Banking Innovations: Marketing Support in the Financial Market of Ukraine

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Abstract

The purpose of the article is to implement a comprehensive approach to assessing the relationship between marketing of banking innovations and financial stability of banking institutions, which under the influence of digital technology determine the innovative capabilities of the banking system, activating the innovation potential of the financial market. The leading method of research of this problem is the modeling of modified technologies that form a platform for the advancement of new banking products, considering determinants of influence on the development of modern marketing of bank innovations, allowing treating this problem as a process of purposeful transformation of the 4P marketing complex and its digitalization. The article presents a structural and functional model of the relationship between the priority areas of the "blue oceans" and the signs of evaluation of the marketing of banking innovations. An integrated assessment of the relationship between the innovation components of the marketing complex of banking innovations and the financial stability of banking institutions of Ukraine is made.

Keywords: banking innovations, marketing, banking system, banking institutions, digital technologies, financial market.

JEL:

Introduction

In the conditions of transformational changes in the economy of the world with a vector for the development of digital innovations in the banking sector and for overcoming the crisis of the banking system, an important role is played by the effective organization of movement and redistribution of society's resources in monetary terms. Global economic trends demonstrate the objective need to ensure the innovative development of banking institutions as a prerequisite for their survival in a period of financial instability, increasing the economic potential. The innovative development of banking institutions that need to increase the efficiency of marketing processes and their modern concepts and components allows for the formation of new approaches to ensuring their financial stability. It requires using

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marketing approaches throughout the life cycle of innovation, from innovative ideas to release-ready products.

Thus, the market of banking services can positively affect the level and rate of growth of the gross domestic product and the development of financial innovations in the banking sector of the economy, forming a separate direction of marketing activities in the financial market that is focused on quality satisfaction of current and future needs, services and marketing technologies; there is a need to take into account the interests of stakeholders in the innovative and profitable development of banks and to gain a competitive advantage in the face of increased competition between financial intermediaries, the impact of digitalization and financial instability (Yaroshenko et al., 2018). At the same time, the identification of risk factors for marketing banking innovations, in particular their systematization by determining the weighted average level of marketing risk of banking innovations allows to assess their impact on banking institutions, enabling the formation of an effective system of measures to minimize the negative consequences of financial instability.

The planning and implementation of financial innovation products on the financial market should take place through a well-established system of communication with the target market, thus meeting the needs of existing and potential customers, taking into account market trends from the standpoint of determining structural components of banking marketing priorities (Batiz-Lazo & Woldesenbet, 2006; Chen, 2006; Medvedieva et al., 2018; Lytvynenko et al., 2022) and determining the level of influence of the latter on the competitive position and financial stability of banking institutions (Ciciretti et al., 2007; Frait & Komárková, 2011; Frame & White, 2009), reducing the influence of some elements and the emergence of others (Gnatyuk et al., 2020; Frait et al., 2011). The priority of our study is to implement a comprehensive approach to assessing the relationship between the marketing of banking innovations and the financial stability of banking institutions that under the influence of digital technology determine the innovative capabilities of the banking system, activating the innovation potential of the financial market.

Materials and Methods

The assessment of the impact of the marketing of banking innovations on the financial stability of banking institutions is based on the conceptual model of "marketing mix 4P" and methods of its practical application (Borden, 2001) and is supplemented by models "5P" and "7P", which according to the content load detail the model "4P" (McCarthy & Perreault, 1993; Kotler & 2009). In addition, a "4C" marketing complex was introduced (Lauterborn, 1990), which changes the emphasis of marketing technologies from product to consumer (that is, the main importance is attached not so much to the product and its development, but to the consumer of the product and its receipt benefits) (Figure 1).

From the standpoint of the specifics of banking products and marketing, the complex "4C" is based on the initial elements of the complex "4P": product, price, distribution, promotion. Depending on the goals of banking marketing, additional elements are formed that help manage customer choice. The optimal complex "4P" in terms of digitalization forms a combination of marketing tools that ensure the rational use of available funds for the marketing budget of banking innovations.

The relative importance of each individual element of the marketing complex depends on various factors that influence the activities of banking institutions. One of these factors is digitalization, which affects the transformation of all components of "4P". In addition, digital technologies reduce banking "information asymmetry", save financial resources by reducing the cost of renting and maintaining the premises, reducing the number of staff, covering a wide range of customers, not limited to geographical location (Melnychenko, 2013).
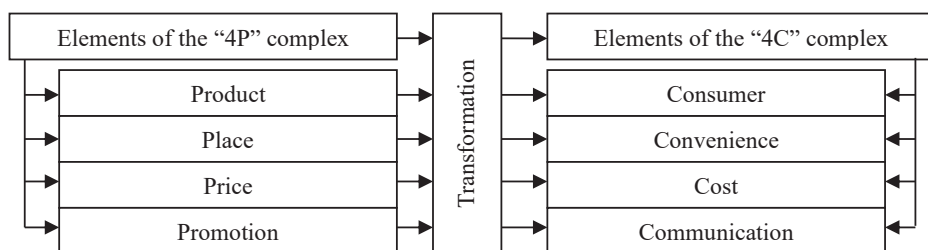

Figure 1. Transformation of the marketing complex "4P" into "4C"
Source: developed by the authors according to (Lauterborn, 1990; Mishchenko & Mishchenko, 2018)

An adaptive approach to the marketing complex in the digital transformation of banking products allows for the careful analysis of the structure of each variable included in the complex "4P", taking into account the specifics of its activities and target audience. That is, the components of the complex are established, which are manageable for the banking institution and are outside the sphere of its influence. They are as follows: basic variables (elements of the traditional marketing complex, such as product, price, place, and promotion); independent components (components of basic variables that have an independent status due to the bank specifics); derivative variables (they are constructed from combinations of independent components or combinations of basic variables in the case when it is expedient) (Doyl, 2003; Kotler et al., 2012).

It is necessary to establish a functional interaction between the marketing of banking innovations and the financial stability of banking institutions, highlighting the risk factors of financial instability that threaten the effective functioning of the banking system and the economy as a whole (Kozlovskyi et al., 2019).

We propose a sequence structure of analysis of factors (destabilizers) that affect the financial instability of banking institutions, namely: identification of structural and institutional imbalances in the economy, which are a constant source of risks of exacerbation of financial and currency crises; analysis of the banking system and opportunities to transform the banking crisis into a systemic one; assessment of the impact of the macro and micro environment on the functioning of banking institutions as institutional units. This will allow for a qualitative assessment of the risks of financial instability in the marketing of banking innovations in the financial market and the introduction of the priority direction of the "blue ocean" (Kim & Moborn, 2019. In the context of digital technology and increased competition between financial intermediaries, the "blue ocean" represents a unique direction for modeling innovations in banking products. That is, the "blue oceans" are the result of the

development of technological innovations in creating their value for consumers of banking services. Most "blue oceans" are based on functioning "red oceans" which have existed for a long time. The quantitative assessment of effective areas of the "blue oceans" forms a modern methodological approach "Value-Based-Marketing" (VBM) which from the standpoint of improving the value of business allows for identifying the value chain of marketing banking innovations that are consistent with aggregate banking services formation of primary value for sale to their consumers (Martin & Petti, 2006).

