development.

Materials and methods. Scientific methods of theoretical generalization, analysis and synthesis, grouping, system approach were used in the paper. The information and analytical base of the research included materials

of the National Bank of Ukraine, reports of the USAID project "Financial Sector Transformation", scientific articles, etc.

Results. It should be noted that the use of advanced innovative technologies in all spheres of human activity, including finance, is a modern trend in the world. Such technologies in the financial sphere have a positive effect on the development of the country's economy and on the general welfare of society. Many countries of the world are gradually and dynamically implementing the tools of the "digital economy", which is based on the introduction of the latest computer technology, because of its obvious competitive advantages of long-term innovation and economic development.

Digital transformation or digitalization is a process that an organization goes through when it changes from an outdated approach to new ways of working and thinking by using digital, social, mobile, and new technologies [6]. Moreover, digital transformation takes a customer-driven, digital-first approach to all aspects of a business, from its business models to customer experiences to processes and operations. It uses AI, automation, hybrid cloud and other digital technologies to use data and drive intelligent workflows, faster and smarter decision-making and real-time response to market disruptions [7]. Digital transformation is considered a driving factor that offers a solution to the challenges that banks currently face. According to the KPMG study "Digitalization in banking beyond COVID-19", digitalization is about the use of technology and innovative tools to improve the efficiency and efficacy of a given process; whether by building in-house capabilities or partnering with third-parties to do so [8].

The authors of the study emphasized that digitalization is used as a broad term, which covers various dimensions and value chain activities of a bank, and other businesses, but there are digital specific tools for banks which enable to solve concrete problems.

Digitalization can have a meaningful impact on banking sector, tools and strategic themes which include:

- simplifying journeys and using digital partners to drive customer centricity;
- strengthening cyber security to manage increased digital traffic and control IT risks;
- rationalizing the application landscape to drive cost reductions and control IT risks;
- using cloud technology to increase flexibility while lowering costs;
- strategic IT outsourcing to increase operational resilience and flexibility;
- using blockchain to facilitate ESG-reporting and practices [8].

The development of the banking system is a key part of the financial system of any country in modern conditions; it is characterized by digitalization of all banking processes. The results of the banks in 2020 showed that the COVID-19 pandemic became a significant factor in intensifying the digital transformation of the banking business as a whole. During the pandemic period and quarantine restrictions, all participants in the banking business were able to appreciate the benefits of the updated customer service

format. The necessity to reduce physical contacts between people, transport restrictions encouraged banks to restructure the work of offices and branches very quickly, to organize remote work of staff, to develop mobile applications and other remote service channels.

In general, the consequences of the pandemic and the effect of quarantine restrictions and anti-epidemiological measures in Ukraine were manifested in the strengthening of the certain trends.

Firstly, such sales channels as Internet banking, SMS-banking, mobile applications, chatbots, mobile bankers, self-service areas 24/7, fully automated offices were used for all clients groups as a transition to remote and online service format.

The largest leaders in digital banking by number of users are Privat24 from JSC "Privat Bank" (over 12 million), Oshchad 24/7 from JSC "Oshchad-bank" (4 million), Monobank from Universal Bank (3 million) in the domestic market. It should be noted that online banking Privat24 is considered as the best digital banking in Ukraine more than 5 years, which is recognized not only in Ukraine, but also abroad.

Research Institute Capgemini carried out the survey, 11 200 consumers from 11 countries participated in it. The Institute made the report "COVID-19 and the financial services consumer" and 45 % of respondents said that they used mobile banking, which was the most convenient for them since the start of the pandemic [9].

Secondly, reorganization of the bank's branches network, staff reduction is the part of optimization.

Ukrainian banks have reduced the number of existing structural units in recent years to optimize their own network and focus on remote service (Figure 1). In general, the number of banking branches is decreasing for the ninth year in a row. State and foreign banks closed their branches more actively than others.

