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THE INNOVATIVE APPROACHES TO ESTIMATING BUSINESS MODELS OF MODERN BANKS

Abstract. *The analysis of business models of banks is a new approach to determining the financial condition and financial soundness of an individual bank and the entire banking system. The definition and analysis of banks' business models allow understanding better the financial and economic activities, risk appetite and management system. The National Bank of Ukraine moves to SREP based banking supervision. Such an analysis involves the verification of banks' business models for their viability and sustainability. No regulatory act provides a precise definition of these concepts. It is still no single approach to the analysis of business models among scientists and researchers. At the same time, traditional methods that focused on the analysis of the bank's capital adequacy, its liquidity and compliance with mandatory NBU economic norms are not sufficient. The study shows that most researchers use cluster analysis methods with a variety of sets of variables, the number of cluster groups, and business models. To determine the business models of Ukrainian banks, to analyse them, and to form on this basis the risk profile of each bank, the authors proposed an innovative methodology of structural-functional groups of banks (SFGB-method). The method is based on the use of neural networks, in particular self-organising Kohonen maps (SOM). For cluster analysis, it is suggested to use the system of financial indicators calculated by the National Bank of Ukraine in the SREP system. The cluster analysis allows identifying ten business models of Ukrainian banks. The article describes the features of each cluster and its propensity to take risks. The distribution of banks by cluster and their place on the map depends mostly on the structure of its assets, liabilities, income and expenses, currency position, as well as other qualitative and quantitative indicators. The conducted research has confirmed that the definition of business models of banks allows forming the basis for introducing a differentiated approach to banking regulation and supervision, taking into account the essential characteristics of each bank, its risk profile and the main distinguishing features.*

Keywords: bank business model, innovative approaches, bank risk profile, structural-functional group, bank.

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Introduction. Transformation processes occurring in the financial system of Ukraine require from each bank to react promptly and adequately to changes in the internal and external environment in order to ensure an acceptable level of profitability and at the same time financial stability of both the individual bank and the entire banking system of the country. Some factors, such as increasing competition in the market, rising levels of systemic risk, the latest technology and expanding the range of banking products and services, are changing the traditional view of banking. Today we need to change the simplified division of banks into universal and specialised banks, state-owned banks and banks with foreign and domestic capital. The idea of differentiation of approaches to determine the real business model of each bank is becoming more and more popular. In the current conditions, there is an increasing need for scientific research in this area and improvement of theoretical and methodological approaches to the definition and analysis of business models of Ukrainian banks. It, in turn, will improve the level of financial steadiness and stability of banks, strengthen their competitive advantages in the market, increase the profitability of banking business and the level of corporate governance, as well as allow to form a clear view of the risk profile of each bank and preventive measures. All this emphasises the relevance of the chosen research topic.

Literature Review. A large number of domestic and foreign scholars are paying attention to determining, evaluating and building the optimal business model of the bank. Among the national achievements, we can distinguish works of G.O. Panasenko and G.P. Bortnikov (2016), O.V. Litvinyuk and M.O. Karpov (2017), O.O. Lubich (2016), D.M. Gridzhuk (2018), Y. Onishchenko (2015), N.M. Panteleeva (2016), Derkachenko, A.V. and Y.S. Khudoliy (2018), A.S. Stadnyk (2017), V. Rashkovan and D. Pokidin (2016), O. P. Zarutska (2010, 2018).

Investigation of business models of Russian banks was carried out by F.T. Aleskerov, V.Y. Belousova and P.K. Bondarchuk (2012), R. Isaev (2010).

Foreign scholars such as R. Ayadi, P. Bongini, B. Casu, D. Cucinelli and W.P. De Groen (2014, 2019), M. Tomkus (2014), F. Mergaerts and R.V. Vennet (2015), M. Farne and A. Vouldis (2017), A. Osterwalder and Y. Pigneur (2004, 2009, 2019), H. Chesbrough and R. S. Rosenbloom (2002), Y. Altunbas, S. Manganelli and D. Marques-Ibanez (2011), Lueg R., Schmaltz C. and Tomkus M. (2019), Shafer S. M., Smith H. J. and Linder J. C. (2005), European Banking Authority (2014) also carried out studies of business models of banks, including euro area banks, in their work.

Assaf A. G., Berger A. N., Roman R. A. and Tsionas M. G. (2019), Diamond D. and Rajan R. (2001), Greenwood R., Landier A. and Thesmar D. (2015), Khmarskyi V. and Pavlov R. (2016, 2017), Sarlin P. and Peltonen T. A. (2013) considered the problem of financial stability of banks. Billio, M., Getmansky, M., Lo A. W. and Pelizzon L. (2012), du Jardin P. and Severin E. (2012), Kohonen T. (2001, 2013), Tkác M. and Verner R. (2016) developed the topic of econometric modelling, neural networks and cluster analysis.

Despite the considerable diversity of national and foreign achievements, there is still no unified approach to the interpretation of the concept of the bank's business model, methods of its definition, analysis and evaluation. However, it should be noted that the National Bank of Ukraine has begun to analyse the business models of Ukrainian banks within the framework of the implementation of the SREP (Supervisory review and evaluation process) concept since 2018.

G. O. Panasenko, G. P. Bortnikov (2016) determine that the business model is «a set of interactions of key elements of a business: products, resources, customers, delivery channels, income, cost management, personnel and information technology» that enable the bank's counterparties to obtain appropriate values that will satisfy their financial needs.

O. V. Litvinyuk, M. O. Karpov (2017) consider the business model as a complicated management system with a set of modern rules and ways of doing business, including «organisational structure, classification of operations and services, conditions and means of their provision, delivery and service, the

main purpose» which form the basis of the company's strategy and also the criteria for determination of effectiveness.

D. M. Gridzhuk (2018) also determine the business model as a management tool, the structure and content of which is determined by the major management systems of the bank. According to the scientist, the business model is a set of concepts and objects that determine the nature and content of the bank's business (types of bank activity), as well as the relationship between them. The same opinion was in the studies of A. V. Derkachenko and Y. S. Khudoliy (2018).

Y. Onishchenko (2015) understands the business model as the market strategy and balance sheet structure that differentiate banks from each other, in order to use the strengths of their organisation, gain competitive advantages and grow.

