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INNOVATIONS OF THE EUROPEAN DIGITAL SPACE IN THE BANKING PAYMENT SERVICES MARKET

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Abstract:

The article examines the specifics of the development of the banking payment services market in the context of the European vector of the development of the digital economy. It is proven that modern banks operate in a state of rapid and irreversible technological changes, where dynamic fluctuations of the banking services market under the influence of constant changes in customer behavior require innovative payment tools and regulatory levers of payment systems in the global digital space. It is justified that the payment system at the mega-economic or global level is a "digital platform of electronic payments" of those states that provide international payment flows coordinated by payment instruments and regulated by the payment systems oversite. Areas of ensuring confidentiality and security of banking customer service are developed on the basis of modern online banking and FinTech innovations. From the point of view of the control function, the payment system oversight is a regulatory lever of the market of bank payment services, which ensures the safety and efficiency of the functioning of electronic cash flows, their monitoring in payment systems, and it is also a digital tool for the confidentiality of information.

Key words: *banking innovations, FinTech innovations, payment systems, electronic transfers, online banking.*

1. Introduction

The development of the market of bank payment services in the context of the European vector of the development of the digital economy and globalization and integration

processes requires significant changes, improvements and innovations in the existing settlement systems, since the rate of development of electronic payments is carried out as quickly as possible and requires protection technologies, as well as guarantees of the receipt of funds in the required period time At the same time, modern banks operate in a state of rapid and irreversible technological changes, where dynamic fluctuations of the banking services market under the influence of constant changes in customer behavior require innovative payment instruments and regulatory levers of payment systems in the global digital space. As a result, banks and their operating models operating now cannot remain unchanged in the future (Chizh & Dzyamulych, 2012).

One of the main driving forces of globalization and digitalization of the economy is the development of the financial sphere through the introduction of innovative technologies, ideas and products. Today, rapid and irreversible globalization of the world is taking place, which is an objective and unstoppable process. Understanding the importance of globalization and integration processes in the conditions of functioning of the digital economy is becoming more and more relevant, because the world in the third millennium is undergoing constant changes. At the same time, the speed and level of financial globalization are at the forefront of measurements of globalization processes of the real economy. Overcoming the asymmetry between the development of the global economy and the development of society as a whole helps to overcome economic instability and its consequences and is one of the main tasks of implementing reforms in the world monetary system.

The latest technologies and information transmission through the global Internet have created the prerequisites for the use of innovative tools of the information economy in international payment systems, and thus led to the strengthening of the international division of labor. Therefore, the market of bank payment services, as well as the market of banking services as a whole, is characterized by the rapid introduction of technological innovations, which, on the one hand, increase the efficiency of banking services, and on the other hand, carry potential risks for both consumers and for the entire banking system. The specifics of these markets encourage constant monitoring of payment systems in order to form new approaches to their effective use in the digital space of banking innovations, which require constant updating under the influence of informatization.

The study of the specific features of the introduction of innovative products into banking activity is devoted to the work of such scientists: Chizh & Dzyamulych (2012), Dzyamulych (2010), Moroz (2012), Sodoma et al. (2019), Staschuk et al. (2020). The theoretical foundations of innovative transformations in global financial markets are covered Apalkova & Tsyganov (2016), Krakhmalev (2007), Mints et al. (2022), Ponomarenko et al. (2019), Telnova et al. (2020), Trusova et al. (2021). Features of the functioning of the payment services market with the use of modern information tools by payment systems are thoroughly described in the works Kovalenko (2018), Kolodiziev et al. (2022), Koval (2012), Kovalchuk & Lukyanov (2010), Kraus (2022), Sytnyk (2019). In general, modern economic science has at its disposal significant developments in the field of banking innovations. However, the peculiarities of the formation of the digital economy lead to the need to review traditional approaches to banking innovations.

The novelty of our research is the improvement of methodological and practical approaches to the implementation of innovations in the market of banking payment services, which take into account the latest technologies of payment systems in the context of the European vector of the development of the digital economy and globalization and integration processes.

2. Materials and Methods

Digital assets of a new type in the banking sector are formed through the creation and development of interregional socio-economic infrastructures, including the provision of free non-competitive access to basic spatial data, digital information models of assets. This will create conditions for the emergence of new markets and businesses based on data monetization. That is, the development of digital assets will contribute to the rapid adaptation of banks to the highly dynamic cross-border environment of modern business (Yakubiv et al., 2019). The information and communication infrastructure of the banking system is a system of interaction of related information banking centers, banking management centers, databases and knowledge, technologies for ensuring the processes of collection, transmission, analysis, processing and storage of banking information, hardware and software, communication systems communication, organizational banking structures, which ensures the functioning and development of the information space of the banking system, as well as supports information interaction with objects of the external socio-economic environment (Apalkova & Tsyganov, 2016).

Management of the development of information and communication infrastructures of banks and the interbank space, design of modern systems of remote banking services, comprehensive development of territories (including by industry), is impossible without the use of technologies for creating and maintaining Internet services based on cloud technologies.

Digital transformation in the banking system distinguishes five main stages of its development: emergence of Digital channels; creation and implementation of Digital products; change in business models of banks; creation of artificial intelligence; construction of digital DNA (Lupenko & Sytnyk, 2021). This made it possible to digitize the banking process in the area of information processing and transmission, with the use of digital technologies, creating prerequisites for the transformation of payment systems in the field of interbank settlements (Pavlenko, 2017).