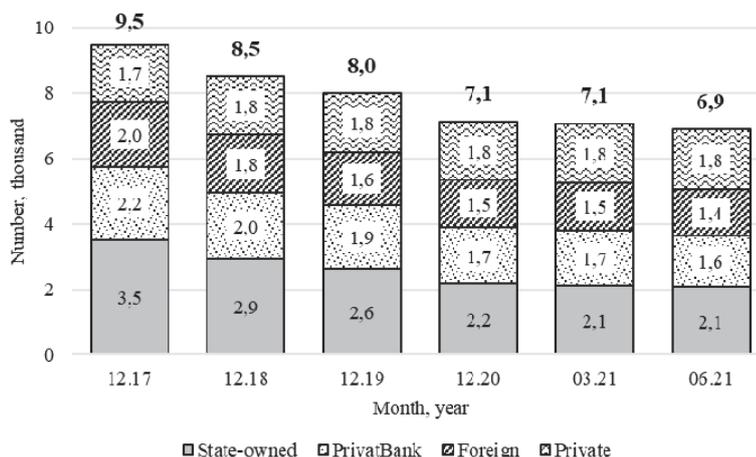


Figure 1. Separate structural branches and head offices of Ukrainian banks
 Source: [10].

According to the survey research by the Capgemini Research Institute, one-fifth of consumers before the pandemic frequently visited the branch and the same number said that they would continue to visit them. However, most consumers have announced the transition to remote banking via the Internet, mobile banking, messengers and chat bots.

The staff reduction was also the result of increased digitalization and the closure of bank branches. The trend of changing the number of staff is shown in *Figure 2*. For the 6 months of 2021, a total of 1.1 thousand employees were laid off, the largest staff reductions were made by state and foreign banks. At the same time, private banks hired almost 1.7 thousand people [10].

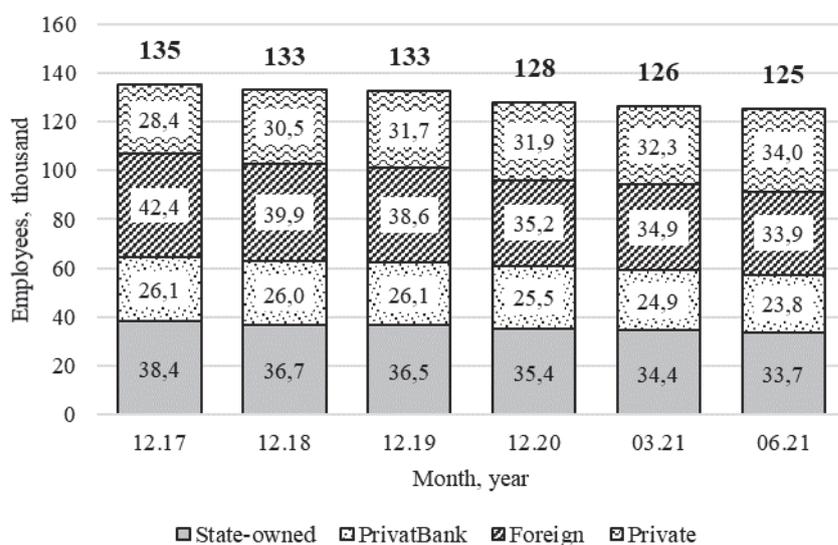


Figure 2. The level of staff in banks, thousand employees

Source: [10].

Thirdly, transformation of the payment infrastructure through increasing the number of banks payment terminals reduces the number of ATMs.

The constant expansion of the payment infrastructure for non-cash payments continues in 2021. The number of sale points that accept payment cards has increased by 2 % since the beginning of 2021 up to 333.5 thousand. The network of trade pos-terminals in Ukraine has also grown by 2 %. Almost 87 % of trade payment terminals provide the possibility of contactless payment. The number of payment terminals (contact and contactless) per 1 million permanent population of Ukraine was 9.6 thousand on April 1, 2021 (8.3 thousands on April 1, 2020).

It should be noted that with the growth of the payment terminals network (Figure 3), the number of ATMs of banks is reduced (Figure 4), which was caused by the global cashless trend, so it provides decreasing cash payments and total amount of cash in circulation.