We suggest that the effectiveness of marketing of banking innovations should be calculated based on two indicators: net income from marketing activities and the index of profitability of marketing activities in a banking institution. Based on the method of T. Lepeiko and Yu. Kotelevska, (2012), we propose to determine the indicator of net income from the implementation of priority areas of the "blue oceans" and signs of evaluation of marketing of banking innovations by equation (1):

$$NPV = \sum_n \frac{P_k}{(1+r)^n} - \sum_n IC, \qquad (1)$$

where, NPV – net income from the sale of "blue oceans" for the development of marketing of banking innovations; P_k – income of the banking institution from the implementation of the priority areas of the "blue oceans" for the development of the marketing of banking innovations for a certain period; r – discount rate of the national bank for a certain period; n – the number of years for the implementation of priority areas of the "blue oceans" in the marketing of banking innovations; IC – costs for the development and implementation of priority areas of the "blue oceans" in the marketing of banking innovations.

The profitability index of innovation marketing measures in a banking institution is calculated by equation (2):

$$PI = \sum_n \frac{P_k}{(1+r)^n} : \sum_n IC \qquad (2)$$

where, P – index of profitability of innovation marketing measures in a banking institution.

The net present income from the implementation of the priority areas of the "blue oceans" of the marketing of banking innovations is defined as the value obtained based on discounting the difference between all costs of the bank for the introduction and sale of new banking products and net income (loss) from the implementation of innovations. Since net income is considered over several years, depending on the validity of the priority areas of the "blue oceans", it is discounted at the discount rate of the national bank, that is at the price on which depends the value of borrowed and placed funds of the banking institution in the financial market to promote marketing innovations and their maintenance. The profitability indicator, in contrast to net income, determines the profitability or unprofitability of the application of innovation marketing measures in a banking institution. Thus, the development and implementation by banking institutions of effective areas of the "blue oceans" for the marketing of banking innovations will facilitate the timely introduction to the market of new products and services, creating a competitive advantage. Using the proposed comprehensive approach to assessing the relationship between marketing banking innovation and financial stability of banking institutions will determine the impact of digital technology tools and its innovation in the banking system focused on meeting customer needs, reducing the

financial uncertainty and consumer risks of new banking products.

Results and Discussion

Banking innovations are characterized by marketing support in the financial market with modified technologies that are interdependent with marketing methods that form a platform for the promotion of new banking products, taking into account the goals of modern marketing. First, numerous objective factors that do not depend on the marketing activities of banking institutions dictate the development of marketing of innovations. These factors include the following: global conditions of competition under the influence of digital transformation; up-and-coming conditions for the transition to innovative banking technologies; the changing role of banking institutions in the financial market (disintermediation); intensified development of new banking products. Secondly, the need for the development of banking marketing

and the formation of specific innovative marketing tools in the financial market and the development and implementation of new banking products and services under the influence of digitalization necessitate the use of new technologies for the operation of marketing activities of banking institutions (Piddubna, 2018).

It should be noted that the source of instability at the global and national levels are the processes of transformation of financial market actors and the reproduction of financial resources through intermediaries. These processes are dialectical in nature. On the one hand, under the influence of the digital economy, they are able to promote the formation of new powerful impulses for innovative development, and on the other, due to the growth of types and volumes of digital financial technologies, there are disparities that exacerbate critical contradictions in the economy (Table 1).

Table 1. Factors influencing the development of the marketing of banking innovations in conditions of financial market instability

Group of factors	Characteristic
Factors of globalization nature (metalevel)	The complexity of the functioning of international banking systems and the use of new financial instruments, the variety of operations and the speed of movement of financial capital, which increases the number of banking risks, their manifestations and possible consequences (the emergence of systemic risk). Requirements for new conditions for the functioning of banking institutions, through the creation of a foreign network of divisions, the introduction of common global standards of customer service. Reducing the share of traditional intermediation, reorienting cash flows to securities markets, which, thanks to new technologies, are able to provide liquidity of banking institutions, transparency, financial security and high profitability. Modification of the banks' strategies due to the focus on changes in the economic situation in the world. Unification of the entire financial sector of the economy of different countries when working in both domestic and foreign markets. Lack of opportunities for the national economy to remain completely closed from foreign capital, which leads to increased competition. The growth of the share of knowledge-intensive industries in the economy leads to an increase in investment and credit resources that have low profitability and a longer period of their return and payback. Improving the level of information and computer support of banking institutions, expanding the range, improving the quality of services and competitiveness in the market.

Group of factors	Characteristic
Factors national character economic development (macro level)	The state of the economy, in which intelligence and innovative solutions determine the pace and prospects of economic development and man becomes the driving force of production, aimed at increasing his abilities and increasing the set of his needs. Development of information and communication technologies and formation on their basis of network economy in which joint projects acquire special value. Information and financial awareness of customers. Changes in the regulation of banking and the functioning of financial markets. Changing demand for banking products due to declining household incomes.
Intrabank factors (micro level)	The need to spread new communication and information technologies, global telecommunications. The level of innovation potential of banking institutions which is determined by the ability to generate, perceive and implement innovative ideas, using available and potential resources. Existence of an effective risk management system capable of objectively assessing and minimizing innovation risks together with other banking risks. The state of innovation culture which is manifested in the willingness of bank employees to innovate in all areas of the banking business and their ability to create innovative ideas. The nature of financial instability of banks, the need to implement tools and methods of macro-regulation, improvement of micro-regulatory methods.

Source: systematized by the authors according to (Caccioli et al., 2009; Beck et al., 2012)

Financial instability as a result of irrational optimism of investors encourages the overvaluation of assets, causing a sharp increase in the risk of deterioration of the banking sector of the economy. The main causes of financial instability include increased volatility of financial markets and deteriorating solvency of financial intermediaries (Crockett, 1997). The development of crises contributes to the spread of financial derivatives, which create conditions for a multiple expansion of financial resources in the market. The growing level of financial instability leads to a significant excess of credit growth compared to GDP. This causes credit risk, which leads to a decrease in the income of borrowers and the loss of their ability to fulfill obligations on time to banking institutions. We suggest that the state of the banking system is identified depending on the level of risks and external shocks, such as stability, instability, volatility and crisis (Table 2).

In the absence (weakness) of external shocks, the financial condition of the banking system can be defined as "financial stability"– the banking system is able to perform its functions (payments, transformation of savings into a resource of economic growth, etc.). With a small or minimal level of risk, the state of the banking system is characterized as "financial volatility", and in this case, the violation of the functions of banking institutions will be minimal and short-term. In some cases, financial stability can be restored without the intervention of the regulator (bank risk management) (Zveriakov et al., 2016).

Table 2. The state of the banking system depending on the accumulated risks and external shocks

Criteria for determining the state of the banking system		Accumulated risks			
		minimal	insignificant	significant	critical
Level external shock	strong	Financial volatility		Financial crisis	
	moderate				
	weak	Financial stability		Financial instability	
	absent				

Source: compiled by the authors according to (Frait & Komárková, 2011)

Among the factors of financial instability of the banking system are financial innovations in the form of complex financial instruments CDO (Collateralized Debt Obligations), ABS (Asset Backed Securities) and CDS (credit default swaps) (Dimsdale, 2009). In addition, the complexity of financial and banking innovation limits the ability of investors to adequately assess risks (Simkovic, 2013) and weakens banks' credit standards (Carbo-Valverde et al., 2015). It should be noted that the causes of financial instability are prompted not only by the cyclical development of the state economy but also by the strategy of using banking marketing, in which investors plan unrealistic expectations of profit, borrowing funds to buy assets and bringing their prices to a high level. The negative impact of excessive competition leads to aggression in the implementation of the marketing strategy of banking institutions (Tushaj & Sinaj, 2012), which leads to some sources of financial instability such as the transformation of terms, financial leverage and credit expansion.