The cumulative effect of the factors that determine changes in the banking system (technology, customer behavior and regulation) strengthen interaction with each other, creating new opportunities for serving customers who invest in the development of digital technologies, change the regulatory policy of the financial market and lead to innovative transformation in the field of banking payment services (Savelko, 2008). At the same time, the change in approaches and expectations transforms the very reality and perception of the role of the banking system based on the theory of the payment system, which contributes to increasing the efficiency of non-cash payments, and therefore – to international payment circulation, which generally affects the prospects of the productive functioning of the state's

banking system. Theory and practice are always in a dialectical combination and interaction, influencing each other's state (Tsyrulyk, 2018).

The payment system at the mega-economic or global level is the "digital platform of electronic payments" of those states that provide international payment flows coordinated by payment instruments and regulated by the payment systems oversite (Trusova et al., 2021). Accordingly, the payment system has a hierarchical level that determines the development of local markets (national and regional) bank payment services based on the totality of components of the economic development of national economies. Thus, informatization of the economy in the global and local dimension is the main determinant of the development of the banking payment services market, which technologically affects banking innovations based on the standardization of the sphere of service provision, as well as the preservation and transfer of information through global and local initiatives of market operators (Figure 1).

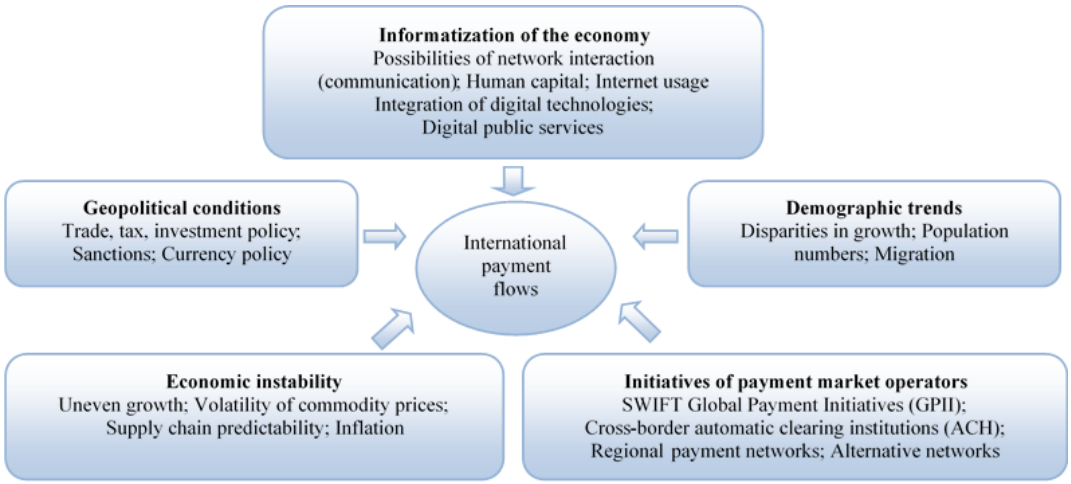

Figure 1: Groups of factors affecting international payment flows

Source: developed by the author based on data Global Fintech market. The Business Research Company, 2023; Kovalchuk & Lukyanov, 2010; Savelko, 2008.

Cross-border payment flows are formed under the influence of a combination of geopolitical, economic and demographic factors, and their intensity is largely influenced by institutional factors. However, in the global information space, mega-regions have formed with an intensive level of use of the Internet and mobile communication services. However, there is a significant difference between the degree of informatization in countries with different levels of economic development, which over time reduces their gap. The demand for payment instruments in online trade has "country" characteristics: in the vast majority of countries of the world, cards are the most popular means of payment for online purchases; cards issued with the function of electronic money in the market segment of banking payment services have a high added value (Staschuk et al., 2020).

The payment system as a general economic phenomenon is considered a mechanism that ensures money circulation and is an integral component of the financial system of the state, as well as an element of infrastructural innovative technologies of banking customer service, which contributes to the realization of the goals of the monetary

policy of the central bank, which coordinates at the legislative level financial institutions and their payment instruments, contractual relations, and thus ensuring the flow of funds between economic entities. A structural and logical diagram of the functioning mechanism of the banking payment services market has been built, which singles out its main components: the combined influence of global informatization factors on the market; the level of regulation of global informatization; market development imperatives.

The determination of the efficiency of banking services is carried out according to the basic formula (1) (Sytnyk, 2019):

$$M = \frac{\sum_i W_i \times B_i}{N}, \quad (1)$$

where, M – is the performance of the payment system (average daily number of conditional bank payment services performed); W_i – the number of bank payment services for the *i*-th type of electronic payments made during the year; B_i – transfer coefficients of electronic payments of the *i*-th type into a conditional bank payment service; N – number of working days per year.

The number of bank payment services performed during the year (W_i)is calculated according to the formula (2) (Sytnyk, 2019):

$$W = M \times N, \quad (2)$$

The cost of one electronic payment for bank payment services (C) is calculated according to the formula (3) (Sytnyk, 2019):

$$C = \frac{Q}{W}, \quad (3)$$

where, Q – current costs for the year.

Calculate the profitability of one electronic payment (P_1) using the formula (4) (Sytnyk, 2019):

$$P_1 = \frac{P}{W}, \quad (4)$$

where, P – is the amount of the bank's profit for the use of the payment system and the provision of electronic payment services for the year.