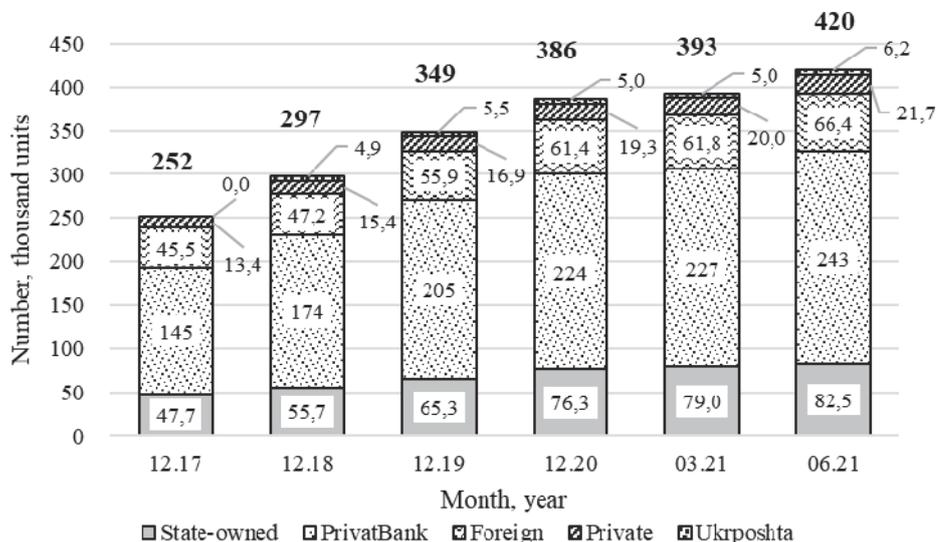


Figure 3. Number of POS terminals, thousand units

Source: [10].

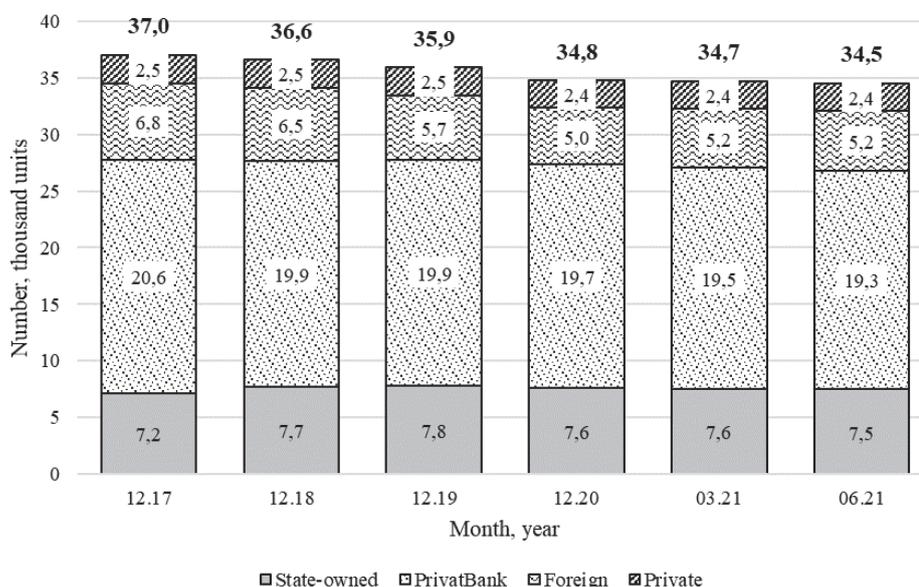


Figure 4. Number of self-service bank machines (ATMs, deposit ATMs, self-service points)

Source: [10].

The growth of non-cash transactions and contactless payments is the fourth trend.

The consumers' habits of financial services have changed quite dramatically during the pandemic. Consumers are increasingly using contactless payment methods using smartphones and Apple Pay and Google Pay technologies (during the pandemic, the number of such transactions has increased almost in 2 times). The popularity of contactless and tokenized cards is due to the high level of security, speed and convenience of operations with their using. According to the NBU, the number of contactless cards used by consumers to carry out transactions has increased by almost 10 % to 14.1 million cards since the beginning of 2021. The volume of contactless transactions (transactions with a contactless card or with the help of smartphones and other gadgets) in the first quarter of 2021 amounted to 119.0 billion UAH. By the way, Ukraine is in the TOP-10 countries in Europe for payment using devices worn on the body or clothing (so-called wearables), such as watches, rings and more [11].