Banking institutions look for sources of increased lending activity in conditions of fierce competition and increase return on assets without adequate capital growth (expansion and reduction of leverage). Banking institutions are forced to increase lending terms without changing the term of borrowing (transformation of terms), which increases credit risk and market share in the structure of the real sector of the state economy. The main sources of uncertainty in the implementation of the marketing tasks of banking innovations include: uncertainty of actions of competing banks or financial intermediaries (Fintech) in the market of banking services; ambiguity of forecast estimates of the results of the introduction of new banking products and their impact on the processes of socio-economic development of the country; uncertainty of goals and criteria for the effectiveness of the marketing of banking innovations, as well as the need to take into account a significant number of factors when making decisions; the lack of information, especially quantitative data needed to make marketing decisions to create and promote banking innovations in the market; concepts, methods and tools of banking marketing, which occur under the influence of digitalization processes (Karmynskyi & Zhdanova, 2013).

Thus, the marketing of banking innovations can have a stabilizing and destabilizing effect on the financial condition of banking institutions or the banking services system as a whole. On the one hand, the introduction of banking innovations helps to minimize risks and increase profits. On the other hand, however, there is a destabilizing effect associated with information asymmetry, the emergence of credit risk, and the diversion of funds for innovation, while equity increase is ignored even though it is a necessary component in developing a marketing strategy for banking innovations. Summarizing the above, we propose to determine the interaction of the marketing of banking innovations and financial stability to distinguish the destabilizing and stabilizing determinants of the banking system that are shown in Figure 2.
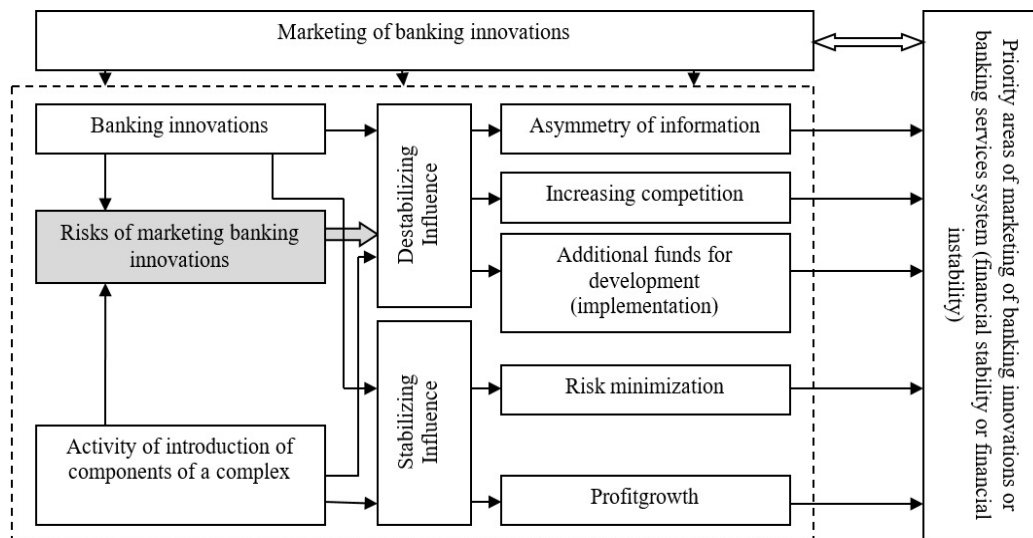
Figure 2. Directions of mutual influence of marketing
of banking innovations and stability of banking institutions
Source: developed by the authors

A significant amount of banking products is sold through information technology, which, in turn, plays a key role in product differentiation and customer engagement. In the banking system of Ukraine, the digital transformation has allowed to form Digital channels (networks of ATMs, Internet banks, mobile banks, chat bots) and create an effective interaction between consumers and banking institutions at the most acceptable time for them. The digital products that have been introduced are "Big Data", contactless payments, virtual cards, artificial intelligence, etc. With the help of advanced modern software, E2E (end to end) products have been created, which satisfy the demands of bank customers around the clock (Figure 3).
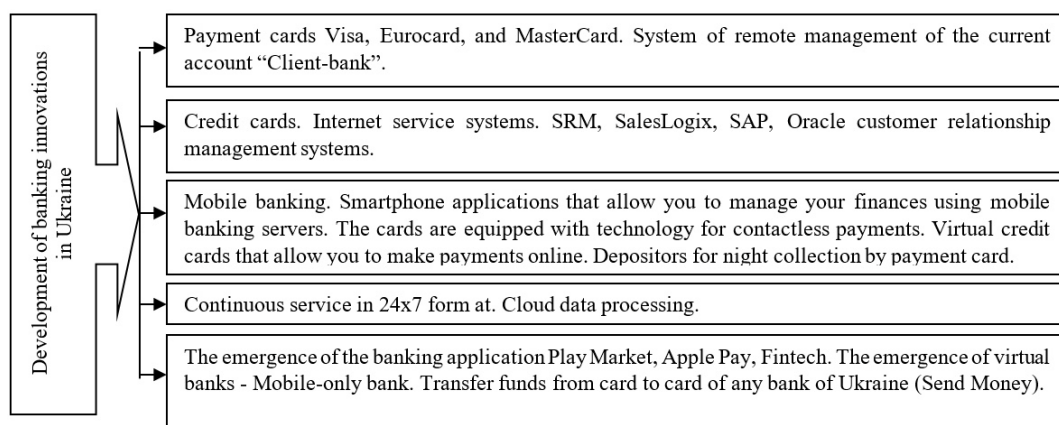

Figure 3. Development of banking innovations in Ukraine
Source: compiled by the authors according to (Kuznietsova & Shmuratko, 2018)

The creation of artificial intelligence ("Digital Brain"), which continuously automatically studies the data of all banking business segments, will contribute to a broader understanding of their capabilities and customer needs. The current cycle of digital servicing of traditional banking products through Digital services and the introduction of new digital services in the network business model of the banking system of Ukraine has influenced their competitiveness in domestic and global financial markets. Note that the world's banking institutions are already using artificial intelligence to experiment with personalizing their services. For example, in the USA pilot projects on use of artificial intelligence of automated consultants for interaction with clients are realized in a system of artificial intelligence, all procedures and mechanisms of rendering of necessary service are described, the history of calls, the history of use by bank services of bank etc. is formed. The peculiarity of the fifth stage is the introduction of "Digital DNA", which is a new system for making priority decisions about the life cycle of a banking institution.

Online services have significantly contributed to the development of marketing banking innovations (World Finance, 2020): First National Bank (FNB) (South Africa) is recognized as the most innovative financial institution in Africa, largely thanks to customer-focused technologies: fingerprint recognition and live chat with private bankers. FNB also offers a full suite of digital tools for small business owners, including DocTrail, a document tracking service, automatic account replenishment and linking to payments. EVO Banco (Europe) offers the following innovative products: smart mortgage, which varies depending on market conditions and has a free year of life insurance; an intellectual account that automatically transfers money from a current account to a savings account when it reaches a certain balance; the use of artificial intelligence to interact with customers. Banking institutions that actively use the marketing of banking innovations offer a number of social and environmental initiatives: New Zealand Banking Group (ANZ) creates projects that help businesses reduce the risks of environmental impact; Banco Popular Dominicano seeks to improve both the domestic culture and the technological infrastructure through the introduction of the most advanced goods and services in the country; National Commercial Bank is the first bank in Saudi Arabia to receive an international certificate for leadership in social responsibility through women's financial inclusion; US Bank provides services to customers to obtain financial resources through its own training center.