The cost of one conditional bank payment service (S) can be recorded (Sytnyk, 2019):

$$S = C + P_1, \quad (5)$$

To calculate the increase in the valuation of the result in banking customer service under the payment system, the formula is used (6) (Sytnyk, 2019):

$$P_t = \sum_{i=t_0}^{T} (S_t \times W_t^{\infty}) \times A_t \quad , \tag{6}$$

where, S_t – is the price of one conditional bank payment service; W_t^{∞} – increase in the volume of electronic payments due to the implementation of the payment system in year *t*; A_t – income discount factor for period *t*; t – index of the year of the calculation period; t_0, T – initial and final years of the calculation period.

The formula can also be used to calculate the efficiency of the payment system (7) (Sytnyk, 2019):

$$PS_{iv} = I_{va} - C_{bs}^{\Delta} - \sum_{t} C_{nb,I}^{\Delta} \quad , \tag{7}$$

where, I_{va} – the increase in the value assessment of the result of the implementation of the payment system in the calculation period; C_{bs}^{Δ} – change in costs in banking services for clients under the payment system in the settlement period; $C_{nb,I}^{\Delta}$ – change in the costs of using the payment system in the *i*-th non-banking sector for the settlement period.

Informatization has an unequal effect on electronic payments through payment systems, which refer to the implementation of innovative solutions in online banking systems, which is based on software solutions to improve the customer service system with a simple and understandable interface that can be used equally effectively in different applications and on different hardware means In addition, an important element that needs innovative improvement is ensuring the confidentiality and security of banking services for customers. Thus, one of the most common approaches to ensuring the confidentiality of the security of banking services for clients is FinTech as an innovation (Figure 2).

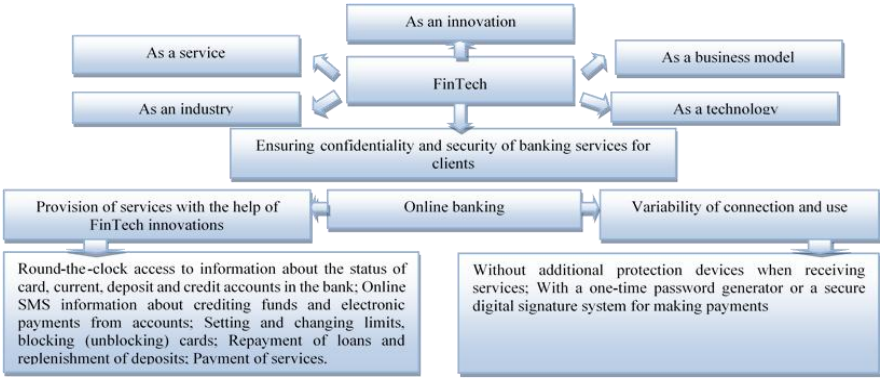

Figure 2: Directions for ensuring the confidentiality and security of customer banking services based on modern online banking and FinTech innovations

Source: constructed by the authors based on data Kovalenko, 2018; Kraus, 2022

FinTech innovations are technological innovations, while financial innovations are not always related to the adaptation of certain information technologies to the market of banking payment services (Lupenko & Sytnyk, 2021). Technological innovations that ensured the development of FinTech are distributed access technologies (blockchain), artificial intelligence, big data analytics (Big Data), application programming interfaces, cloud technologies, biometrics, and others. FinTech is considered as the relationship of two main components: innovations and new business models for providing banking payment services in the financial market (Chizh & Dzyamulych, 2012; FinTech development strategy in Ukraine until 2025, 2023). In addition, innovative FinTech technology is used to meet the needs of consumers of financial and administrative services in the conditions of the country's economic development (Apalkova & Tsyganov, 2016). In a broad sense, FinTech means the sphere of the financial system of the economy, which unites companies that use the latest developments to provide better services in the financial market, and in a narrower sense, it means the companies themselves belonging to this industry (Global Fintech market. The Business Research Company, 2023).

3. Results

A stable and secure banking payment infrastructure, in addition to its effective functioning, is the basis not only for reducing the costs of exchanging goods and services, but also for increasing the reliability of the financial sector and increasing opportunities for access to these services. A significant increase in the number and volume of financial settlements became the basis for the growing importance of payment systems. The payment system of the euro zone includes the payment systems of countries that use the single European currency as a national monetary unit. To begin with, they were created to function in the conditions of each individual European country. These payment systems were significantly different from each other and did not meet the requirements that were put forward during the introduction of a single currency. Accordingly, the conditions for the implementation of real mechanisms for the unhindered and rapid movement of money flows in the Eurozone have been created (Figure 3).

RTGS Plus	A decision was made to merge two German clearing networks into one: the RTG electronic communication system and Euro Access Frankfurt – an integrated RTGS system that can effectively manage liquidity. This payment system, in addition, is also a component of the TARGET system - the pan-European clearing payment system.
Paris Net Settlement (PNS)	Gross settlement payment system that works in real time. Mechanisms for saving liquidity have been introduced, characterizing them as deferred net settlements. PNS belongs to hybrid payment systems. In order to replenish the liquidity of the Central Bank's money, PNS participants are obliged to make a transfer from the current account to PNS. The minimum amount of this initial transfer is 15 million EUR.
CHAPS (Clearing House Automated Payments System)	The CHAPS system is a distributed network where electronic payment messages are transmitted from a member of the settlement system (sender) to a member of the settlement system (receiver) without the need to pass through a central payment processing point or Clearing House. This system is designed for fast transfers of large payments (from seven thousand pounds and more) and settlements between participating institutions within one day.
TARGET	The system performs calculations between commercial and central banks of the Eurozone (the largest payment system of the European Union). The system processes large payment flows in euros, which are operationally connected to the European system of central banks; the system regulates the daily balance of settlement systems on a net basis. The system coordinates client, interbank payments and currency transactions based on transactions in the financial market.
EURO1	The system uses the SWIFT technical platform, allows European banks to make payments and net settlements during the day (netting), until the final settlements are made through open accounts with the European Central Bank (ECB) at the end of the day.