The smart phonization of population is growing every year and smartphones are becoming one of the main gadgets for Internet access (accounting for 53.3 % of all web requests) and online banking, respectively [12]. That is why banks mobile applications have become the most popular tool to access to online banking. The research carried out by Fidelity National Information Services (FIS) shows that at the beginning of the pandemic mobile banking traffic increased by 85 % in April 2020, a new digital registration increased by 200 % [13].

The total number of transactions (non-cash and cash) with payment cards issued by Ukrainian banks during January-March 2021 amounted to 1691 million units, and their value was UAH 1089.1 billion. The number of these transactions increased by 22.1 % in comparison with the same period last year, and the amount increased by 18.3 %. Also non-cash transactions prevailed among payment card transactions by number and value in the first quarter of 2021. Thus, in the first quarter of the current year 9 out of 10 transactions were non-cash (almost 90 % of the total number of payment card transactions) [14].

The share of non-cash transactions (*Figure 5*) amounted to 61 % of all card transactions. In the first quarter of 2020 these indicators were 85.4 % and 54.6 %, respectively. In general, during January-March 2021, in comparison with the same period last year, the number of non-cash transactions with payment cards increased by more than a quarter (28 %) and amounted to 1 512.8 million units, and the value comprised a third (32 %) and reached UAH 664.3 billion. In general, more than a third of the number of non-cash transactions with a payment card in the first quarter of 2021 were carried out on the Internet (36.7 %). This amounted to almost UAH 202.3 billion during January-March 2021. The volume of contactless transactions (transactions with a contactless card or with smartphones and other gadgets) amounted to UAH 119.0 billion in the first quarter of 2021[14].

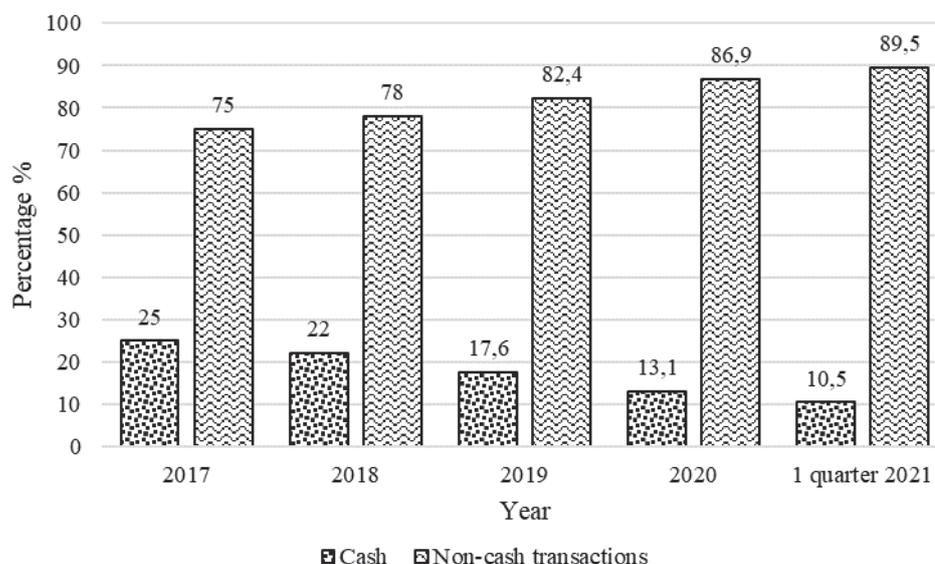


Figure 5. The growth of the share of non-cash transactions in number, percentage %

Source: [14].

Development of digital services and products is the fifth trend. Such new banking products as alternative types of payments (contactless and mobile payments, B2B payments, QR-payments, payments through mini-payment terminals, fast transfers by drag'n'drop, electronic and digital wallets), digitized credit and deposit cards, online collection, online services for brokers, algorithmic stock trading, etc. are very popular in Ukraine at present.