Within the latter, competitive advantages are seen as the right choice between the direction of differentiation of innovation activities of banking institutions and reducing the cost of introducing new products. The priority areas of the "blue oceans" combine these two factors for the development of the marketing of banking innovations (Figure 4).
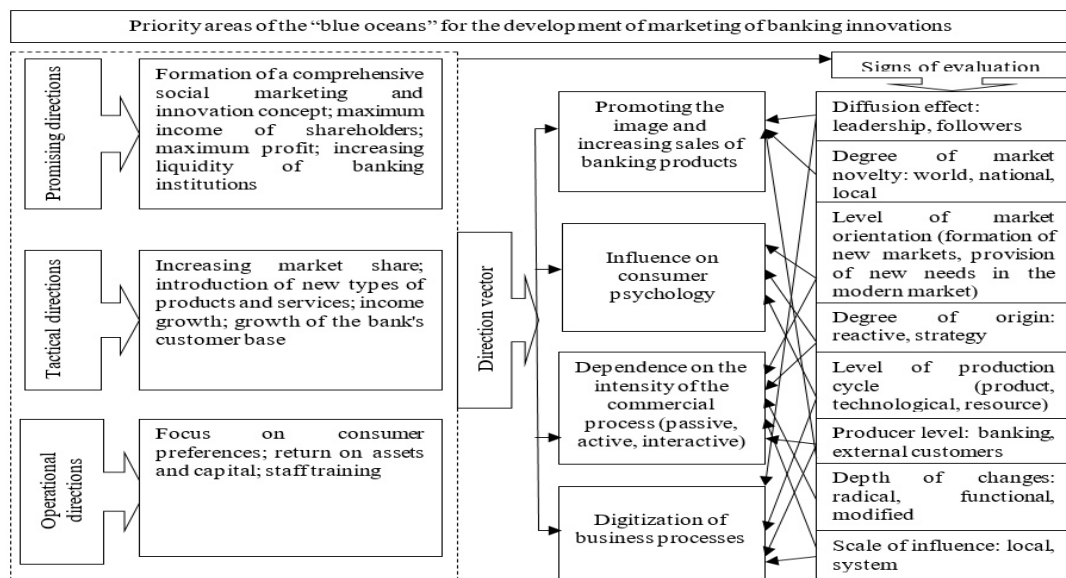
Figure 4. Structural and functional model of interrelation of priority directions of "blue oceans" and signs of estimation of the marketing of bank innovations

Source: developed by the authors according to (Kim &Moborn, 2019; Helm et al., 2014)

The threat to the competitiveness of banking institutions is not only financial technologies (Fintech) but also the so-called FinTech-firms which use a combination of technology with customer-centric service and flexible business structure to reduce costs, expand customer base and increase market share in the financial market (Zherdetska & Horodynskyi, 2017). In Ukraine, the greatest demand is for such banking services as issuing and servicing payment cards (70%), payment (61%), and Internet banking (53%) (Figure 5). The innovative development of banking institutions of Ukraine in 2020 underwent changes in many areas. Thus, the level of introduction of Internet banking in the first group of surveyed institutions with a state share is 67%, in the second (foreign banks) is 86%, in the third (banking institutions with private capital) is 76.2%. It should be noted that only 43% of banking institutions offer their customers mobile applications for managing their own accounts making payments, managing deposits and paying for utilities, etc.

Blockchain technology as a priority of the "blue oceans" of the marketing of banking innovations allows you to save and use the resources of the participants Fintech. That is, the transaction is carried out without the participation of the main counterpart (banking institution or payment system), while providing the conditions for the creation of crypto currency by recording information about transactions (KPMG, 2021).
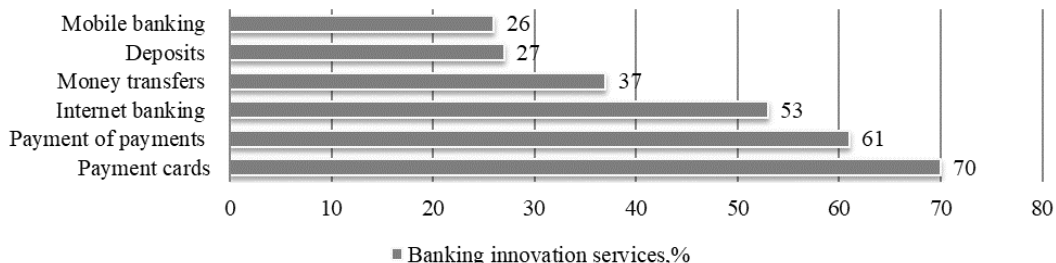
Figure 5. Innovative banking services via the Internet in Ukraine, %
Source: calculated by the authors according to (National Bank of Ukraine, 2020)

More than 245 billion USD (of which 243 billion USD belongs to China) in the Asia-Pacific region that was sent through an alternative online platform is P2P lending (Mellow, 2019). However, the world leaders in P2P lending are the United States, Great Britain and China. Its fastest growth in the Asia-Pacific region was due to Singapore (216 million USD; year-on-year growth of about 163 million USD). As a result, Singapore became the sixth largest market in the region with a total of 163.75 million USD (Lomochynska & Kunytsia, 2018). Therefore, the best solution for most banking institutions is to create innovations in partnership based on business platforms that combine traditional banking and financial technologies. In Ukraine, Fintech is reflected in the financial sector, primarily in the field of P2P lending, as an alternative to retail lending. In the P2P lending model banking institutions perform only technical functions to provide services to potential creditors and borrowers for a certain amount of commission (Mishchenko & Mishchenko, 2018). In Ukraine, P2P lending services began to be provided by JSC CB "PrivatBank", offering high yields (on average + 5% per annum of base rates on deposits) (Zherdetska & Horodynskyi, 2017).

Among the non-bank digital payment services that prefer individual and customer-oriented approaches are the English electronic payment systems Skrill and Transfer Wise, as well as the American companies Venmo and Braintree, which are part of the international payment system PayPal and WePay. The partner of the Transfer Wise system is JSC CB "PrivatBank" of Ukraine (Mishchenko & Mishchenko, 2018). In addition, Fintech includes online loans through the use of electronic payment systems. For example, Monobank has appeared in Poland as an online structure with a high-tech IT platform with more than 200 functions. The Hungarian group OTP Group has created a similar Touch Bank, which focuses on customers of the affluent segment from "middle class and above". There are six neo-banks registered in Great Britain that receive significant investment resources to support innovation (Fintech 100: Leading Global Fintech Innovators, 2019). In Ukraine, Neobank (digital bank – Monobank) provides services for payment, microcredit and deposits for individuals through a mobile application. Monobank works in partnership with JSC UNIVERSALBANK and actively forms its own customer base. According to the 2019 Fintech 100 rating, neo-banks

have increased their representation to 10 companies, including companies such as Monzo, Number 26, SolarisBank, StarlingBank (KPMG, 2021). The TOP 10 includes such financial companies as Ant Financial (China), JDFinance (China), Grab (Singapore), Baidu (DuXiaoman Financial) (China), Sofi (USA), Oscar Health (USA), Nubank (Brazil), Robinhood (USA), AtomBank (Great Britain), Lufax (China), (Novack & Kauflin, 2020). In 2020, in Ukraine Fintech providers are working in the areas (Figure 6).
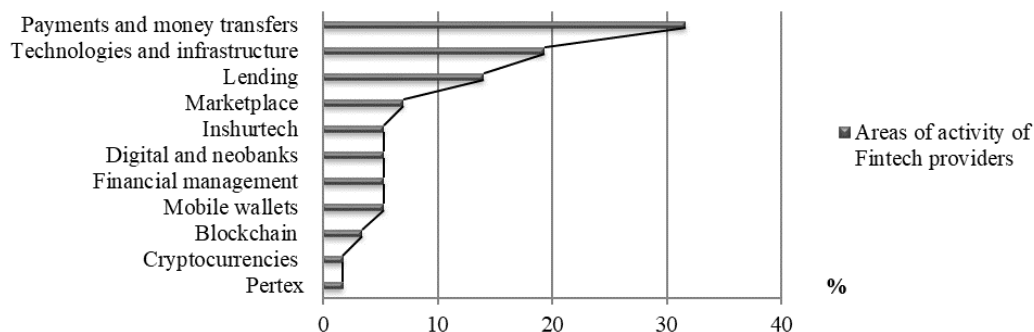