Figure 3: The main payment systems of the largest European countries

Source: built by the authors based on data Apalkova & Tsyganov, 2016; Chizh & Dzyamulych, 2012; Euro Banking Association, 2023; Digital markets: FinTech. Statista, 2023; Dzyamulych, 2010; Krakhmalev, 2007

The financial infrastructure of payment systems of the European Union continues to improve, as the latest technologies are constantly developing, and the European and global economies are increasingly becoming digital. Thus, the EURO1 payment system is intended for the transfer of a large volume of payment flows and transfers in Euros between commercial banks registered or having a branch in the European Union (Digital markets: FinTech. Statista, 2023; Euro Banking Association, 2023; EURO1. Single payments, 2023). The total number of transactions of the EURO1 payment system is presented in Figure 4.

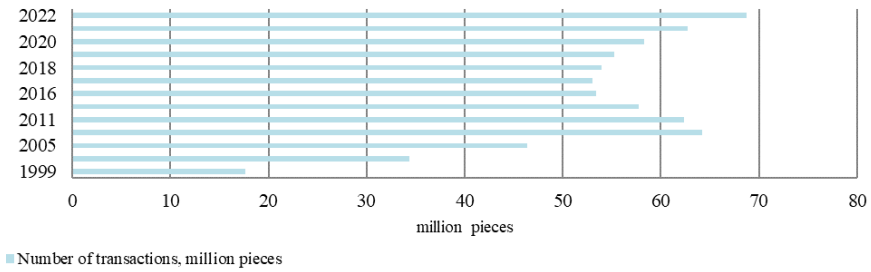

Figure 4: Volume of transactions in the EURO1 payment system for 2019-2022, million pieces

Source: built by the authors according to data Digital markets: FinTech. Statista, 2023; Euro Banking Association, 2023; European Central Bank, 2023.

Thus, since the start of the EURO1 payment system and until 2022, a significant dynamic acceleration of the number of payment transactions can be observed – almost 4.0 times. In 1999-2008, their rapid growth (3.6 times) took place. However, the financial crisis

of 2008 led to a sharp reduction in the number of payments in the EURO1 system by the period of 2017 – a drop in transactions compared to 2008 by 17.3%. In 2018, the outflow of payments stopped - there was a slight increase in payment flows by 1.7%, or by 0.913 payment transactions. During 2018-2022, the economy of European countries stabilized, the outflow of transactions stopped. Every year, the volume of operations in the EURO1 system grew by an average of 2.5%. Over the past five years, the number of payment transactions increased by 27.3% and amounted to 68,711 million pieces in 2022.

The electronic payment system of the National Bank of Ukraine (SEP of the NBU) is a state bank payment system created to ensure interbank transfers through accounts opened at the country's central bank. In the operation of the SEP, there are no priority indicators of the order of payment processing, except for the time of their arrival in the payment system (Ministry of Digital Transformation, 2023; National Bank of Ukraine, 2022a). The SEP of the NBU is a reliable regulator of bank payment services. In this system, about 90% of interbank transfers take place in the national currency, while through correspondent accounts opened by banks in other banks – no more than 5% of transfers per period. In 2022, the volume of interbank transfers carried out within Ukraine through SEP and through correspondent accounts in the national currency amounted to 96%, in 2021 – 97%. At the same time, money transfers through direct bank correspondent accounts accounted for only 4% and 3%, respectively (National Bank of Ukraine, 2022b).

In 2016-2022, the participants of the NBU SEP were banks of Ukraine and their branches, the State Treasury Service of Ukraine and its bodies, and institutions of the NBU. In 2017, their total number was 423 participants, of which 180 were banks, 178 were bank branches, 28 were participants and users of the State Treasury Service of Ukraine, and 37 were NBU institutions. However, after the economic downturn and the reduction of banking institutions, the number of participants decreased by 5.5 times and already at the beginning of 2020 it amounted to 77 institutions, including 75 banks, the National Bank of Ukraine and the State Treasury Service of Ukraine. The results of the effective functioning of the electronic payment system of the National Bank of Ukraine are presented in Figure 5.

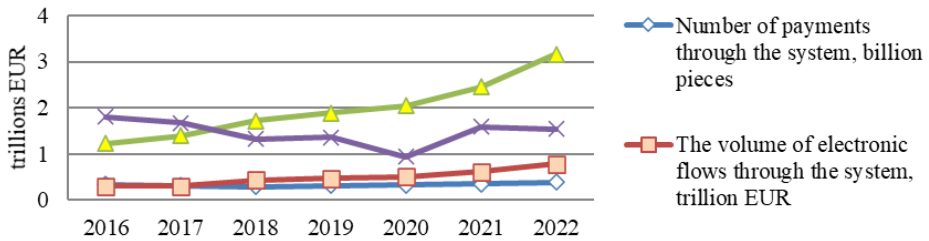

Figure 5: Volume of transactions in the SEP payment system of the National Bank of Ukraine for 2016-2022, trillion. EUR

Source: constructed by the authors based on data Ministry of Digital Transformation. 2023; National Bank of Ukraine, 2022a; National Bank of Ukraine, 2022b

Thus, the efficiency of loading the SEP of the NBU and annual transactions in the system for the period 2016-2022 are increasing, despite the wartime and severe financial difficulties in the country's economy. In 2022, the volume of payments amounted to 788.1 billion EUR, the number of transactions carried out by electronic flows – 384 million pieces,

which compared to 2016 is 2.6 times more in terms of the potential of transfers in national currency and 10.6% in terms of the number of transactions. The turnover ratio of funds in the SEP of the NBU during the study period ranged from 0.94 to 1.64, which had a dynamic trend of fluctuations and is explained by the volume of the average daily balance of funds on the accounts of system participants (in 2020-2021, the average daily balance increased by 54.8%). In 2021-2022, the ratio in relation to 2020 increased by 69.1% and 63.8%, respectively.