N. M. Panteleeva (2016) considers the classic and innovative business model of the bank in her work. She emphasises that the classic business model, which «reflects the economic logic of the bank's activity», its position in the banking system, the model of value creation and profit, as well as it is the development and social importance, is permanent and not allow to respond promptly to the influence of constantly changing indoor and outdoor environmental factors. An innovative business model is one of how business factors are combined into a «chain of value creation and supply for a new product to the consumer», that allows to turn it into profit and increase the economic value of the bank.

A. S. Stadnyk (2017) holds the same opinion. In his view, the bank's business model, in general, is characterised by the way it conducts business, it is logic of operations, its position in the banking system in terms of profit generation, risk management, general development and social importance.

According to V. Rashkovan and D. Pokidin (2016), the business model is the main characteristic that differentiates companies between each other. The chosen business model by the bank demonstrates the essential characteristics of the company, namely, target customers, regions of work, product mix, distribution channels, suppliers, etc. In their view, the definition of a business model is carried out purely by clustering methods.

Foreign scientists A. Osterwalder, Y. Pigneur (2009) in their work emphasises that exactly business model allows understanding how enterprises conduct their activities, as well as the basic principles of their organisation, which ensures the creation and fixation of their value. Researchers use the concept of «Business model canvas», which they believe is formed of nine components, such as the customer segment, value proposition, delivery and communication channels, customer relationships, revenue streams, core resources, key activities, affiliate network and cost structure.

H. Chesbrough, R. S. Rosenbloom (2002) in their works point to the direct link between the business model and value creation, and the business model itself is part of that value. However, in the components of the business model, scientists identify only six components: market segment, value proposition, value chain, competitive strategies, revenue streams and cost structures.

F. Mergaerts, R. V. Vennet (2015) believe that the banking business model encompasses a set of strategic variables that reflect the bank's long-term strategy for managing assets, financing, capitalisation and income diversification. According to the scientists, the structure of assets is characterised by the coefficient of lending, quality of loans and the size of the bank. The liability structure is disclosed in the number of deposits and the risk of financing. The structure of income consists of their diversification, and the structure of capital consists of the level of capitalisation.

According to M. Tomkus (2014), the business model is described as a set of components that significantly influence and determine the bank's approach to its financing, set of business products, services and risk-taking. This approach is based on the fact that, according to the researcher, the banking business develops around three main processes: obtaining funds for operations, providing services and products as a means of generating revenue, as well as risk.

M. Farne, A. Vouldis (2017) define the business model concerning the activities carried out by the firm. According to them, the variables that define the mode of operation in detail such as the degree of efficiency of activity, price policy, performance, income, expenses, belong to the business strategy like a result of the bank's business model and are not part of it.

Researchers led by R. Ayadi and W. P. De Groen in «Banking Business Models Monitor 2014. Europe» (2014) emphasise that defining and detection business models in the banking sector is not an easy task because of its versatility, constant variability, and significant dependence on the details of the bank's activities and risks. In their view, business models can be considered as a means by which banks seek to achieve their goals (profit maximisation or value creation), leading to inevitable consequences such as financial results, risk profile, contribution to financial stability (or instability) as well as an economy that can change later. The authors' accent that the analysis of business models contributes to a better understanding of financial and economic indicators, the degree of risk and management at the system level.

Y. Altunbas, S. Manganelli, and D. Marques-Ibanez (2011) in their works underscore the relationship between the chosen business model by the bank and the risk of its collapse. In their opinion, the main risk-forming components are the chosen structure and model of financing and income. Dependency on borrowed funds, for example, reduces the likelihood of default, while corporate and retail financing increase it. However, it is noted that this situation is not typical and may affect different banks in different ways.

Although the considerable diversity of approaches to the interpretation of the concept, the National Bank of Ukraine has begun to analyse the business models of Ukrainian banks in Ukraine from 2018. The Regulator does not specify the definition of the business model and the assessment and analysis of a bank's business model is done through an analysis of its viability (the ability to generate an acceptable level of income over the next 12 months) and the sustainability (the ability to generate an acceptable level of income. for at least three years) (NBU, 2019).

However, the approaches to identifying the bank's business model should be concrete and clear. It will allow to differentiate the models of different banks within the banking system using different indicators and to investigate their changes over time. The characteristic of the business model should take into account the specificities of the strategy, product and service systems, customer base and risk profile of the particular bank. The business model is a selected segment of the bank's activity, that is characterised by a system of financial indicators that reflect efficiency, risk profile, other features of the bank's viability and sustainability, and therefore the ability to generate an acceptable level of revenue in the long term.

It should be noted that today the primary methods for determining the business models of banks are based on conducting cluster analysis, but the volume of coefficients, the degree of detail, the analysed period, the number of cluster groups in different works differ.

For example, G. O. Panasenko, G. P. Bortnikov (2016) consider the business model of banks in attracting customer funds. Researchers analysed the banking system's indicators to identify the relationship between the frequency of bank failures and their business model in attracting customer funds. The following indicators were selected for the analysis: share of clients' funds in liabilities, the share of clients' funds in current accounts in clients' funds, share of individuals' funds in clients' accounts, share of term deposits in individuals' accounts, ratio of loans to customers' funds, branch network dynamics, clients' funds per unit.

O. O. Lubich, G. P. Bortnikov, G. O. Panasenko (2016) analysed business models of state-owned banks of Ukraine and divided them into clusters, considering the development of the branch network and the business profile. To analyse the business models of banks, researchers propose to use their official reporting by business segments. The following indicators are used for the analysis: structure of assets, liabilities, income and expenses by business segments, dynamics of personnel and assets, the ratio of operating expenses to operating income, the scale of business (assets per employee, operating income

per employee, operating expenses for assets), strategic target customer segments, Eurobond issuance conditions, credit rating.

A. V. Derkachenko and Y. S. Khudoliy (2018) propose to use the system of 12 coefficients to analyse the business models of Ukrainian banks: the ratio of bank's assets to branches assets, the share of own capital and subordinated debt, the share of retail loans and deposits, share of loans, ratio of loans to deposits, adequacy (sufficiency) of bank's capital, bank's liquidity, bank's interest margin, reservation of bank's loans, return on assets and bank's capital.