Figure 6. Areas of activity of Fintech providers in Ukraine in 2020
Source: calculated by the authors according to (National Bank of Ukraine, 2020)

Partnerships with banking institutions and international payment systems include platforms for P2P (card transactions, payment cards with logos of several companies and other payment services), which are introduced through JSC FIRST UKRAINIAN INTERNATIONAL BANK (9.4%), JSC Oschadbank (16%), JSC ALFA-BANK (14%), Raiffeisen Bank Aval JSC (11.6%), TASCOMBANK JSC (26%) and international payment systems (Visa / MasterCard is 23%). At the same time, the product range of innovations of banking institutions takes into account the components of the marketing complex based on the basic model "4P", which includes the product (product policy), price (pricing policy), point of sale (competitive position), promotion (sales policy). The components of the marketing complex allow you to maximize profits, the growth of which depends, firstly, on the market share of the banking institution and the number of customers, and secondly, on liquidity, riskiness and profitability of operations.

The relationship between individual components of "4P" banking institutions of Ukraine and the results of their financial stability (both traditional indicators characterizing the elements of the complex and innovative components of the marketing complex of banking innovations) is generalized and shown as an integrated indicator (Figure 7).
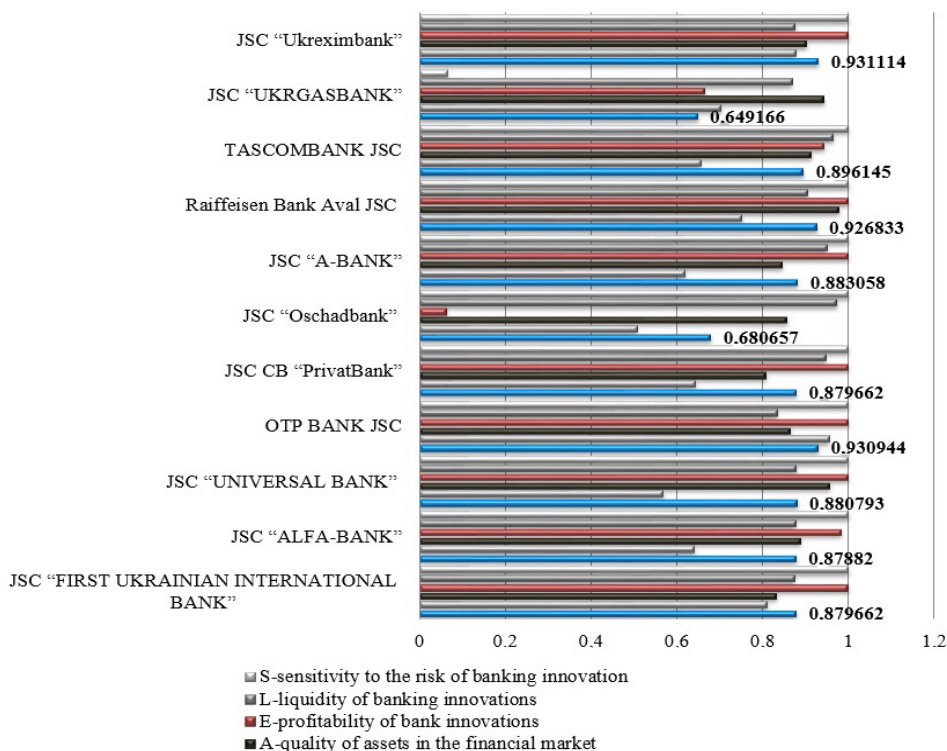
Figure 7. Integral assessment of the relationship between innovation components of the
innovation marketing complex and the financial stability of banking institutions of Ukraine in 2020
Source: calculated by the authors

As the data of figure 8 show, the leaders in the use of the marketing of banking innovations are JSC CB PrivatBank, JSC UNIVERSAL BANK, JSC ALFA-BANK, JSC FIRST UKRAINIAN INTERNATIONAL BANK, JSC Oschadbank, JSC A-BANK, Raiffeisen Bank Aval JSC, JSC UKRGASBANK and OTP BANKJSC. Comparing the assessments of the "4P" complex in general and the marketing of banking innovations, it should be noted that at the present stage of development of the banking sector of Ukraine, the innovation component contributes to the effective use of the components of the "4P" complex. This conclusion is supported by the high value of the correlation coefficient between the estimates of the "4P" complex in general

and its innovative component in particular (89.03%).

The banking system is able to absorb the imbalance of marketing activities of banking institutions after short-term imbalances with a weak change in asset prices. At the same time, financial stability as a process should include a reliable assessment of financial risks and an effective management system, using an innovative approach to restoring the marketing activities of banking institutions after external shocks or increasing imbalances, any deviations from safe parameters caused by crises (Herrero & Simo, 2006). Note that the risks of marketing banking innovations (payment systems) by origin and the possibility of influencing the financial stability

of banking institutions are more manageable. Therefore, when determining the level of *n-th* risk, matrix values can be adapted according to the method of expert assessment. Risk assessment of the marketing of banking innovations (payment systems) is presented in Table 3.

Table 3. Risk assessment of marketing of banking innovations (payment systems) in Ukraine

Component risk assessments of payment cards	2017	2018	2019	2020
Google Pay				
The level of credit risk	x	0.304	0.297	0.220
Level of liquidity risk	x	0.208	0.203	0.150
Level of business risk	x	0.207	0,198	0.164
Level of innovation risk	x	0.112	0.101	0.106
Level of operational risk	x	0.310	0.288	0.271
The level of risk of technological and information security	x	0.344	0.311	0.329
Monobank				
The level of credit risk	0.127	0.137	0.135	0.100
Level of liquidity risk	0.048	0.047	0.046	0.034
Level of business risk	0.069	0.068	0.066	0.049
Level of innovation risk	0.042	0.042	0.041	0.031
Level of operational risk	0.051	0.050	0.046	0.048
The level of risk of technological and information security	0.046	0.045	0.041	0.043
MasterCard				
The level of credit risk	0.007	0.007	0.007	0.004
Level of liquidity risk	0.012	0.009	0.009	0.007
Level of business risk	0.003	0.003	0.003	0.002
Level of innovation risk	0.002	0.005	0.004	0.004
Level of operational risk	0.007	0.010	0.007	0.009
The level of risk of technological and information security	0.004	0.002	0.005	0.007
Visa				
The level of credit risk	0.071	0.068	0.067	0.049
Level of liquidity risk	0.024	0.024	0.022	0.017
Level of business risk	0.041	0.033	0.032	0.024
Level of innovation risk	0.022	0.021	0.020	0.015
Level of operational risk	0.014	0.031	0.022	0.024
The level of risk of technological and information security	0.015	0.022	0.020	0.021
PROSTIR				
The level of credit risk	0.267	0.101	0.094	0.031
Level of liquidity risk	0.126	0.148	0.150	0.111