In the SEP of the NBU, funds are transferred in file mode and in real time based on the obligations of the banks and on the instructions of the clients of the banks, as well as other system participants. The exchange of electronic settlement interbank documents in file mode takes place through document circulation, which are grouped into separate files. If transfers or payments are made through the Electronic Payments System in real time, then the funds are debited from the technical account of the payer of this payment system and simultaneously credited to the account of the SEP participant (Figure 6).

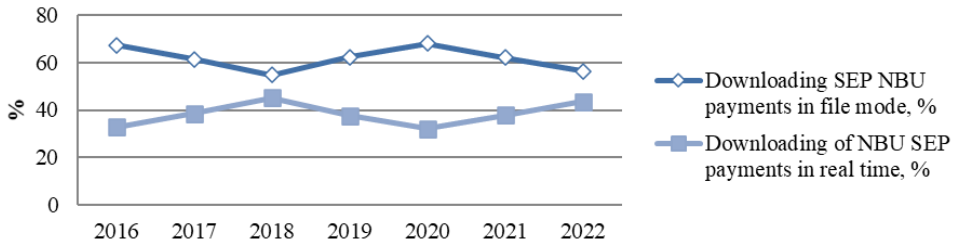

Figure 6: Download volume of NBU SEP by volume of electronic payments in file mode and real time, %

Source: constructed by the authors based on data Ministry of Digital Transformation, 2023; National Bank of Ukraine, 2022a

Thus, the NBU's SEP during 2016-2022 shows that the share of real-time payments increased dynamically until 2019 (from 32.7% in 2016 to 45.2% in 2018). However, from 2019 to 2020, its changes took place, which had a decreasing trend from 37.7% to 32.1%%, which is connected with the decrease of system participants and the reorganization of the country's banking system. The regulation of the infrastructure of bank payment services by the National Bank of Ukraine in the period 2020-2022 made it possible to gradually restore payment transactions in real time to the level of 43.6%. At the same time, during this period, there was a decline in system payments in file mode, due to a change in the preferences of participants and users of this payment platform in the direction of ensuring the confidentiality and security of banking services through Internet banking from the use of FinTech innovations in its component (Catalog of FinTech companies of Ukraine et al., 2023; FinTech development strategy in Ukraine until 2025, 2023). Downloading of SEP payments of the NBU in file mode decreased from 67.9% in 2020 to 56.4% in 2022.

The adoption in 2007 of the Directive of the European Parliament and the Union No. 2007/64/EC on payment services (internal market), which amended Directives 97/7/EC, 2005/60/EC, became an important step in the further development of the financial space of the European Union. The directive regulates the principles of supervision of the provision of bank payment services and directions for the use of special payment instruments. Directive

of the European Parliament and the Union No. 2009/110/EU was adopted in 2009 and provided for the establishment of rules for working with electronic money. Prudential supervision over the work of financial institutions working with electronic money, as well as requirements for them, was separately presented (ISDA Margin Survey 007, 2023; Telnova et al., 2020).

The international bank account number (IBAN) began to be assigned to bank customers after the entry into force of Directive No. 2007/64/EU on payment services (2007) in 48 countries of the world, starting in 2010. At the end of 2019, the National Bank of Ukraine introduced the international bank account number account number (IBAN), which became mandatory for clients of Ukrainian banks when transferring funds and making payments in national and foreign currency. Yes, now the payer and recipient of funds can be quickly identified by IBAN. At the same time, you can also use the QR code for information about the international bank account number (Krakhmalev, 2007; Telnova et al., 2020).

In 2015, to improve payment services and protect users, the European Parliament adopted the second Payments Directive (PSD2), which entered into full force in the EU in 2018. This Directive was created to promote the development of a competitive environment and its innovation in the payment sector. This document regulates the functionality of credit organizations that must serve customers (ASPSPs that provide and service payment accounts of customers); Acanthus Information Paying Organizations (AISP); organizations that initiate online payments (the main purpose of their creation is to facilitate the use of online banking for making payments - PISP) and clients of payment services. Due to PSD2, changes were made to increase security measures for users when making payments. In order to ensure correct user authentication, the European Banking Association (EBA) has been given the following powers. The Second Payments Directive uses the rules for providing technology – SEPA Credit Transfer (based on the XML protocol), as well as the rules for exchanging messages – ISO 20022 (Euro Banking Association, 2023).

Over the past ten years, there has been an increase in payments in Europe, both in terms of number and volume of use of Internet services. At the same time, the number of their varieties by means of electronic payments, aimed at meeting the payment needs of consumers, is increasing. In Ukraine, compared to EU countries, non-cash payments, transfers, and settlements are only becoming more widespread (the highest percentage of use among young people, as well as in large cities). However, the war in the country does not allow the National Bank of Ukraine to implement legislative developments in the field of payments. It is the acceleration of the process of introducing the legal framework for the implementation of the Second Payment Directive of the occupied territory of the country and the popularization of mobile payments among the population (Telnova et al., 2020).