A. S. Stadnyk (2017), developing the concept of micro-prudential banking regulation in Ukraine through the analysis of business models of banks, identifies the leading indicators of the business model of the bank: ownership structure (dependence of the bank on owners' funds, the share of capital in assets); the structure of assets (characteristics of the loan portfolio, quality of loans and scale of investments); financing structure (concentration of resources obtained from a single source that determines dependency on customer's funds and risk of loss of financing); revenue structure (diversification of sources of income); cost structure (main directions of bank's expenses). In his opinion, the set of quantitative parameters for defining a business model is the following: capitalisation, liquidity, profitability, quality of assets, quality of resources, level of risk.

V. Piddubna (2018) uses the following indicators (as a percentage of assets) to determine the characteristics of Ukrainian banks' business models: loans to legal entities and individuals, interbank loans, deposits from legal entities and individuals, funds from other banks and investment portfolios.

R. Kornylyuk and A. Kornylyuk in their work «Ukrainian Banks` Business Models under Systemic Risk» (2018) highlighted the following most indicative and simple to interpretation coefficients: the ratio of retail loans to total loans, the ratio of retail deposits to liabilities, the ratio of non-deposit resources to liabilities, the ratio of capital and assets, the net assets of the bank.

R. Ayadi and W. P. De Groen (2014) in their studies used six «tools» to build bank clusters according to banks' business models such as share of loans to banks in assets, the share of trade assets in assets, share of bank liabilities in assets, share of customer deposits in assets, share of debt in assets and share of derivative exposures in assets.

The National Bank of Ukraine evaluates the business models of banks based on a system of scoring and consider additional factors of influence. The score is based on the determination of quantitative and qualitative indicators, each of which has an appropriate weight.

Quantitative indicators include: the ratio of operating expenses to operating income, net interest margin (including expenses on reserves), covering staff costs with non-interest income, the correlation between net commission income and net assets, return on equity, the sufficiency of fixed capital, coverage of credits by clients' attracted funds, the ratio of troubled assets uncovered by credit risk to regulatory capital, the concentration of TOP 5 borrowers and groups of related borrowers, concentration of TOP 5 creditors, dependence on funds from other banks and international organisations, the ratio of I.T. operating and capital costs to total assets, the ratio of marketing and sponsorship costs to total assets, the ratio of personnel costs to the total number of staff (NBU, 2019).

Qualitative indicators that are taken into account in the analysis include: an indicator of achievement of planned results, an indicator of realism of development, liquidity and market availability for funding, reputation risk, prudential compliance score, related party risk score (NBU, 2019).

Aims of the articles. The article proposes a method of using differentiated supervisory approaches for different banks, which is based on the use of structural-functional analysis of bank groups (SFGB) and the construction of Kohonen self-organisation maps to visualise the results. The following system of indicators is proposed for such analysis: efficiency of banks, capital adequacy, quality of assets, the structure of assets and resource base, bank interest rate policy, non-interest income sources, currency position, size of bank assets.

Methodology and research methods. The formation of a group of banks with the same business models was done with the help of Kohonen's self-organising maps (SOM). It method allows processing big massive data. The multidimensional arrays of information are reduced to a two-dimensional map and provide easy visualisation of the data. This method allows considering many risk factors inherent each business model of banks.

The formation of Kohonen's self-organising maps was carried out with the help of Viscovery SOMine software. Determining the number of clusters and their formation is carried out by the software complex independently, based on the formed database of the fundamental quantitative indicators of banks' activities (coefficients-indicators) (NBU, 2019). Each bank on the map has a corresponding place (point), which is determined based on the values of its basic coefficients-indicators and indexes of neighbouring banks. The map point is the location of one or more banks during the study period.

Authors propose a method of using differentiated supervisory approaches for different banks, which is based on the use of structural and functional analysis of bank groups (SFGB) and the construction of Kohonen self-organisation maps to visualise the results. The following system of indicators is proposed for such analysis: efficiency of banks, capital adequacy, quality of assets, the structure of assets and resource base, bank interest rate policy, non-interest income sources, currency position, size of bank assets. The authors developed the system of basic coefficients-indicators based on improvement in the SFGB method and the NBU's approach to defining business models of Ukrainian banks.

Results. Based on the analysed approaches and techniques, we propose own set of indicators that allow to define and analyse the business model of the bank, as well as to form, based on such analysis, the risk profile of the group of banks which belong to one business model (Table 1).

Unlike the previous models, the set of indicators that allow us to analyse the business model of the bank is as close as possible to the system of indicators used by the National Bank of Ukraine. However, the results of the formation of structural and functional groups with the same business models are different from the classification used by the NBU. Using the SOM allow analysing in detail the received classification, to study the dynamics of changes over a long period and to evaluate the financial condition of the entire banking system. The method of structural and functional groups of banks allows evaluating the business models of individual banks, quantitative and qualitative characteristics of their groups and the financial condition of the entire banking system.

Table 1. Basic coefficients-indicators of banks' business models

№	Marking	Characteristic
1	NAnc/N.A.s	Share of the bank's net assets in national currency in the net assets of the system
2	NAfc/N.A.s	Share of the bank's net assets in foreign currency in the net assets of the system
3	LiAnc/N.A.	Share of bank's liquid assets in national currency in the bank's net assets
4	LiAfc/N.A.	Share of bank's liquid assets in foreign currency in the bank's net assets
5	FinOBnc/N.A.	Share of funds in other banks in national currency in the bank's net assets
6	FinOBfc/N.A.	Share of funds in other banks in foreign currency in the bank's net assets
7	LLEnc/N.A.	Share of loans to legal entities in national currency in the bank's net assets
8	LLEfc/N.A.	Share of loans to legal entities in foreign currency in the bank's net assets
9	LInc/N.A.	Share of loans to individuals in national currency in the bank's net assets
10	LIfc/N.A.	Share of loans to individuals in foreign currency in the bank's net assets
11	DGDBnc/N.A.	Share of Domestic Government Debt Bonds (DGDB) in national currency in the bank's net assets
12	DGDBfc/N.A.	Share of Domestic Government Debt Bonds (DGDB) in foreign currency in the bank's net assets
13	N7	The normative of the maximum amount of credit risk per counterparty
14	N8	The normative of high credit risks