In general, the improvement of the range of banking products and services under the influence of digitalization proceeds in two directions. The first is a change in the form of providing existing products and services, including the addition of advanced electronic capabilities, greater availability and convenience of online account management. The second direction involves the development of new products and services, such as virtual cards or cash registers in smartphones and other automated payments through the interaction of the customer's and bank's ERP systems, which became possible by digital technologies and alternative business models. The second direction also includes the emergence of additional support services for providing round-the-clock communication and timely service support by the bank to its customers in real time. To do this, banks are introducing chatbots, SMS-assistants and other online consulting tools.

An important role in the development of digital services and products of banks is played by the desire and opportunities gained through new technologies to respond more quickly to requirements of clients and accurately meet their needs. As a result, banks with a high level of digital deve-

lopment offer personalized cashback services with a choice of purchase categories, as well as use intelligent analytics to create individual offers for their customers. A high level of personalization is also achieved through the ability of customers to adapt the interface and customize personal accounts to their needs. This allows customers to spend a minimum of time managing their finances.

A special place in the range of new digital services belongs to the electronic authorization and authentication of citizens using their data in the bank where they are served. In particular, there are the BankID system of the National Bank of Ukraine and SmartID: Qualified electronic signature from Privatbank in Ukraine. Bank ID is a state system of remote identification ensuring transfer of the consumers' personal data from the bank where the account is opened to the entity that provides administrative and other services to consumer. As of August 30, 2021, 37 Ukrainian banks were participants in the BankID System of the National Bank. Today the most popular are BankID from Oschadbank and Privatbank [15]. SmartID from Privatbank is a qualified electronic signature, which is analogous to a handwritten signature that can be used to sign documents and reports, verify identity and receive services online using a smartphone. SmartID is stored in a secure cloud storage and does not require the use of additional devices and applications to store e-signatures [16].

An important step towards a new level of digital service is the integration of banks with cryptocurrency services. Thus, in January 2020, the largest cryptocurrency exchange Binance with the assistance of the Ministry of Digital Transformation of Ukraine for the first time opened an account in a Ukrainian bank – IBOX BANK. This makes transactions with cryptocurrencies and other virtual assets even more available to Ukrainians.

Improving the mechanism of banking security and data protection is the sixth trend.

Due to the fact that bank customers provide their personal and financial data using electronic banking services, it is extremely important to ensure the confidentiality and protection of such data. At the same time, customers prefer the identification and verification processes to be as simple and fast as possible. Therefore, domestic banks are actively implementing biometric security technologies such as fingerprint scanner systems, face scanning, etc. in order to quickly and efficiently identify customers, verify their data and ensure the security of banking information. Video chat identification is also becoming popular in Ukraine. In particular, Alfa-Bank was the first in Ukraine to launch full-fledged video identification for remote opening an account in 10 minutes [17].

Much attention in ensuring security and data protection is paid to the possibility of using blockchain technology. The blockchain is used to build databases with joint decentralized ownership for the bank and its customers

based on the formation of data registers in banking business. Blockchain provides complete data confidentiality, increases the level of cybersecurity of banks' information space. In addition, this technology provides a complete data register and the formation of the history of transactions, at the same time any banking transaction on the blockchain is possible only if a compromise between all participants in the chain is reached. Today, blockchain is used in tokenization of payments, smart contracts in banks; in addition, the National Bank of Ukraine is considering the issuance of electronic currency e-hryvnia based on blockchain technology.

Cooperation with fintech companies is the seventh trend.

The global banking system is progressively engaging outsourcing to reduce costs and increase the experience of software infrastructure upgrades as a basis for digital transformation. In Ukraine, this trend appears, but there are already results that indicate effective cooperation between banks and fintech companies. According to the results of the Survey of Ukrainian Banks and Fintech Companies 2019 "USAID Financial Sector Transformation Project" Ukrainian banks mostly perform this work independently yet. However, almost every second fintech company that participated in the survey has experience in providing at least one service or product of the bank. The most popular services provided by fintech companies to banks are electronic invoicing (22 % of respondents), other types of payments except for card and cross-border payments (17 %) and cross-border payments (14.6 %). Another 12.2 % of surveyed fintech companies issue electronic money together with banks [18].