Great Britain conducts the most cashless transactions, which is due to the popularity of the Paym payment system, specially designed for smartphones, which, in terms of the potential for the development of bank payment services, increases the number of transactions compared to such payment systems as Apple Pay and Google Wallet. The dynamics of the number of electronic transactions in the countries of Europe and Ukraine is shown in Figure 7.

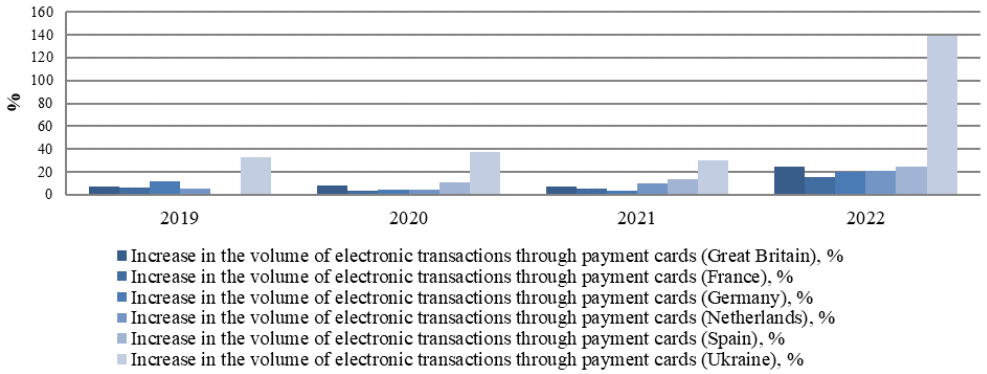

Figure 7: Growth rate of the volume of electronic transactions through payment cards in the countries of Europe and Ukraine, %

Source: built by the authors based on data Digital markets: FinTech. Statista, 2023; Chizh & Dzyamulych, 2012; European Central Bank, 2023; National Bank of Ukraine, 2022a; National Bank of Ukraine, 2022b

Thus, the rate of growth of electronic transactions through payment cards in Great Britain for 2019-2022 accelerated by 3.3 times, in France – by 2.4 times, in Germany – by 1.7 times, in the Netherlands – by 24.8 times, in Ukraine – by 4.2 times, which characterizes the progressive trend in the development of banking innovations and payment services.

Under the influence of the innovative and technological effects of digitalization in the European and Ukrainian payment space, new elements and segments of the market of banking payment services are being formed, virtual banks, financial companies developing FinTtch innovations, international electronic money systems, digital currency market tools are actively developing, online banking The trend towards strategic specialization of banks in two types of services: traditional and the latest allows to develop mobile online communication and enter the segment of retail payments of the global market, and thus provide the population with the possibility of instant payment for goods and services.

During the martial law in Ukraine, digital technologies in the market of bank payment systems remain attractive for investments. Ukraine is successfully moving towards the introduction of FinTech innovations on the market, which is confirmed by the diversity of startups, ideas, and the increase in the number of FinTech companies that continue to work and appear on the market, despite the crisis situation in the country. The state should support, first of all, by legislation, technologies working in the field of cashless payments, which, as practice shows, contribute to the effective operation of the digital economy, especially in times of crisis. It is obvious that the war made adjustments to all the positive aspects of digitalization, but the Ukrainian FinTech community continues to actively develop services and startups with the understanding that their activities are a progressive contribution to the country's post-war future.

4. Discussion

The functioning of the banking system in the conditions of technical and technological transformations definitely requires prompt response from bank management regarding the formation of new and relevant banking products and solutions offered to

clients. This is what determines the need for innovative activity of banking institutions, which in the practical plane is revealed through two main directions: innovations related to the introduction of new technologies directly into the system of real banking services for customers, which will include equipping banks with payment terminals, ATMs, smart branches, which work without service personnel; innovative solutions in the field of development of new software products and applications that are used by bank clients online with the involvement of various hardware and gadgets (FinTech development strategy in Ukraine until 2025, 2023).

The main reason for innovations in the banking sector, as well as in other sectors of the economy, is the prospect of making a profit. However, favorable conditions for the emergence of banking innovations are created, first of all, by changes in the external banking environment. The main institutional factor affecting the process of development and implementation of banking innovations is the existing system of banking regulation in the country, as well as the legislation that determines the development of other financial markets (Chub, 2009). Specific directions for the introduction of innovative products into the activities of banks are the implementation of 90% of technical, software and hardware solutions related to customer service technologies and conducting banking operations using online banking (Koval, 2012). This trend is due to the strengthening of competition in the market of bank payment services, because due to the large-scale spread of new network communication technologies, banks can work even in those markets that were previously not of interest to them due to the lack of physical branches or other representative offices in a certain territory.

Currently, the influence of banking institutions is spreading over market niches that were once the exclusive prerogative of small regional or specialized banks. Moreover, transnational financial and industrial groups gain access to specific sectors of the national markets of different countries, where they could previously operate with certain restrictions, and innovations in the provision of banking services through online banking make it possible to circumvent these restrictions. On the other hand, bank clients who use online banking are given the opportunity of round-the-clock access to perform various banking operations with their funds, which eliminates the concept of an operational banking day and dictated restrictions in the field of making payments (Kolodiziev et al., 2022).

Banking innovations are implemented in the field of online banking, which is formed in the conditions of a limited communication system and includes mixed channels of telephone, mobile and Internet communication between the bank and its customers. Functionally, online banking includes three main directions, which are characterized by different technical orientation of software solutions, which should be included in their innovative improvement. At the same time, it should be noted that the basic and most successful element of online banking is Internet banking, since all Digital software products and technologies are implemented in the system of economic relations of the European space and form a new digital economy based on Internet communication technologies (Milai, 2004). In addition, as practice shows, this type of communication is being developed in the Star Link network, which is implemented by SpaceX and aims to create a global satellite Internet network without any restrictions. In this regard, it should be noted that the global

spread of Internet communications threatens the disappearance of such a direction of online banking as telebanking (Mints et al., 2022).