Continued Table 1

15	ReAO/N.A.	Share of deductions to reserves for active bank operations in total assets of the bank (Asset quality)
16	FLEnc/G.L.	Share of funds raised from legal entities in national currency in the general liabilities of the bank
17	FLEfc/G.L.	Share of funds raised from legal entities in foreign currency in the general liabilities of the bank
18	FInc/G.L.	Share of funds raised from individuals in national currency in the general liabilities of the bank
19	FIfc/G.L.	Share of funds raised from individuals in foreign currency in the general liabilities of the bank
20	FOBnc/G.L.	Share of funds raised from in other banks in national currency in the general liabilities of the bank
21	FOBfc/G.L.	Share of funds raised from in other banks in foreign currency in the general liabilities of the bank
22	LCnc/FCnc	Coverage of loans to clients in national currency by raised clients' funds in national currency
23	LCfc/FCfc	Coverage of loans to clients in foreign currency by raised clients' funds in foreign currency
24	RC/NA	Regulatory bank's capital is weighted on the bank's net assets
25	ME/NA	Share of bank's marketing expenses in the bank's net assets
26	OE/NA	Share of the bank's operating expenses in the bank's net assets
27	OIn/N.A.	Share of the bank's operating incomes in the bank's net assets
28	NIIn/N.A.	Share of the bank's non-interest incomes in the bank's net assets
29	NInM	Net interest margin
30	CoBF	The cost of borrowed funds by the bank
31	InPF	The income of the funds placed by the bank
32	Re/N.A.	Share of deductions to reserves in the bank's net assets
33	ROA	Return on assets of the bank

Sources: developed by the authors.

The ratios listed in Table 1 allow allocating a clear idea of the structure of assets, liabilities, income and expenses of the bank, as well as determine the degree of credit, currency and liquidity risk. Outstanding in the method is the use of both quantitative coefficients proposed by the NBU and other indicators, thus extending the boundaries of analysis. So, the proposed approach combines the SFGB method and the NBU's requirements for defining banks' business models.

The use of SOM to process a range of defined Ukrainian banks' ratios for the period from 01.01.2019 to 01.10.2019 made it possible to segregate and describe the following clusters (business models) (Table 2). Discovery SOMine software provides the automatic formation of homogeneous bank groups without user intervention. Groups are grouped by the values of Basic coefficients-indicators of banks' business models (Table 1).

Table 2. Characteristics of bank clusters on Kohonen's map as of 01.10.2019

Cluster	Determinative C.I.s	Characteristic
C 1	FinOBnc (max) LLEnc (av)	Assets: funds in other banks in national currency, mainly loans to legal entities in national currency.
	FLEnc (av) FIfc (av)	Liabilities: mainly funds of legal entities and individuals in national currency.
C 2	LLEnc (av) LLEfc (av) FinOBfc (av)	Assets: mainly loans to legal entities in national and foreign currency, funds from other banks in foreign currency.
	FIfc (max) FLEnc (av) FLEfc (-av)	Liabilities: funds of individuals in foreign currency, partly funds of legal entities in national and foreign currency.
C 3	LInc (av) FInc (av)	Assets: mainly loans to individuals in national currency.
	FLEnc (av)	Liabilities: funds of individuals and legal entities in national currency.
	OE (max) ME (max)	Operating and marketing costs are highest.

Continued Table 2

C 4	NAnc (min) LiAnc (min) DGDBfc (max) DGDBnc (max) FOBnc (av) LCnc/FCnc (min) RC (max) CoBF (max) InPF (max) N7 (min) Re (min)	Assets: the smallest share in the total assets of the system, low liquidity, government bonds in foreign and national currency. Liabilities: funds of other banks in national currency. High coverage of loans to clients in national currency by raised clients' funds in national currency, highest regulatory capital, high cost of borrowed funds and income of placed funds, N7 low, greatest deductions to reserves.
C 5	NAnc (max) NAfc (max) LiAnc (max) DGDBnc (av) DGDBfc (av) LLEfc (av) FIfc (av)	Assets: the largest share in the total assets of the system in national and foreign currency, high liquidity, mainly government bonds in national and foreign currency, loans to legal entities in foreign currency. Liabilities: funds of individuals in foreign currency.
C 6	LiAfc (max) LLEnc (av) LIfc (min) FinOBfc (max) ReAO (max) FInc (min) FIfc (min) FLEnc (max) FLEfc (max) ME (min) NIIn (min)	Assets: high liquidity in foreign currency, mainly loans to legal entities in national currency and the smallest amount of credit to individuals in foreign currency, funds in other banks in foreign currency, the smallest reserves for active operations. Liabilities: the smallest funds of individuals in national and foreign currency, the most significant funds of legal entities in national and foreign currency. Lowest marketing costs and non-interest incomes.
C 7	LLEfc (max) LCfc/FCfc (av) FinOBfc (av) ReAO (av)	Assets: loans to legal entities in foreign currency, partly funds in other banks in foreign currency, the average level of coverage of loans in foreign currency by attracted funds of clients in foreign currency, the average level of reserves for active operations.
	FOBnc (min) FOBfc (av) OIn (min)	Liabilities: mostly funds of other banks in foreign currency and the smallest amount of funds of other banks in national currency. Operating incomes are lowest.
C 8	LInc (max) LLEnc (min) DGDBnc (min) FInc (max)	Assets: loans to individuals in national currency and the smallest amount of loans to legal entities in national currency, the smallest amount of government bonds in national currency.
	FOBfc (min) OIn (av) OE (av)	Liabilities: funds of individuals in national currency, the smallest amount of funds of other banks in foreign currency.
	NInM (max) ROA (max) N7 (min) N8 (min)	The average operating incomes and expenses, the highest net interest margin and the return on assets, the N7 and N8 are the lowest.
C 9	LIfc (max) DGDBfc (min) ReAO (min) FOBfc (max) FOBnc (max) LCfc/FCfc (max) ROA (-av)	Assets: loans to individuals in foreign currency, smallest amount of government bonds in foreign currency, significant reserves for active operations. Liabilities: funds from other banks in foreign and national currency. Low coverage of foreign currency loans with borrowed funds in foreign currency, low return on assets.
C 10	N8 (max) N7 (max) Re (max)	Assets: loans to legal entities in national currency. Liabilities: mostly funds from individuals in foreign currency. Highest N7 and N8, lowest deductions to reserves.

Sources: systematised by the authors based on NBU statistics for the period from 01.01.2019 to 01.10.2019.

The positions of banks belonging to different clusters, and therefore to different business models with different risk profiles, are shown on the map as of October 1, 2019, in Fig. 1.

