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## Article

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# METHODOLOGICAL RESEARCH OF FINANCIAL SECTOR DIGITAL TRANSFORMATION TRENDS IN BANKING

*The article analyzes the current problems of the financial sector within the framework digital transformation and the gradual transition to digital service financial transactions. The object of research is the Ukrainian financial banking sector, the peculiarities of which functioning at this stage crisis economy Ukraine require finding adaptation ways for the introduction digital transformation procedures. The subject is financial relations in the digital adaptation sphere and innovative development banking through the prism involvement of tools and information technologies in financial system, in general, and financial operations and procedures, in particular. The problems domestic financial sector transformation became more acute in connection with the mass transition to remote channels interaction with clients, first due to the restrictions that were applied as a result the COVID-19 pandemic, and then due to the armed aggression of Russia to Ukraine. The research methodology is based on a comprehensive assessment dynamic changes in the financial environment and the creation a basis for modeling predictive scenarios and strategies based on the study existing situation, theoretical basis development and financial and banking sector development directions for effective interaction in Ukrainian economy conditions. The Ukrainian banking system trends changes are outlined. The peculiarities of the international development financial and banking sphere are defined, a comparison with the world experience is outlined, analytical studies best global cases are carried out for the possibility introducing the results to the Ukrainian financial space. The research results about digital capabilities banking sphere in Ukraine are presented, the essential content banking, the properties system, the peculiarities building a banking digital architecture and architectonics through the prism of components and tools for a banking strategy model are presented. Attention is paid to the innovative development of the banking sector and directions for attracting investment resources. Procedures for creating digital opportunities transition financial sector and reengineering business processes for companies when transitioning to a digital format commercial activity have been worked out, that will be of theoretical and applied importance for further research by scientists from different countries. The authors offer recommendations to solving the digitization problems of the Ukrainian financial sector. The research results of the digital transformation direction in banking sector are presented for further use in modeling Ukrainian's business post-war recovery scenarios.*

**Keywords:** financial system, digital transformation, banking sector, digital banking, digital finance, innovative development.

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## 1. Introduction

Today, digital banking (Digital Banking) is a state-of-the-art trend that is gradually displacing traditional banking structures from the market. The digital revolution contributed to the development digital technologies, including in the financial sector. These trends, along with the urbanization of the economically active population, led primarily acceleration of the pace human life and a change in the customers psychology in banking institutions, who stopped accepting traditional banks with their conservative branches, queues and often unhurried service. Currently,

technologies and providers have appeared that allow customers to carry out all the necessary operations at a distance at a time convenient for them. Banks began to widely use such opportunities, developing and offering their partners, counterparties and clients mobile applications, improved remote service and internet banking systems. Today, with the digital banking, any client can make a transfer, pay bills, check the balance, order a new plastic card or block an existing one, as well as open an account and make a deposit. Therefore, bank branch functions as universal financial hubs, where clients carried out all kinds financial transactions, is gradually becoming a thing of the past.

*The object of research* is the Ukrainian financial banking sector, the peculiarities of which functioning at this stage crisis economy Ukraine require finding adaptation ways for the introduction digital transformation procedures. *The subject of research* is financial relations in the digital adaptation sphere and innovative development banking through the prism involvement of tools and information technologies in financial system, in general, and financial operations and procedures, in particular.

*The aim of the article* is to conduct a methodological study development financial architecture of the banking sector, analytical studies of the state and prospects for the development of the banking sector under the influence of digital technologies, as well as outline directions for modeling scenarios involving innovative digital tools in Ukrainian banking. The main tasks of the research are: the study of the essential content and development trends of digital banking in Ukraine and in the world; working out the component basis for creating scenarios for adapting digital transformation to the banking system; modeling approaches and procedures for the maximum implementation of digital policy in the financial banking sphere; conducting research through the prism of information support systems and technological solutions for the transition to digital banking, taking into account modern digital security tools.