Servicing bank clients using applications in mobile phones largely overlaps with Internet banking in technical solutions regarding the software shell of applications through which transactions are carried out by bank clients. It can even be argued that they come to a unified form, leaving behind only the difference in the way the communication channel is formed - if Internet banking works exclusively through Internet communication channels, then telebanking implements the same functions, but with the help of telephone communication channels communication and wireless access to communication with the servers of the bank itself (Krakhmalev, 2007).

The competitive position of banks in payment systems is largely determined by the quality and innovativeness of the development of Internet banking systems. Moreover, banking competition is not only about access to cheap financial resources that generate operational income for banks, but also about cooperation with customers who use these resources. This cooperation depends on the quality of technical solutions that are embedded in the Internet banking systems of each individual bank that is a participant in the market of bank payment services. That is, the efficient operation of banks, on the one hand, is impossible without the involvement of online banking systems. But on the other hand, online banking alone cannot allow the bank to feel confident in the market, as it requires constant technical and software updates in accordance with new trends in technological development (TOP-10 events on the Ukrainian FinTech market in 2022, 2023).

The main directions of implementation of innovative solutions in the field of improvement of banking products, which are implemented with the help of online banking, should correspond to the key directions of the development of the digital economy. Among the most sought-after areas of implementation of innovative solutions in banking activity in the near future, the following can be included: the use of cognitive technologies and artificial intelligence in the field of network customer service of the bank; introduction of cloud technologies into the system of banking services and internet banking; adaptation of banking products to their combination with the Internet at the software and hardware level; large-scale use of Big Data in analytical processes carried out by banks in the process of planning their activities; focus on the formation of such business models of banking services, which are based on banking digital platforms, which significantly simplifies the process of interaction between the bank and its customers; adaptation of bank payment systems for the possibility of using cryptocurrency as a means of payment (TOP-10 events on the Ukrainian FinTech market in 2022, 2023).

The foundations are defined in the document "Oversite of payment systems by the central bank" (Central bank oversight of payment and settlement systems, 2005), which presents the principles of effective oversight of payment systems, objects of oversight, banks' responsibility for oversight, regulation of the principles of joint oversight of payment systems in the market of banking payment services (Trusova et al., 2021). From the point of view of the control function, the payment systems oversight is a regulatory lever of the market of bank payment services, which ensures the safety and efficiency of the functioning of electronic cash flows, their monitoring in payment systems, and it is also a digital tool for the confidentiality of information (Figure 8).

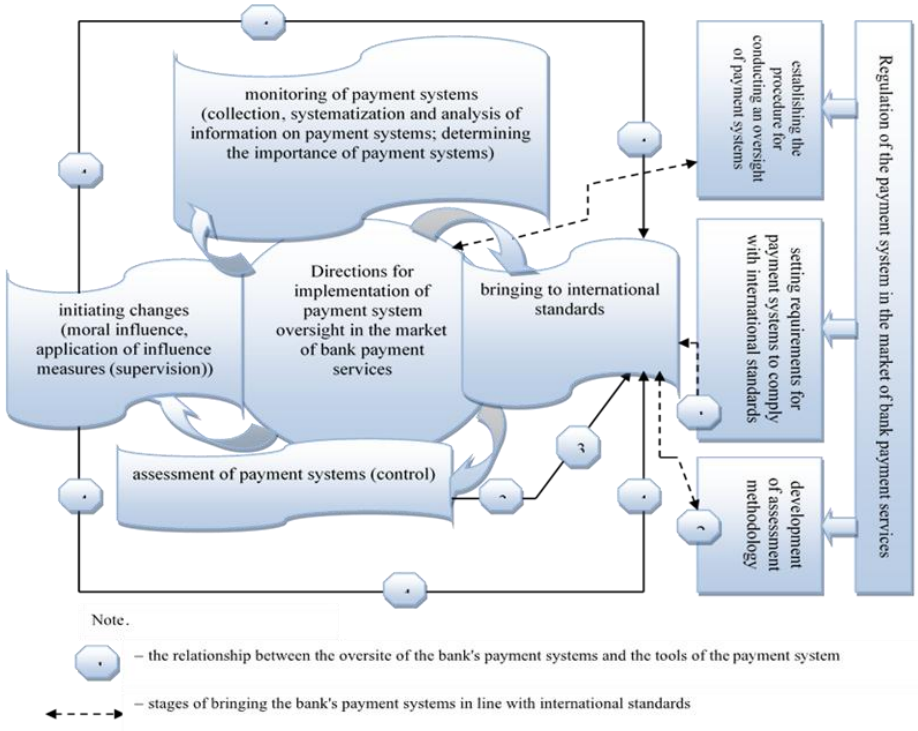

Figure 8: Areas of activity of the market of bank payment services and its implementation according to the functions of the oversite of payment systems

Source: developed by the authors based on data Central bank oversight of payment and settlement systems, 2005)

Payment systems operating on the market of bank payment services according to their areas of origin, settlement mechanisms, time distribution, methods of ensuring security in the environment of FinTech innovations, take into account the international standards of oversight in national payment systems, through their securitization on the financial market (TOP-10 events on the Ukrainian FinTech market in 2022, 2023; Versailles, 2010). The process of securitization of individual payment systems in the financial market, caused by the following economic factors: increased competition between banking institutions; increase in the cost of the resources involved; a decrease in the operating margin, which leads to a decrease in the income of banking institutions; the deterioration of the quality of bank payment portfolios, which, in turn, causes an increase in the requirements for payment instruments and regulators in the financial capital of banks (Securitization – Special Report, 2003; Tsyrulyk, 2018).