This trend is confirmed in the Fintech Catalog 2019, a study of the Ukrainian financial technology market and analysis of trends in its development, prepared by the Ukrainian Association of Fintech and Innovation Companies with the support of the National Bank of Ukraine and Visa [19]. Of the eleven banks that participated in the survey (Privatbank, Oschadbank, Ukrgasbank, Raiffeisen Bank Ukraine, Alfa-Bank, Ukrsibbank, FUIB, Credit Agricole, OTP Bank Ukraine, TasComBank, Megabank), eight have already had experience in implementing joint projects with fintech companies and the other two plan to launch such cooperation in the near future. PrivatBank has its own powerful IT potential.

Banks are also developing incubation programs to support fintech startups in the context of developing cooperation with Fintech companies. Thus, OTP Bank and the NBU launched the Open Banking Lab mentoring program, which focuses on solving the national fintech challenge of Ukrainian clients and businesses through the paradigm of banking problems, using the bank's corporate infrastructure, API and open corporate data [20]. Among the areas of projects that can receive funding and mentoring are banking solutions for SMEs (digital lending, cash management, invoicing, factoring), Big Data analytics (credit rating, forecast and behavioral analytics, data security and privacy), RegTech (customer verification services (KYC),

antimoney laundering, optical character recognition), payments and transactions (peer to peer payments, transaction processing, biometrics), investment technologies and trading operations (crowdfunding, artificial intelligence).

The change in the format of customer service has led to a powerful impulse for banks to improve and transform existing digital channels for providing services, or even create them. Thus, there is an objective need to classify banks operating in the domestic market in accordance with the level of their digitalization. We offer to carry out grouping of banks according to criteria corresponding to the trends that have been identified (*Table*).

Table

Categories of banks according to the level of their digitalization

Criteria	Bank			
	Digital (neobanks)	Technologically advanced	With an average level of digitalization	With a low level of digitalization
Availability of online sales channels				
Internet banking	yes	yes	yes	yes
SMS banking	yes	yes	yes	no
Mobile applications	yes	yes	yes	no
Chat bots	yes	yes	yes	no
Self-service areas 24/7	no	yes	no	no
Fully automated branches	no	yes	no	no
Optimized network of branches and outlets				
Availability of offline branches	no	yes	yes	yes
Permanent reduction in the number of front office employees	no	yes	no	no
Payment infrastructure for non-cash payments				
Service through ATMs	there is no own network, partner banks are involved	shorten	shorten	unchanged
Service through payment terminals	there is no own network, partner banks are involved	expanded	expanded	unchanged
Possibilities of contactless payment methods				
Issuance of virtual contactless and tokenized cards	yes	yes	yes	no
Partnership with Apple Pay and / or Google Pay	yes	yes	yes	no
Development of digital services and products				
Introduction of 2-3 new digital products and services annually	yes	yes	yes	no
High level of personalization of products and services	yes	yes	no	no
Electronic authorization and authentication services	yes	yes	no	no
Sharing of digital documents	yes	yes	no	no
Improved mechanism of banking security and data protection				
Remote customer identification and verification	yes	yes	no	no
Biometric security technologies	yes	yes	no	no
Cooperation with fintech companies				
Implementation of own fintech startups	no	yes	no	no
Implementation of joint projects with fintech companies	yes	yes	no	no

Source: developed by the authors.

According to the formulated criteria, group of digital or neobanks in Ukraine consists of Monobank, Sportbank, Izibank, O. Bank, Todobank, NEOBANK, and "Own Account". However, we should remember that these banks are based on and use the licenses of traditional banks. The group of technologically advanced banks should include Privatbank, Raiffeisen Bank Ukraine, Alfa-Bank, Ukrsotsbank, Ukrsibbank, FUIB (PUMB), Credit Agricole, OTP Bank Ukraine, TasComBank, Megabank, Oxy Bank, Idea Bank, Concord Bank. ProCreditBank, Kredobank, Forwardbank, Agroprosperis Bank, Credit Dnipro Bank, Bank Pivdenny, IBOX Bank, Ukreximbank belong to the banks with an average level of digitalization include. All other banks are still banks with a low level of digitalization, but some of its achievements have already been actively implemented, or under the influence of the requirements generated by the COVID-19 pandemic will be implemented in the near future.