Component risk assessments of payment cards	2017	2018	2019	2020
Level of business risk	0.064	0.055	0.043	0.199
Level of innovation risk	0.025	0.01	0.039	0.039
Level of operational risk	0.052	0.026	0.014	0.013
The level of risk of technological and information security	0.293	0.421	0.204	0.301
Privat24				
The level of credit risk	0.010	0.065	0.058	0.004
Level of liquidity risk	0.282	0.116	0.183	0.006
Level of business risk	0.045	0.350	0.210	0.056
Level of innovation risk	0.011	0.024	0.034	0.290
Level of operational risk	0.065	0.062	0.060	0.029
The level of risk of technological and information security	0.054	0.186	0.053	0.073
Oschad 24				
The level of credit risk	0.180	0.358	0.414	0.001
Level of liquidity risk	0.063	0.258	0.310	0,. 88
Level of business risk	0.273	0.258	0.032	0.453
Level of innovation risk	0.519	0.235	0.060	0.561
Level of operational risk	0.002	0.001	0.006	0.001
The level of risk of technological and information security	0.005	0.005	0.006	0.006
Apple Pay				
The level of credit risk	x	0.009	0.009	0.009
Level of liquidity risk	x	0.008	0.007	0.008
Level of business risk	x	0.009	0,009	0.008
Level of innovation risk	x	0.008	0.007	0.009
Level of operational risk	x	0.008	0.008	0.009
The level of risk of technological and information security	x	0.011	0.011	0.010

Source: calculated by the authors

Thus based on the results of the risk assessment of payment systems of banking institutions of Ukraine, taking into account the existing level of probability of threats, it can be concluded that the highest risks have the payment system Oschad 24, whose values ranged from 0.414 credit risk in 2018 to 0.561 (level of innovation risk) in 2020, which was largely due to the low level of fulfillment of its financial obligations and the availability of financial assets in the financial market. Quite a high level of risk is observed in the domestic payment system PROSTIR, which was 0.267 (level of credit risk) in 2017 and 0.421 (level of risk of technological and information security) in 2018, due to changes or the unpredictable application of legislation. The highest risks of the Google Pay payment system are credit risk, liquidity risk, business risk, operational risk and technological and

information security risk. The reliability and security of the Monobank payment system is reduced largely under the influence of credit risk, which indicates the low effectiveness of risk management policy. Among the risks of the Privat24 payment system, which reduce the security of use of this payment system, it is worth noting the liquidity and business risks. The most secure payment systems currently in operation are Visa, Apple Pay and MasterCard.

Forecasts

Modern risk management theory has a number of quantitative and qualitative methods of assessment and analysis. During the qualitative analysis, all possible risks that may arise in the activities of banking institutions are identified; risk factors and business processes within which the identified risks may arise are identified. The results of the qualitative analysis are the starting point for quantitative analysis. Quantitative analysis makes it possible to assess the scale of the consequences of the occurrence of risk-related situations, to determine the degree of impact of risks on the performance of banking institutions. The difficulty of risk assessment is due to the vague goals of marketing programs and the lack of regulation of the main processes in decision-making. In our opinion, the assessment of the marketing risks of banking innovations should be carried out using the method of cost-effectiveness analysis, the method of expert assessments and the method of using analogues. The method of expert assessments combines logical and mathematical tools that allow you to assess the risks in determining the relative characteristics for complex formalized tasks. Given that, the risks of marketing banking innovations are informal and insufficiently studied. We selected five Ukrainian banks to conduct an expert assessment of the risk factors for marketing banking innovations, namely: JSC CB "PrivatBank", JSC "ALFA-BANK", JSC "Oschadbank", OTP BANK JSC and JSC "UNIVERSAL BANK". In order to provide an expert assessment of risks to build relationships between objects of the empirical system (risk factors), the authors used the method of assessing the significance of each of the factors within the group or ranking. The results of the expert survey are presented in Table 4.

Table 4. Estimation of probability of occurrence and degree of influence of risks of marketing of innovations in banking institutions of Ukraine

Risk factors for marketing banking innovations	JSC CB "PrivatBank"		JSC "ALFA-BANK"		JSC "Oschadbank"		OTP BANK JSC		JSC "UNIVERSAL BANK"	
	r	p	r	p	r	p	r	p	r	p
Group I. Risk of inappropriate management of banking innovations										
Lack of developed marketing policy	1	0.1	1	0.2	1	0.3	1	0.3	1	0.3
Inconsistency of the developed marketing strategy with the measures of its practical implementation	2	0.2	3	0.3	2	0.2	2	0.2	3	0.3

Risk factors for marketing banking innovations	JSC CB "PrivatBank"		JSC "ALFA-BANK"		JSC "Oschadbank"		OTP BANK JSC		JSC "UNIVERSAL BANK"	
	r	p	r	p	r	p	r	p	r	p
Inconsistency of the developed product (service) of the bank's development strategy	3	0.3	2	0.3	2	0.2	2	0.4	2	0.3
Lack of support for innovation implementation by management	2	0.4	2	0.2	2	0.3	1	0.1	1	0.1
Group II. Risks of non-compliance of the quality of innovative products and services with consumer requirements										
Lack of sufficient resources for product development	1	0.1	1	0.1	1	0.1	1	0.1	1	0.1
Lack of developed technological map of product implementation	2	0.1	2	0.15	1	0.1	2	0.1	2	0.1
Clearly defined product characteristics and service conditions have not been developed	3	0.15	2	0.15	2	0.15	2	0.1	2	0.1
The characteristics of the product are unclear to the end user	2	0.25	3	0.2	2	0.2	3	0.15	3	0.15
Product features are unclear to staff	2	0.2	2	0.15	2	0.15	2	0.15	2	0.1
Insufficient level of technological conditions for implementation	1	0.1	2	0.1	1	0.15	1	0.2	2	0.25
The technological capabilities of the bank and end users for the introduction of innovative products do not coincide	2	0.1	1	0.15	1	0.15	2	0.2	2	0.2
Group III. Risks of inefficiency of the banking institution's pricing policy for innovative products and services										
Price conditions for innovative products and services are defined incorrectly	2	0.2	2	0.3	3	0.4	3	0.35	3	0.3
Projected revenues from the introduction of innovative products and services will not cover costs	1	0.4	1	0.3	1	0.3	1	0.35	1	0.4
Price conditions for innovative products and services make the latter unavailable to end consumers	1	0.4	2	0.4	3	0.3	2	0.3	2	0.3
Group IV. Risks of inefficiency of the sales system organization										
The volume of the potential sales market has been incorrectly estimated	1	0.35	1	0.3	1	0.3	2	0.2	1	0.2
Availability of competitors for similar products	2	0.05	2	0.1	3	0.2	2	0.3	2	0.3
Customers admit dissatisfaction with their needs	2	0.2	1	0.25	2	0.2	1	0.2	1	0.2
Lack of competitive advantage	1	0.05	2	0.15	2	0.2	1	0.2	2	0.2
Improper organization of the regional sales distribution system	3	0.35	3	0.3	1	0.1	3	0.1	3	0.1

Risk factors for marketing banking innovations	JSC CB "PrivatBank"		JSC "ALFA-BANK"		JSC "Oschadbank"		OTP BANK JSC		JSC "UNIVERSAL BANK"	
	r	p	r	p	r	p	r	p	r	p
Group V. Risks of inefficiency of the system of promotion of innovative products on the market										
Lack of advertising	3	0.2	2	0.25	1	0.3	1	0.35	2	0.3
Negative perception of advertising by consumers	1	0.2	1	0.25	2	0.2	1	0.25	2	0.2
Characteristics of innovative products are reflected in advertising incorrectly and no emphasis is placed on competitive advantages	2	0.3	2	0.25	3	0.3	2	0.2	1	0.35
Advertising costs do not match its effectiveness	2	0.3	2	0.25	2	0.2	2	0.2	1	0.15

Source: calculated by the authors

The risk factor that is assigned the rank (r) "1", has the greatest impact on the activities of the banking institution in the event of a risk event, with the rank (r) "2" is moderate, with the rank (r) "3" is least. The ranking of risk factors for marketing banking innovations is carried out within risk groups according to the probability of their occurrence (p) which allows us to focus on the study of those risk factors whose probability of occurrence is the highest. This methodological approach allows you to assess the risks of marketing banking innovations within individual groups by equation (3), (Yehorycheva, 2011):

$$P_{mbi} = \sum r_{ij} \times (p)_{ij} \qquad (3)$$

were, r_{ij} – the rank set for the relevant risk factor (j) of the risk group (i); (p_{ij}) – the probability of occurrence of a risk event by risk factor (j) of the risk group (i).