The securitization of the risk of payment systems must be implemented in Ukraine in the economic component of the functioning mechanism of the banking payment services market, which functions in the conditions of global digitalization, by diversifying payment portfolio settlement procedures, limiting the payment portfolio, and creating reserves of additional assets on the financial market. In Ukraine, diversification is carried out by distributing the settlement procedures of the payment portfolio of a banking institution among the participants of payment systems (SEP of the NBU), which differ in terms of cooperation

according to the spheres of influence in the economy and the geographical region that makes interbank electronic payments and transfers (FinTech development strategy in Ukraine until 2025, 2023; Milai, 2004). The proposed approach to securitization of the risk of payment systems placed in banking institutions will allow to reserve their additional assets on the financial market, which are divided into three main types (Trusova et al., 2021b):

1) Classic securitization of the risk of payment systems. A banking institution sells a share of its assets to a specialized legal company SPV (special purpose vehicle) for the placement of payment systems, which finances the purchase of these assets by issuing securities on the financial market [36]. The SPV must be completely separated from the primary owner of the assets (the bank) in order to prevent its exclusion from the consolidated group of financial companies (Catalog of FinTech companies of Ukraine, 2023; Chub, 2009) (developers of FinTech innovations) and avoid the possible consequences of insolvency of the primary shareholder.

The classical specialization scheme itself may include several stages: the first stage – the payment systems department of a banking institution conducts operations for providing and servicing credit payments and transfers; the second stage – the payment systems department together with the bank's payment portfolio risk management department forms a pool of homogeneous assets (capital); the third stage – at a joint meeting of the credit committee and the committee for managing electronic cash flows through payment systems, information on the formed pool of assets is considered; the fourth stage – the Board of the banking institution makes a decision on the securitization of the risks of payment systems and submits the issue to the Supervisory Board for consideration; the fifth stage – the Supervisory Board approves the decision of the Management Board; the sixth stage – the credit committee transfers the pool of assets to the SPV and writes it off the balance sheet; the seventh stage – SPV with the help of an underwriter, financial companies (developers of FinTech innovations) issue and place securities on the financial market; the eighth stage – hedging providers participate in minimizing the risk of payment systems.

2) Synthetic securitization of the risk of payment systems. The assets remain on the balance sheet of the banking institution, but the bank transfers the risk of losses from electronic transactions recorded through payment systems to the financial company (developer of FinTech innovations), for which it pays a premium or a certain amount of money. It is advisable to use this method in the case when the bank's asset (capital) pool is formed from a low-risk payment portfolio and their write-off can worsen the quality criteria (standards) of the risk of payment systems in the bank (Trusova et al., 2021b).

3) Accumulative securitization of the risk of payment systems (used mainly by small banks): the bank ensures the security of payment systems operating in the country and the volume of their transfer operations through foreign banks. At the same time, loans issued for the placement of payment systems are a condition for the preservation of securities (in fact, the sale of loans does not take place) (Trysova et al., 2021a).

It should be noted that despite the complexity of implementing the process of securitization of the risk of payment systems, the originator bank (banking institution) receives significant advantages, namely: instead of term assets, the bank receives liquid funds that can be used for further development; the range of potential investors is expanding; the probability of interest and credit risks in the bank, as well as liquidity risk, decreases

(securitization redistributes such banking risks between the bank, investor and intermediary); current economic standards improve (for example, the ratio of liabilities to equity); there is an opportunity to position itself as a financial institution capable of working with complex international financial instruments in the global payment system; the list of assets whose securitization is potentially possible is expanding.

5. Conclussions

In the modern structure of the market of banking payment services, which introduces innovations of the European digital environment, payment systems of large amounts dominate, which accumulate the largest cash flows and ensure the growth of the number of retail international payment systems with a large number of participants and, accordingly, a high level of competition. In most countries of the world, high-value payment systems are the main elements of the payment mechanism in the banking sector, in the stock and currency markets, in the implementation of monetary and currency policy measures.

The article focused on the specifics of the development of the banking payment services market in the context of the European vector of the development of the digital economy. Thus, during the study it was established that that the payment system at the mega-economic or global level was a "digital platform of electronic payments" of those states that provide international payment flows coordinated by payment instruments and regulated by the payment systems oversite. Areas of ensuring confidentiality and security of banking customer service were developed on the basis of modern online banking and FinTech innovations.

It was demonstrated that since the start of the EURO1 payment system and until 2022, there was a significant dynamic acceleration of the number of payment transactions. Apart from that, it was discussed that the electronic payment system of the National Bank of Ukraine (SEP of the NBU) was a state bank payment system created to ensure interbank transfers through accounts opened at the country's central bank. Thus, the efficiency of loading the SEP of the NBU and annual transactions in the system for the period 2016-2022 was shown, despite the wartime in Ukraine.

Moreover, it was proved that by the control function, the payment system oversight was a regulatory lever of the market of bank payment services, which ensured the safety and efficiency of the functioning of electronic cash flows.

In addition, it was confirmed that the most successful element of online banking was internet banking, since all digital software products and technologies were implemented in the system of economic relations of the European space and form a new digital economy based on communication technologies of internet communication.

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