Many papers are devoted to the issue research on digitalization banking sector of Ukraine [1–5]. Researchers are exploring trends in the digital transformation of the financial sector in banking from different angles. The research materials point to the importance of digital innovations in the financial industry and their impact on the creation of new business processes. The studies consider financial technologies as the main tool for digital transformation of the financial sector. However, in our opinion, the study of the main trends in the development digital banking must be carried out on an ongoing basis, and the problematic moments of the financial sector of Ukraine in the framework transition to digital are not sufficiently covered. The reviewed studies by authors of [6, 7] focus on the opportunities and challenges of the digital transformation financial sector. They attention to the importance of introducing digital technologies to ensure a high level banking competitiveness. It is proved that digital transformation has a positive impact on the financial performance of banking. Empirical studies on the impact digital transformation on the financial performance of American banks are considered. Studies show that digital transformation is an important factor in the financial industry and affects the improvement qualitative and quantitative indicators of banking activities. However, researchers note that digital transformation also creates new challenges and risks that require careful analysis and development of appropriate strategies.

Consequently, the banking industry is changing rapidly. Not so long ago, most customers were ready to switch banks if their local branch closed. Currently, this is not a problem, as there is always the possibility of remote use almost the entire range banking services. Currently, reviewing the functionality of the bank and the banking network is one of the most important tasks banking institutions. If earlier the growth banking network, especially in the regions, spoke the scale banking business, now the situation has changed. Currently, there is no need for the physical presence bank divisions in different regions of the country, it is possible to limit yourself to only a small representa-

tion bank personnel who would be functionally responsible for technical support and advise clients. Some banks are gradually completely abandoning even their representative offices, transferring technical support and interaction with clients to the virtual space (offering the services bots or virtual assistants that allow solving the most simple and standard problems). For example, over the past five years, US banking structures have closed about a third of their branches, which has made it possible to cut operating costs in half. It should be noted that such innovations almost did not affect the number of involved customers [3, 8].

In connection with the decrease in wide banking network, bankers will have to decide what to do with the areas that have become vacant. However, it is not worth prematurely talking about the complete liquidation banking networks in the next 15–20 years, because a large part customers pre-retirement and retirement age prefer physical visits to bank branches. In addition, any society is characterized by conservative attitudes, which are gradually transformed into the category «national tradition». Thus, in the USA, Great Britain, Malaysia and the countries-former colonies of Great Britain, clients still pay by checks, which is not the case in the banking systems other countries [1, 4, 9]. Bank branches will continue to exist in the future, although in some countries they will turn into an analogue of elite clubs. It is possible that the functions financial advisor or private-banking (round-the-clock banking services for wealthy clients) will come to the fore, and bank employees will advise clients on various economic issues throughout their lives.

## 2. Materials and Methods

Conducting research is based on monographic and analytical methods of scientific knowledge with the aim finding scientific ways to solve the problem exiting the financial banking sector from a crisis situation and adapting to digital transformation. The research was conducted by identifying the strengths and weaknesses banking sector, outlining opportunities and threats based on strategic analysis, using a scenario approach and modeling development directions through the prism of using the results world experience, working out the best cases and drafting proposals in banking digital transformation. The methodology conducted research is represented by a comprehensive approach to the assessment the situation, theoretical provisions definition and practical recommendations development for the implementation proposed solutions.

## 3. Results and Discussion

Within the framework concept digitalization at the current stage of development, bank branches are in the stage transition from the main channel interaction with clients to a niche highly specialized plane, and in the near future will become only a supplement to other channels of digital banking communication. The process of such a transition is facilitated by the constant improvement technology opening bank clients' accounts without their physical presence. Modern software and technical solutions allow compliance with all requirements of Ukrainian legislation regarding client identification and personal data protection. During the transition of the bank to the Digital Banking model, its management faces a number of problems that must be solved: determine the required number of

physical bank branches; determine which branches will be built on a self-service system, and which will become advisory centers and sell banking products; what number personnel is needed in the main office, consulting centers, sales points; which bank functions should be outsourced; whether it is necessary to significantly reduce staff; what benefits will the client receive; should the branch be re-oriented to more specialized branches for Private Banking, partner banking, etc.; what technologies should be used in each department, and how they will correlate with certain customer groups; what other ways of interaction with customers and counterparties should the bank use and how to integrate technologies, methods and products into a single digital bank system?