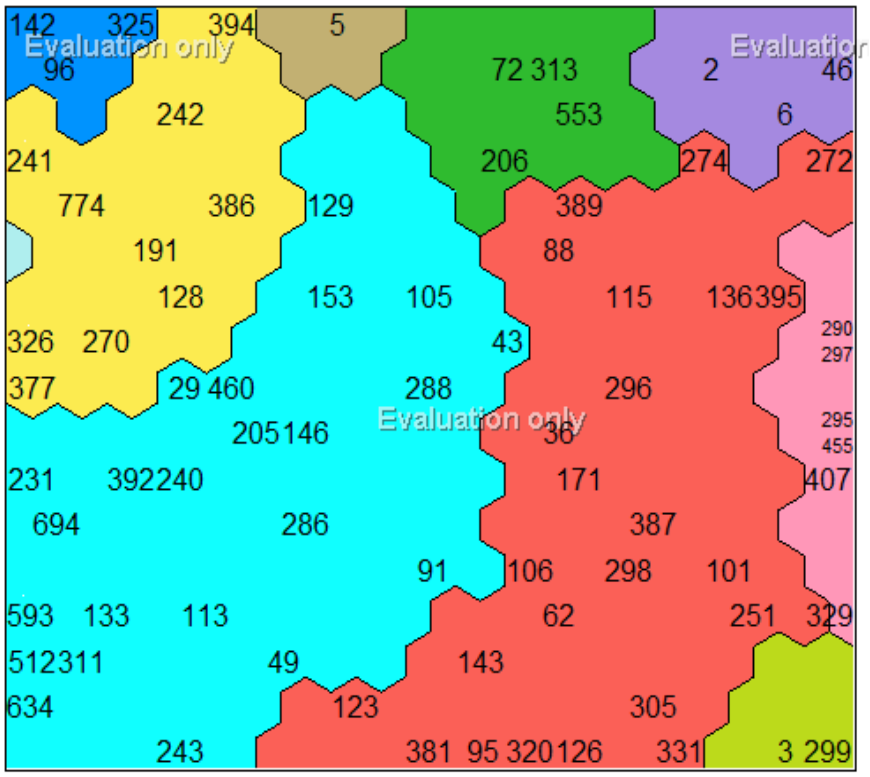

Figure 1. Placement of clusters (business models) of banks on the Kohonen's map as of 01.10.2019

Sources systematised by the authors based on NBU statistics for the period from 01.01.2019 to 01.10.2019**.**

Using the software, 10 different clusters (business models) with different banks were obtained. Clusters that have similar coefficients-indicators but differ in specific characteristics are located close to each other on the map. The numbers on the map correspond to the NKB Bank in the statistical grouped balance sheets of banks, published on the NBU official website, as of 01.10.2019.

The clusters in Table 2 analyse on depending on the average values of the coefficients-indicators specific to it, as well as their location on the Kohonen's map.

The average values of the coefficients-indicators of the group of banks in the clusters as of 01.10.2019 are shown in Table 3.

Based on the data in the tables above, we can draw the following conclusions regarding the banks united in Cluster 1 (Table 4). Banks in this group have average Indicators' value compared to other clusters. Among active transactions, lending to legal entities in the national currency and placement of funds in other banks also in the national currency prevails.

Table 3. Average values of coefficients-indicators of group of banks in clusters as of 01.10.2019

Cluster	C 1	C 2	C 3	C 4	C 5	C 6	C 7	C 8	C 9	C 10
NAnc/NAs	0,00	0,01	0,00	0,00	0,11	0,00	0,00	0,00	0,01	0,01
NAfc/NAs	0,00	0,01	0,00	0,00	0,05	0,00	0,01	0,00	0,00	0,00
LiAnc/NA	0,07	0,06	0,08	0,02	0,28	0,08	0,03	0,04	0,05	0,27
RC/NA	0,33	0,18	0,25	0,53	0,07	0,18	0,23	0,14	0,16	-1,37
N8	53081713,0	33,00	23,00	7,00	56,00	16,00	20,00	2,00	30,00	20968962048,0
N7	2286109,0	5,00	5,00	3,00	5,00	4,00	5,00	3,00	6,00	1160062464,0
Re/NA	0,01	0,01	0,04	-0,01	0,01	0,01	0,04	0,08	0,03	1,24
ROA	0,01	0,03	-0,01	0,02	0,04	0,04	-0,01	0,05	-0,09	-0,71
NIIn/NA	0,06	0,06	0,25	0,04	0,06	0,03	0,03	0,09	0,10	0,53
OIn/NA	0,18	0,17	0,35	0,15	0,15	0,14	0,14	0,39	0,20	0,54
OE/NA	0,16	0,13	0,32	0,14	0,11	0,08	0,11	0,27	0,26	0,00
ME/NA	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
FInc/GL	0,22	0,18	0,28	0,02	0,26	0,02	0,07	0,74	0,02	0,02
LInc/NA	0,03	0,06	0,15	0,00	0,06	0,00	0,00	0,69	0,08	0,00
NInM	0,08	0,07	0,05	0,07	0,04	0,06	0,08	0,22	0,06	0,01
LCnc/FCnc	1,69	0,99	0,99	0,24	0,50	0,74	1,05	0,98	5,16	6,49
LLEnc/NA	0,32	0,30	0,23	0,05	0,10	0,31	0,11	0,01	0,14	0,73
DGDNnc/NA	0,05	0,03	0,05	0,31	0,30	0,06	0,01	0,00	0,00	0,21
CoBF	0,07	0,07	0,10	2,26	0,09	0,07	0,17	0,13	0,82	-0,01
FLEnc/GL	0,42	0,30	0,33	0,22	0,13	0,54	0,11	0,11	0,04	0,03
ReAO/NA	-0,08	-0,07	-0,09	-0,09	-0,39	-0,03	-0,82	-0,28	-0,87	-0,69
LCfc/FCfc	0,44	0,77	0,31	0,06	0,46	0,31	8,21	0,36	8,89	0,00
FOBfc/GL	0,00	0,03	0,00	0,00	0,01	0,04	0,46	0,00	0,52	0,01
LIfc/NA	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,27	0,00
FOBnc/GL	0,01	0,00	0,05	0,09	0,00	0,00	0,00	0,00	0,31	0,00
LLEfc/NA	0,07	0,24	0,05	0,02	0,16	0,07	0,44	0,02	0,11	0,00
FIfc/GL	0,19	0,25	0,15	0,10	0,20	0,04	0,09	0,08	0,04	0,06
InPF	0,32	0,20	0,25	6,45	0,35	0,33	0,20	0,46	0,21	0,01
DGDNfc/NA	0,04	0,03	0,02	0,15	0,13	0,06	0,00	0,01	0,00	0,00
FLEfc/GL	0,06	0,15	0,06	0,14	0,11	0,34	0,06	0,01	0,02	0,01
FinOBfc/NA	0,05	0,10	0,05	0,04	0,07	0,22	0,18	0,04	0,05	0,00
LiAfc/NA	0,07	0,12	0,09	0,05	0,07	0,29	0,19	0,05	0,08	0,00
FinOBnc/NA	0,01	0,01	0,01	0,00	0,00	0,00	0,00	0,00	0,01	0,00