At the next stage, we determine the sequence of the impact of marketing risks of banking innovations on the financial stability of banking institutions (Figure 8). Thus, the most significant risks for such banking institutions as JSC CB "PrivatBank" and JSC "ALFA-BANK" are the risks of inefficiency of the pricing policy for banking innovations. The highest risk for JSC Oschadbank is when the quality of banking innovations does not comply with consumer requirements. The authors identified an inefficient system of promotion of innovative products on the market as the most significant risk for OTP BANK JSC and JSC UNIVERSAL BANK. The least significant for the banks of JSC CB PrivatBank and JSC ALFA-BANK are the risks of lack of management of banking innovations. The authors highlight that the inefficient pricing policy for banking innovations and the non-compliance of the quality of innovative products with consumer requirements are the least significant risks for JSC Oschadbank and OTP BANK JSC. Assessing the impact of banking innovation risks, it should be noted that JSC CB PrivatBank and JSC ALFA-BANK belong to the banks-innovators, which are characterized by a high level of corporate culture and an effective overall concept of development and implementation of banking innovations.
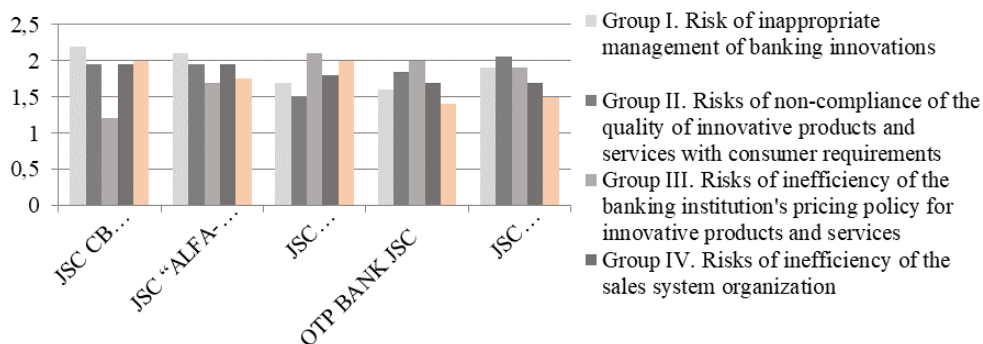
Figure 8. Distribution of marketing risks of banking innovations
between the banking institutions of Ukraine
Source: calculated by the authors

At the same time, depending on the combination of indicators of the activity of implementation of the components of the marketing complex of banking innovations JSC CB PrivatBank belongs to the cluster of balanced leaders, while JSC ALFA-BANK - to the advertising leaders (Table 5).

Table 5. Sequence of influence of risks of marketing
of innovations in banking institutions of Ukraine

JSC CB PrivatBank (balanced leader)	JSC ALFA-BANK (advertising leader)	JSC Oschadbank (product leader)	OTPBANK JSC (sales leader)	JSC UNIVERSAL BANK (price leader)
GroupIII	Group III	Group II	Group V	Group V
Group II	Group V	Group I	Group I	Group IV
Group IV	Group IV	Group V	Group II	Group III
Group V	Group IV	Group V	Group II	Group III
Group I	Group I	Group II	Group II	GroupII

Source: calculated by the authors

Therefore, for JSC CB PrivatBank more effective measures in the market of banking innovations will be measures related to the coordination of its pricing policy, for JSC "ALFA-BANK" re-evaluation of the policy of promoting innovative products to increase its efficiency. "Balanced leader" and "advertising leader" have the best values of all components of the marketing complex. On the contrary, "sales leader", "product leader" and "price leader" are inferior to the results of banking innovations compared to other clusters, but these components of the marketing mix are their strengths. Among banking institutions, the product leader is JSC Oschadbank, the sales leader is OTPBANK JSC, and the price leader is JSC UNIVERSAL BANK. JSC Oschadbank, as a state-owned bank with the most extensive branch network, should focus on improving the quality of banking innovations and bring it closer to the needs of consumers, taking into account their regional specifics.

For OTPBANK JSC and JSC UNIVERSAL BANK, the most relevant risks associated with the promotion of banking innovations are the

inconsistency of the bank's advertising policy with its product policy and service promotion policy; the risk of incorrect addressing of advertising; the risk of a failed time horizon for advertising and other communication campaigns; the risk of insufficient coverage of the target audience; risk of errors in financing sales and advertising promotion measures; the risk of irrational budget allocation for communication activities; the risk of ineffectiveness of the banking brand policy; the risk of losing reputation, declining customer loyalty, etc. The problem of effective management of these risks is exacerbated by the lack of a clearly developed marketing strategy for banking innovations, which is confirmed by the impact of risks of inadequate management of banking innovations. The second place is for JSC Oschadbank and OTPBANK JSC and the third place for JSC UNIVERSAL BANK.

In our opinion the impact of marketing risks of banking innovations can be assessed not only directly from the standpoint of the impact of their individual types, but also by the sphere of manifestation. Thus, we propose to assess the marketing risks of banking innovations that arise at a certain level according to the equation (4), (Yehorycheva, 2011):

$$L = \frac{\sum r_{ij} \times (p_{ij})}{\sum r_{ij}} \qquad (4)$$

where, L – weighted average risk of marketing of banking innovations.

The results of the assessment of the weighted average risk of the marketing of banking innovations are shown in Figure 9. Thus, there are difficulties in realizing the risks of marketing banking innovations for JSC CB PrivatBank and JSC ALFA-BANK because they are concentrated in the relationship of staff, customers and competitors (risk factors that arise during the organization of the sales of banking innovations). For JSC Oschadbank there is a need to strengthen its own competitive advantages.
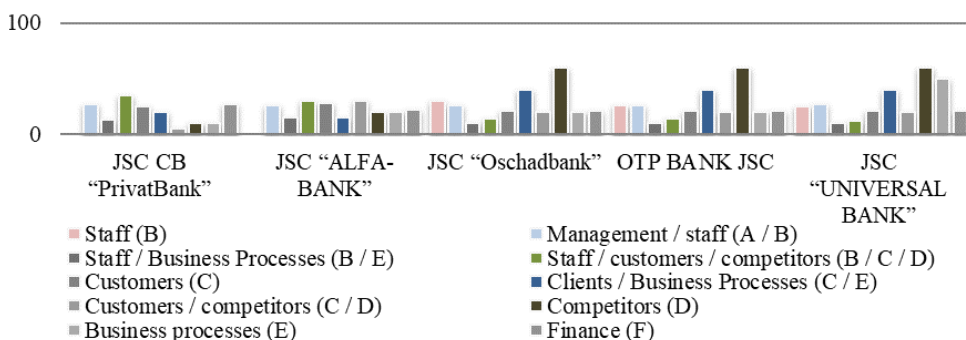

Figure 9. Weighted level of risk of marketing of innovations of banking institutions of Ukraine, %
Source: calculated by the authors

For OTPBANK JSC and JSC UNIVERSAL BANK the probability of risks that are due to lower technological capabilities, as well as the level of innovative potential of business processes worsens their competitive position in the market, as evidenced by the results of the study. Assessing the risks of marketing banking innovations and their interpretation will allow banking institutions to avoid possible threats and eliminate the negative consequences, while ensuring the financial stability of the bank. The indicator of the effectiveness of the measures taken to ensure the financial stability of banking institutions, in

particular through the marketing of banking innovations, can be calculated by the formula (5), (Yehorycheva, 2011):

$$I_{fsMBI} = \frac{AD}{(C+LC)} \tag{5}$$

where, I_{fsMBI} – criterion for ensuring the financial stability of the bank, taking into account the impact of marketing risks of banking innovations; AD – averted loss in the field of marketing banking innovations; C – incurred by the bank preventive costs in the field of the marketing of banking innovations; LC – liquidation costs incurred by the bank in the field of the marketing of banking innovations.