As it is possible to see, this is a rather complex process, and there are many urgent issues that need to be solved effectively. The bank's competitiveness will directly depend on the correct answer to these questions. The first property digital banking is the active use Internet and other digital technologies, which leads to the need to reformat branches and traditional bank branches. This is quite significant, but not the main trend of the digitalization process. The main stage in the process transition to digital banking is a change in bank behavior, when a general transformation paradigm banking. The concept digital banking implies that a financial institution should develop in new areas, where it should create special opportunities for different groups of customers. At the same time, the bank should offer not only hybrid, transactional products, but also an understandable and customer-friendly technological interface with technical solutions that are necessary for this category of customers [1, 2].

Within the framework new concept digital services, banking structures, as a kind of virtual intermediaries, must be ready to offer a set services needed by the client, not limited to financial transactions. Thus, the bank can create channels of interaction with clients in information services and social networks, in electronic business and the Internet of Things, in mobile applications, using any system virtual space where the client may need banking services. Thus, digital banking sets itself the task covering all areas human activity, financial institutions are actively working in the mobile sphere and in social networks, but in other channels banks are still at the experimental stage. It should be noted that Digital Banking is a comprehensive business strategy that includes all information channels. Let's consider it possible to note that the situation with the transition to digital technologies is changing so rapidly that banking institutions that have not yet started the transition process will be so far behind in their development that they will not be able to compete with those banking structures that have already embarked on the path transformation from traditional banks to ecosystems for providing a complex of all virtual services, among which banking operations will be only a small part. Digital bank is the next stage in the evolution retail banking, which includes mobile payments, online loan and deposit systems, mobile banking, mobile point sale, a personal financial accounting system, etc. [7].

The increased competition in the banking sector, which actively uses digital technologies, has led to special demands customers, especially from the view point speed and comfort of conducting banking operations. Today's customers have increased needs for a virtual bank, as they want to receive exclusive banking services selected just for them. And such a need is quite understandable, since

the lifestyle modern bank customers are closely related to the Internet environment and virtual space. For traditional banks that want to succeed in the transition to a new digital banking platform, it is no longer enough to simply have an official website and a mobile application. Similar systems responsible for consumer loyalty and supporting the sales mechanism are already available today in all medium and large financial structures without exception; they no longer provide a sufficiently significant increase in the client base. Therefore, in conditions increased competition both in banking business and online space, banks need to develop a new, unique concept building an information infrastructure and competently present it to the market.

Currently, most credit institutions manage classically formatted multi-level processes that involve special control. But these processes in modern conditions make it possible to retain part of conservative customers, and not to attract new ones with special needs in digital technologies. At the same time, even traditional banks offer only separate digital services (for example, a mobile bank or Internet service using remote access through a personal account), this is no longer enough, since it is impossible to fully construct a comprehensive model digital banking for a financial institution [4, 5, 9].

Most experts believe that building a digital infrastructure without an integrated approach is unproductive. It is quite difficult for new players to integrate into the existing digital space, and even more so to form their own unique digital infrastructure, which is quite flexible and effectively developed in accordance with the requests and requirements for new type customers.