Sources: calculated based on NBU statistics for the period from 01.01.2019 to 01.10.2019.

Funds are raised mainly in national currency from individuals and legal entities. Therefore, it is a group of small banks with common characteristics as well as the average level of credit and currency risk, but liquidity risk is above average.

Table 4. Description of Cluster 1 (the central-western part of the map)

№	Banks	Banks	Key indicators
Cluster 1	512 JSC «ALPARI BANK»	460 JSC «BANK SICH»	
	311 JSC «BANK TRUST-CAPITAL»	286 JOINT STOCK BANK «RADABANK»	
	634 JSC «BANK PORTAL»	694 JSC «CRYSTALBANK»	
	43 JSC «ALTBANK»	113 JSC «Poltava-bank»	
	243 JSC CB «ZEMELNY CAPITAL»	288 JSB «CLEARING HOUSE»	FinOBnc (max)
	49 Policombank	392 "CB «ACCORDBANK» PuJSC	LLEnc (av)
	133 JSC «ASVIO BANK»	91 JSCB «Lviv»	FLEnc (av)
	205 «MetaBank»	29 JSC «BANK ALLIANCE»	FIfc (av)
	231 JSC «UNEX BANK»	105 PJSC «MTB BANK»	
	146 PJSC «BANK 'UKRAINIAN CAPITAL»	129 PJSC «BTA BANK»	
		153 «PRAVEX BANK» JSC	
	240 JSC «CIB»	593 JSC «SETTLEMENT CENTER»	

Sources: systematised by the authors based on NBU statistics for the period from 01.01.2019 to 01.10.2019.

Based on the data obtained, we can draw the following conclusions regarding the banks united in Cluster 2 (Table 5). Among the active operations of the banks in Cluster 2, lending to legal entities in national and foreign currency prevails, and the funds in other banks are placed in foreign currency. Liabilities are represented by funds that are attracted from individuals in foreign currency and partly from legal entities in national and foreign currency. Thus, cluster 2 combines medium-sized banks with common characteristics, average credit risk, high currency risk, and above-average liquidity risk.

Table 5. Description of Cluster 2 (the central-eastern part of the map

№	Banks	Banks	Key indicators
Cluster 2	274 JSB «UKRGASBANK»	381 JSC «MOTOR-BANK»	LLEnc (av)
	101 JSCB «INDUSTRIALBANK»	389 JSC IIB	LLEfc (av)
	106 Pivdennyi Bank	95 OKCI BANK JSC	FinOBfc (av)
	272 JSC «ALFA-BANK»	296 OTP BANK JSC	FIfc (max)
	387 JSC «AP BANK»	298 JSC «PROCREDIT BANK»	FLEnc (av)
	123 JSC "BANK «GRANT»	115 JSC «FUIB»	FLEfc (-av)
	320 JSC «BANK FOR INVESTMENTS AND SAVINGS»	251 JSC «PIRAEUS BANK ICB»	
	143 JSC «COMINVESTBANK»	36 Raiffeisen Bank Aval JSC	
	331 JSC «CREDITWEST BANK»	62 TASCOMBANK JSC	
	88 JSC «KREDOBANK»	136 JSC «UKRSIBBANK»	
	171 JSC «CREDIT AGRICOLE BANK»	395 JSC «EIB»	
	126 MEGABANK JSC	305 PJSC «BANK VOSTOK»	

Sources: systematised based on NBU statistics for the period from 01.01.2019 to 01.10.2019.

Clusters 1 and 2 have similar characteristics and are placed close to each other on the clusters' map. However, a significant difference is the placement of funds in other banks in national currency by the banks in cluster 1 and the placement of funds in other banks in foreign currency as well as lending to legal entities in foreign currency by the banks in cluster 2.

Unlike the classification of banks by the National Bank of Ukraine, the proposed classification takes into account the share of assets and liabilities in foreign currency. Currency risk indicators are particularly important in the conditions of the volatility of the national currency.

Based on the data obtained, we can draw the following conclusions regarding the banks of Cluster 3 (Table 6). The banks' active operations in Cluster 3 are mainly represented by lending to individuals in national currency. Funds are mainly borrowed from individuals and legal entities in national currency. The banks' operating and marketing costs in the cluster is the biggest. Thus, cluster 3 combines small banks with common characteristics, medium credit risk, low currency risk and medium liquidity risk.

Table 6. Description of Cluster 3 (the western part of the map)

№	Banks	Banks	Key indicators
Cluster 3	241 JSC «IBOX BANK»	774 JSC «RWS BANK»	LInc (av)
	326 JSCB «CONCORD»	128 JSC «SKY BANK»	FInc (av)
	394 JSC «BANK ¾»	377 JSC «UKRCONSTINVESTBANK»	FLEnc (av)
	270 JSC «BANK CREDIT DNEPR»	242 JSC «UNIVERSAL BANK»	OE (max)
	386 JSC «CB «GLOBUS»	191 JSC JSCB «ARCADA»	ME (max)

Sources: systematised by the authors based on NBU statistics for the period from 01.01.2019 to 01.10.2019.