It is determined that the reference bank, which has the best combination of indicators of financial stability and marketing "4P", best corresponds to the indicators of JSC CB PrivatBank. The mathematical description of the components and functions of the developed model reflects the essential properties of the ideal bank and can be used as a tool for forecasting, planning and marketing the management of banking innovations. We will find the correlation between the indicators of financial stability and marketing "4P" in JSC CB PrivatBank using the methodological provisions (Ayvazyan & Mhitaryan, 2001) and build graphs of the intensity of the relationship of individual indicators of financial stability and the marketing of this banking institution. We construct an even linear regression, where the average value of the dependent variable is considered as a function of one independent variable (x). This is a model of the equation (Ayvazyan & Mhitaryan, 2001):

$$\hat{y}_x = f(x) \tag{6}$$

The regression equation is reduced to estimating its parameters. To do this, we use the method of least squares, which allows for

obtaining parameters in which the sum of the squares of the deviations of the actual values of the resultant characteristic (y) from the theoretical ($\hat{y}x$) is minimal. The closeness of the connection of the studied phenomena is estimated by the linear pair-wise correlation coefficient rxy for linear regression (-1 ≤ 1), (Ayvazyan & Mhitaryan, 2001):

$$r_{xy} = \frac{cov(x,y)}{\sigma_x \sigma_y} \tag{7}$$

where, $cov(x,y)$ – covariance of signs x and y, respectively; $\sigma_x \sigma_y$ – variance x and y.

The results of calculating the ratio and relationship between indicators of financial stability and "4P" marketing are shown in Figure 10.
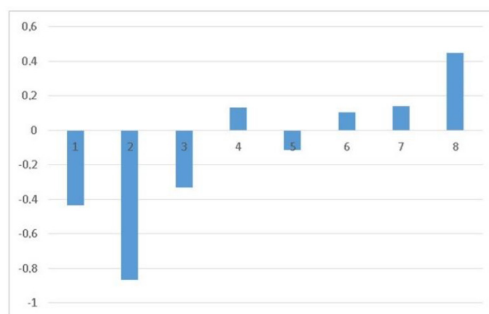

Figure 10.1. Histogram of the correlation of the ratio of the reliability indicator and "4P" marketing indicators in JSC CB PrivatBank
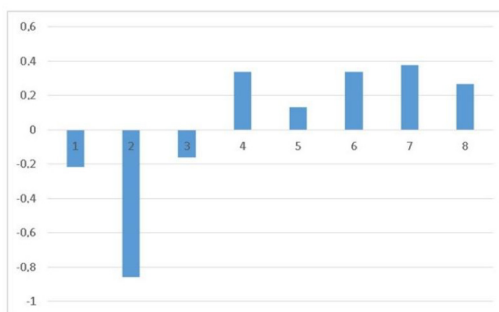

Figure 10.2. Relationship correlation histogram solvency indicator and "4P' marketing indicators in JSC CB PrivatBank
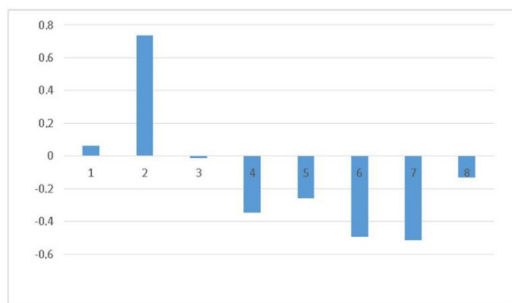
Figure 10.3. Histogram of the correlation between the ratio of the indicator of the general level of profitability and marketing indicators "4P" in JSC CB PrivatBank
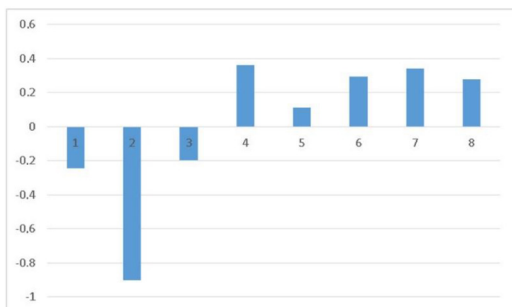

Figure 10.4. Histogram for correlation of sales profitability indicator and marketing indicators "4P" JSC CB PrivatBank

Figure 10. Histograms of the ratio and relationship between indicators of financial stability and marketing "4P" in JSC CB PrivatBank
Source: calculated by the authors

Note: marketing indicators: 1 – the average price of credit products, 2 – the average price of deposit products, 3 – the number of channels of communication with customers, 4 – the share of advertising costs, 5 – the number of payment terminals, 6 – the number of ATMs, 7 – the number active payment cards, 8 – number of branches

Thus, according to figure 11 we have drawn the conclusion that in JSC CB PrivatBank on the growth of the reliability indicator, a high degree of influence is exerted by the number of branches and the share of advertising costs. The correlation between the solvency indicator and the components of "4P" marketing shows the growth of the financial indicator, which is significantly affected by the price of deposits on the financial stability of the banking institution. At the same time the correlation between the general level of profitability and "4P" marketing indicators shows that the number of active payment cards of the bank has the greatest impact on the financial condition. Correlations between sales profitability and marketing indicators "4P" demonstrates that the growth of financial performance is most affected by the time spent on advertising. The results of the analysis prove the validity of the selected tools for the implementation of the priority areas of "blue oceans" marketing of banking innovations in JSC CB PrivatBank as a reference financial institution for the promotion of banking products and services.

Conclusions

The process of market transformation in the global space objectively stimulates the rapid development of banking institutions, which are central to the market system of economic relations and an integral part of modern world civilization, a powerful force for accumulating huge amounts of money redistributed to the economy and for the continuity of the reproductive resource base and, as a consequence, the increase of tangible and intangible benefits of society. Given the priority areas of formation and development of the world economy, the study of the transformation of banking in the digital economy in an unstable economy leads to the search for appropriate approaches to the organization of marketing activities with the use of banking innovations. In this context, it becomes highly relevant to identify and assess the risks of marketing banking innovations. The analysis of risks of the marketing of bank innovations is expedient in the following

cases: if the modern strategy does not correspond to new challenges and conditions of the external environment (strengthening of aggressiveness of competitors); if the sales of banking products are sharply reduced, some sectors of banking products are lost; and if customers refuse to use traditional products and services.

The use of digital technologies in banking today is an objective necessity and is important in the development and implementation of its own strategy for the development of financial technologies that provide financing for high-tech digitization projects and contributes to high performance in both financial and socio-economic activities at the global level. Therefore, providing support for the functioning and digital transformation of the banking system in the formation and development of the digital economy at the state level will create a system of marketing regulators to accelerate changes in the current business model and marketing strategies to select the banking sector, promising service segment and customer satisfaction banking innovative products.

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