Conclusion. The impact of new technologies on the modern financial market today is very difficult to overestimate. The fintech industry is rapidly and steadily developing, penetrating all areas of financial activity and providing customers with new and convenient financial services and tools. The growing number of smart devices users and the distribution of the Internet and mobile technologies are contributing to the rapid adaptation of digital payments around the world. Due to this, the modern consumers radically change their attitude to financial services. They strive for remoteness, ease and security in managing their own finances. Today's events in the context of the global coronavirus pandemic COVID-19 demonstrate the rapid rise in remote services and demand for online financial market products.

Due to the influence of the COVID-19 pandemic, digitalization trends have intensified in the following areas in Ukraine – improvement of remote and online service format for all customer groups with the use of innovative sales channels; reorganization of the network of branches and outlets of banks, staff reduction; increase in the number of payment terminals of banks, decrease in the number of ATMs; growth of non-cash transactions and contactless payments; development of digital services and products; improving the mechanism of banking security and data protection; intensification of cooperation with fintech companies.

As a result of the study of these trends, a system of classification features was formed, which allows to group banks according to their level of digital development, in particular, digital banks (neobanks), technologically advanced banks, banks with average and low level of digitalization were identified. The developed classification approach will allow tracking the transition of banks from one group to another and assess the scale of the digital transformation of the banking system of Ukraine under the influence of the COVID-19 pandemic.

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Еркес О., Калита О., Гордієнко Т. Диджиталізація банківського сектора під час пандемії COVID-19.

Постановка проблеми. Фінансовий ринок зазнав кардинальних змін упродовж останнього десятиріччя. За цей час він трансформувався з моделі традиційного корпоративного бізнесу банків до цілих екосистем банківського та небанківського ринків. Трансформації продиктовані й новими викликами, що стимулюють активне зростання диджитал-операцій та формують попит на цифрові продукти і сервіси у фінансовій сфері. Пандемія COVID-19 стала своєрідним імпульсом для прискореної диджитал-трансформації банківського бізнесу.

Аналіз останніх досліджень і публікацій показав, що попри наявність окремих наукових доробок, залишається невирішеною важлива науково-практична проблема щодо впливу пандемії COVID-19 на цифрову трансформацію банківського сектора України та розробки критеріїв для класифікації банків за рівнем їх цифрового розвитку з урахуванням національних особливостей, досвіду та практики.

Метою статті є дослідження впливу пандемії COVID-19 на процеси диджиталізації вітчизняних банків.

Матеріали та методи. У процесі дослідження використано методи теоретичного узагальнення, аналізу та синтезу, групування, системного підходу.

Результати дослідження. Визначено ключові вектори диджиталізації банківських процесів в Україні, зокрема: перехід на дистанційний та онлайн-формат обслуговування всіх груп клієнтів; реорганізація мережі філій та відділень банків, скорочення персоналу; трансформація платіжної інфраструктури через збільшення кількості платіжних терміналів банків та зменшення кількості банкоматів; зростання обсягів безготівкових операцій та безконтактних оплат; розвиток цифрових сервісів та продуктів; удосконалення механізму банківської безпеки та захисту даних; співпраця з Fintech-компаніями тощо.

Висновки. У результаті дослідження ключових змін, що відбулись у банківському секторі під впливом пандемії коронавірусу, запропоновано систему класифікаційних ознак для групування банків за рівнем їх цифрового розвитку. Розроблений класифікаційний підхід передбачає групування банків на: цифрові банки (необанки), технологічно просунуті банки, банки з середнім та низьким рівнем диджиталізації. Запропонована система дає змогу відслідковувати ступінь цифрового розвитку окремих банків та загалом оцінити масштаби цифрової трансформації банківської системи України.

Ключові слова: диджиталізація, цифровізація, цифрова економіка, дистанційне обслуговування, цифрові канали збуту.