A significant difference between cluster 3 and 1, 2 is the prevailing lending to individuals in the national currency. Based on the tables and charts above, we can draw the following conclusions regarding the banks in Cluster 4 (Table 7). The banks' active operations in Cluster 4 are represented by government bonds in national and foreign currency. Funds are mainly raised by other banks. The banks in the cluster are characterised by high coverage of loans granted to customers in national currency by funds attracted

from customers also in national currency. The banks in the cluster have significant regulatory capital, high cost of borrowed funds and high income of the placed funds, the N7 is low, the amount of reserves is the largest. Thus, the cluster is formed by small banks with a low level of liquidity, which makes liquidity risk high, low credit and medium currency risk.

Table 7. Description of Cluster 4 (the north-central part of the map)

№	Banks	Key indicators	Key indicators
Cluster 4	553 JSC «BANK AVANGARD» 206 Misto Bank 313 JSC «Ukrainian Bank for reconstruction and development» 72 PJSC «BANK FAMILNY»	NAnc (min) LiAnc (min) DGDBfc (max) DGDBnc (max) FOBnc (av)	LCnc/FCnc (min) RC (max) CoBF (max) InPF (max) N7 (min) Re (min)

Sources: systematised based on NBU statistics for the period from 01.01.2019 to 01.10.2019.

The main feature and difference of Cluster 4 from the others is the most significant amount of funds placed in government bonds in both national and foreign currency.

In recent years, the share of Ukrainian banks' assets placed in government bonds has been gradually increasing. It creates an additional risk of concentration and limits the development of direct lending to borrowers. According to the classification of the National Bank of Ukraine, no groups of banks with an increased share of funds in securities are identified. In our view, the banks in this group need separate control and risk profile research.

Based on the data above, we can draw the following conclusions regarding the banks in Cluster 5 (Table 8). The funds placed in government bonds in both national and foreign currency, as well as a large share of loans to legal entities in foreign currency, prevail in active operations of the banks in the cluster. Funds are mainly raised from individuals in foreign currency and insignificantly in national currency. The largest banks in the system with significant liquidity were united in Cluster 5. Credit risk is medium, and currency risk is high, liquidity risk is low.

Table 8. Description of Cluster 5 (the extreme north-east part of the map)

№	Banks	Key indicators	Key indicators
Cluster 5	46 JSC CB «PrivatBank» 6 JSC «Oschadbank» 2 JSC «Ukreximbank»	NAnc (max) NAfc (max) LiAnc (max)	DGDBnc (av) DGDBfc (av) LLEfc (av) FIfc (av)

Sources: systematised based on NBU statistics for the period from 01.01.2019 to 01.10.2019.

It should be noted that the largest state-owned banks form cluster 5. Based on the tables, we can draw the following conclusions regarding the banks in Cluster 6 (Table 9). Lending to legal entities in national currency prevails in active operations of banks of the 6th cluster, while the share of lending to individuals in foreign currency is the smallest and the largest share of funds placed in other banks in foreign currency. Cluster's banks are characterised by the smallest amount of active operations reserves, which may indicate a risk of under-provisioning. Liabilities are represented by the funds of legal entities in national and foreign currency, while the amount of funds of individuals in national and foreign currency is the smallest. The banks in Cluster 6 have the least amount of marketing costs and non-interest incomes, indicating some conservative activity and the development of standard banking products. Therefore, cluster 6 includes small banks with high liquidity. Credit risk, as well as liquidity risk, is average for these banks and currency risk is high.

Table 9. Description of Cluster 6 (the extreme eastern part of the map)

№	Banks	Key indicators	Key indicators
Cluster 6	290 JSC «FIRST INVESTMENT BANK» 329 JSC «CREDIT EUROPE BANK» 455 JSC «SEB CORPORATE BANK» 407 JSC Deutsche Bank DBU 295 JSC «ING Bank Ukraine» 297 JSC «CITIBANK»	LiAfc (max) LLEnc (av) LIfc (min) FinOBfc (max) ReAO (max) FInc (min)	FIfc (min) FLEnc (max) FLEfc (max) ME (min) NIIn (min)

Sources: systematised by the authors based on NBU statistics for the period from 01.01.2019 to 01.10.2019.

Based on the data obtained, we can draw the following conclusions regarding the banks of cluster 7 (Table 10). The active operations of banks are represented by lending to legal entities in foreign currency and partially placed funds in other banks in foreign currency. The banks of Cluster 7 have an average level of coverage of loans to customers in foreign currency by funds attracted from customers in foreign currency. The volume of reserves for active operations is average. In liabilities, other banks' funds in foreign currency are dominated, and the smallest amount, compared to other clusters, is the funds borrowed from other banks in national currency. The operating income is the lowest in the banks of cluster 7. So, the medium-sized banks belong to this cluster with average credit and liquidity risk, and currency risk is high.

Table 10. Description of Cluster 7 (the extreme south-eastern part of the map)

№	Banks	Key indicators	Key indicators
Cluster 7	3 PSC Prominvestbank 299 «SBERBANK» JSC	LLEfc (max) LCfc/FCfc (av) FinOBfc (av) ReAO (av)	FOBnc (min) FOBfc (av) OIn (min)

Sources: systematised by the authors based on NBU statistics for the period from 01.01.2019 to 01.10.2019.

The defining and distinguishing feature of cluster 7, compared to others, is the most significant volume of foreign currency lending to legal entities.

Based on the data above, we can draw the following conclusions regarding cluster's number 8 banks (Table 11). The active operations of banks are represented by lending to individuals in the national currency, while the volume of lending to legal entities in the national currency and placement of funds in government bonds in the national currency is the lowest compared to other clusters. Funds are drawn from individuals in national currency, and the share of banks' funds in foreign currency is smallest. The level of operating incomes and expenditures of banks in the 8th cluster is average, and net interest margin and asset return are the highest. Normative N7 and N8 are low. Therefore, the group is formed by small retail banks with high credit risk, low currency risk and high liquidity risk.

Table 11. Description of Cluster 8 (the extreme north-western part of the map)

№	Banks	Key indicators	Key indicators
Cluster 8	96 JSC «A – BANK» 325 JSC «BANK FORWARD» 142 JSC «Idea Bank»	LInc (max) LLEnc (min) DGDBnc (min) FInc (max) FOBfc (min) OIn (av)	OE (av) NInM (max) ROA (max) N7 (min) N8 (min)

Sources: systematised based on NBU statistics for the period from 01.01.2019 to 01.10.2019.