The digital banking pioneers were global banking empires that started investing in a digital strategy earlier than other banks, as well as new generation banks that immediately built their business strategy as Digital banks. They rightfully took the top places of the leading digital banks in the ratings largest consulting companies: Hello bank! (Austria, Belgium), Holvi (Finland), Hype (Italy), ImaginBank (Spain), Knab (Netherlands), Lunar (Denmark), mBank (Czech Republic, Poland, Slovakia), MonoBank (Ukraine) [4–6]. The flagships digital banking market has already managed to achieve that the interaction between the bank and the client is carried out without the participation bank employees. Other financial institutions have to make significant efforts to catch up with their competitors in this area. In addition, non-banking companies (Google, Apple) are appearing in the markets of traditional banking services. Optimal, in our opinion, the bank's strategy should be aimed at such customer service, in which all operations are carried out quickly and conveniently, and requests are processed around the clock in real time. To do this, synchronize all service channels, clearly target product offers to a specific customer, use end-to-end information processing and constantly communicate with customers online.

At the same time, situation in the world for digital technologies, which is rapidly changing, it is necessary to provide for flexibility both in IT systems (which allows for prompt changes, adjustments and changes to services, interaction channels, banking tools and products), and in the job descriptions bank employees and management mechanisms in order to quickly respond to the changing environment without delaying the decision-making process.

To build a comprehensive digital banking system, a standard and uninterrupted customer service mechanism should

be created. At the same time, all channels interaction with customers must be integrated with each other, as well as interact with the API (a software shell responsible for the interaction various applications in the general information system) and the central banking system. Within the Digital platform, special attention should be paid to consistency actions, and the possibility for customers to manage virtual services provided by banks should be provided. For a modern bank client, it will be important to be able to individually configure the channels for the implementation banking services with other virtual systems: social networks, search engines, etc. [10–12]. The banking information system should be flexible, easy to change and configure, be able to quickly remove or add software components developed by different manufacturers, modernize and modify them. The concept «Open API» is relevant today – an open software interface that manages various applications in the general information system. It is the use such a concept by banks that will allow banking structures to quickly and comfortably interact with customers, collect and process information about their needs, offering additional services that are needed by a certain category of customers. Digital banking is currently becoming a topic research in various professional communities as it includes finance, IT and sales. Software that allows users to pay for purchases contactlessly by linking debit and credit cards is now available to most companies. A massive replacement plastic payment instruments with virtual ones is predicted (as is already practiced by PayPal). The contactless payment function is in great demand among payers, and banks should get involved in this direction, otherwise non-bank companies will take their place.

Currently, Digital Banking is becoming a competitive advantage, and financial institutions are working on the release highly specialized digital products aimed at attracting customers, but within a single banking application. Thus, one of the services especially needed against the background the growth labor and forced (in connection with the war in Ukraine) migration is the money transfer system. Traditional industry leaders are companies with a Western Union and Moneygram history. But now a large part of the market is occupied by online transfers companies Xendpay, Transfer Wise and Xoom due to the convenience of their services and favorable tariffs. A financial institution can not only provide additional functions for mobile devices, such as money transfers, utility payments, currency exchange, in its proprietary application, but also the ability to conduct various advertising campaigns and market research [10–12].

Banks need correct and up-to-date information about their existing and potential customers, so they should use the maximum amount useful information from profiles in social networks and analyze which banking products can be offered to them. Determining the location and actions of customers (location) customer today can be tracked using a GPS system. Such information is in demand by financial companies, which can prepare marketing reports, orienting service customers and advertisers to a specific target audience, which allows more targeted work with potential customers, already knowing their basic needs and location. Customer data from the history of their visits to various sites, search requests, movements, as well as demographic data, such as marital status, family composition, presence and age of children, social status, may be of interest. According to Ukrainian legislation, this information is not personal

data, is publicly available, and therefore is actively used by banking structures in marketing activities [5, 10–12].

Therefore, access to virtual channels for collecting and analyzing any information expands the capabilities of banking structures, because in this way banks will be able to better understand the needs of their customers, more accurately build different customer profiles, which will give them a competitive advantage and ensure commercial success.

However, there is another very important aspect that must building Digital Banking – this is information security. The transition to digital and Internet technologies is accompanied by significant informational and commercial risks. At the same time, one of the main problems is the threat crimes in cyberspace. Cybercrimes targeting individual banking structures and the country's financial sector as a whole are recognized as the most serious in terms of the overall scale material losses and moral damage. As a rule, they are aimed at the accounts and information systems credit and financial institutions, with the aim stealing financial resources.

At all stages of the implementation digital banking operations – from the development a new software methods and technical solutions to the sale banking products to their customers – the management credit institutions must be aware existing risks, primarily the possibility of vulnerability information security systems. In the era of rapid development information technologies, which allow business structures to expand the range operations they conduct, reach more customers and, accordingly, get more profit, issues information security become key. The seriousness of the approach to the issues early identification potential threats and timely response to these threats for banking information systems is determined by the stage at which the information security service is involved in all banking processes. Note that currently, modern large financial structures are already able to successfully solve information protection tasks using their full-time specialists [11, 13].

At the same time, it should be noted that there are two important categories in the field of information security: threat (potential risk cybattack) and attack (a direct attack on an information system with the aim of stealing confidential information and/or funds). If potential threats are not considered, unprotected information systems will be attacked, resulting in serious and sometimes catastrophic financial losses. At the same time, it is the client who most often suffers most losses, since it is the least protected, although it is connected to banks through remote service systems. Therefore, it is advisable for banks to start by protecting the client by providing it with a reliable information security system [13].

It should be noted that currently the number crimes related to the theft funds from the accounts bank clients has increased using social engineering and neuro-linguistic programming methods, when criminals, having received part of the personal data bank client through telephone communication, force it to provide card data, gain access to account or the client's personal account and remotely steal funds from bank accounts. An additional threat is posed by former employees banks who had access to internal confidential information related to mechanisms and procedures of information security, methods of storage and withdrawal of funds. Therefore, it is important that banking institutions systematically approach the development problem and improvement comprehensive measures to combat virtual cybercrimes – from physical access control to computer and banking equipment to virtual protection systems.



The proposed directions of innovative development of the banking sector, directions of attracting investment resources and the elaborated procedures for creating digital opportunities for the transition of the financial sector and reengineering business processes for companies in the transition to a digital format of commercial activity will be of theoretical and applied importance for further research by scientists from different countries.

#### 4. Conclusions

The conducted study current state of the financial banking system allows to draw conclusions that digital banking, both in the world and Ukraine, is at development stage. The results of the strategic analysis showed that financial institutions should act quickly, but carefully – trying to adopt the best experience active participants in the digital space, using a full set tools and financial mechanisms to ensure innovative development. Development scenarios and models digital transformation of the banking sector should include procedures and algorithms for digital adaptation. The restructuring banking service system, which involves the transition to Digital Banking, aims to make the banking service more convenient, comfortable, accessible and safer for its customers, who will increase the competitiveness banking sector, as well as attract new customers. An important component creating management decision-making models in the direction of digital transformation banking system is information security. At the same time, without building a reliable and multi-faceted information security system, the bank will not be able to protect its financial resources and client funds from cybercrimes in the digital space. In addition, combating criminal cyberattacks should take place within the framework of effective cooperation between government agencies, financial institutions and their clients. It is the coordination joint efforts of all the listed participants, built on the principles equal access to information, that will ensure protection and promote the development of the domestic financial sector, including regional segments, which will consolidate the possibilities making reliable and fast transactions in digital format.

Thus, digital technologies have changed the lifestyle, needs and financial mentality of most banking institutions customers. Based on this, banks are transforming from traditional financial institutions into new digital business systems for providing financial services.

#### Conflict of interest

The authors declare that they have no conflict of interest in relation to this research, whether financial, personal, authorship or otherwise, that could affect the research and its results presented in this paper.

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