Based on the data obtained, we can draw the following conclusions regarding the cluster's number 9 banks. The active operations of banks are represented by lending to individuals in foreign currency and the smallest amount of government bonds in foreign currency. The amount of reserves for active operations is the smallest, which may be evidence of under-provisioning. Funds are raised from other banks in foreign and national currency. The level of coverage of loans to customers in foreign currency by funds attracted from customers in foreign currency is low, which is indicative of a particular imbalance of active and passive transactions. The return on assets of the cluster's banks is below average. Therefore, the cluster includes small banks with high credit, currency and liquidity risk.

Table 12. Description of Cluster 9 (the extreme northern part of the map)

№	Banks	Key indicators	Key indicators
Cluster 9	5 JSC «Ukrsotsbank»	LIfc (max) DGDBfc (min) ReAO (min) FOBfc (max)	FOBnc (max) LCfc/FCfc (max) ROA (-av)

Sources: systematised based on NBU statistics for the period from 01.01.2019 to 01.10.2019.

Finally, consider the last cluster number 10 that occupies the extreme western part of the map. Cluster 10 as of 01.10.2019 is not represented by any bank, which is evidence of structural changes that have taken place in the banking system since the beginning of the year. The defining characteristics of the cluster are the highest values of the N7 and N8 standards, as well as the smallest deductions to reserves. High-risk banks are merged into this cluster. Based on the cluster analysis, determine the main business models of Ukrainian banks. So, as part of the SREP analysis, the NBU proposes the following classification of banks' business models:

1. Universal business model. It is characterised by a significant proportion of transactions with legal entities, individuals, interbank transactions and transactions with other financial market participants in the structure of assets and liabilities.
2. Retail business model. It is characterised by a significant proportion of transactions with individuals in the structure of assets and liabilities.
3. Corporate business model. It is characterised by a significant share of credit operations with legal entities in the structure of assets and borrowed funds from legal entities in the liability structure.
4. The corporate model with retail financing. It is characterised by a significant share of credit operations with legal entities in the structure of assets and borrowed funds from individuals in the liability structure.
5. Limited credit intermediation business model. It is characterised by a small share of loans to legal entities and individuals, which is no more than 30%, the lion's share of loans provides to a limited number of individuals, or the bank's funds finance active operations.

Based on the application of the neural network method and the conducted cluster analysis, we can distinguish the following business models of banks:

1. BM-FinOBnc. The business model is characterised by a large proportion of funds placed in other banks (the interbank market); the rest of the indicators are relatively balanced and are on average level. According to the NBU classification, the business model is universal.
2. BM-FIfc. The business model is characterised by a large number of funds attracted from individuals (deposits of individuals) in foreign currency; the other indicators are relatively balanced and are on average level. According to the NBU classification, the business model can be classified as universal.
3. BM-Av. The business model has relatively balanced indicators at an average level and small amounts of assets. Significant features are the highest volume of operating and marketing expenses; non-interest income is significant. According to the NBU classification, the business model is universal.

4. BM-DGDB. The business model is characterised by the most significant volume of domestic government bonds in foreign currency in the asset structure. According to the NBU classification, banks of this group can be attributed to the business model of limited credit intermediation.

5. BM-NA_ LiAnc. The business model is characterised by the most significant volumes of net assets in both national and foreign currency, as well as a significant stock of liquidity in national currency, and the other indicators are at a relatively average level. According to the NBU classification, the banks of this group can be attributed to the universal business model.

6. BM-LiAfc_FinOBfc_FLE. The business model is characterised by a significant stock of foreign currency liquidity, and foreign currency funds are placed with other banks, corporate funds outweigh in the liabilities structure. According to the NBU classification, the business model can be defined as corporate.

7. BM-LLEfc. The business model is characterised by a high proportion of loans to legal entities in foreign currency and the smallest operating incomes. According to the NBU classification, the business model can be defined as corporate.

8. BM-LInc_FInc. Banks this business model specialise in loans to individuals (retail financing) in national currency, and also attract funds from individuals in national currency. According to the NBU classification, the business model is retail.

9. BM-LIfc_FOB. The business model is characterised by the most significant volume of lending to individuals in foreign currency and significant dependence on interbank resources (banks with foreign capital). According to the NBU classification, the business model is retail.

10. BM-P. It is the group of banks with the worst financial position, which is significantly different from other cluster groups.

The distribution of banks by business models, depending on their significant coefficients-indicators and characteristics of clusters, can be represented schematically (Fig. 2).

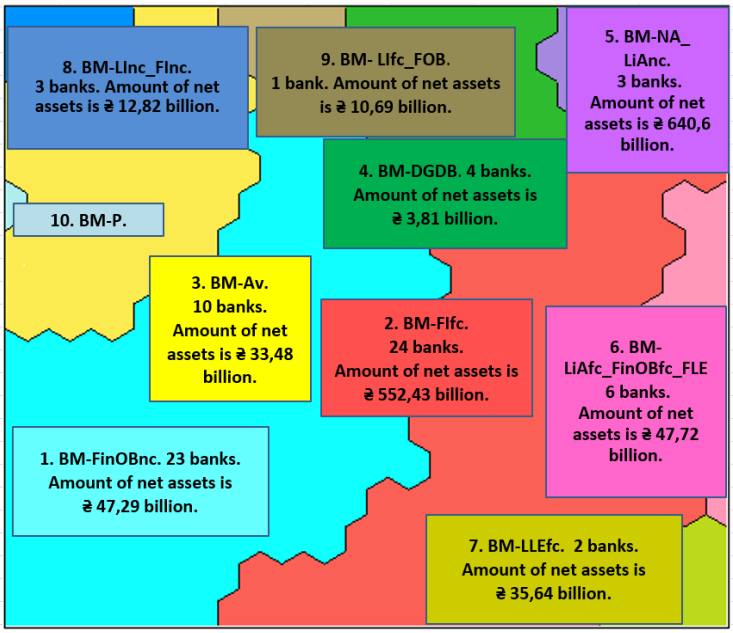

Figure 2. Schematic distribution of banks by business models as of 01.10.2019.

Sources: systematised by the authors on the basis of NBU statistics for the period from 01.01.2019 to 01.10.2019.

Based on the data which are shown in Fig. 2, we see that the most significant bank clusters are located in the centre of the map, while the clusters with the most significant fundamental differences are concentrated in the extreme parts of the map.

Conclusions. So, based on the analysis, we can conclude that it is not currently suggested by scientists a single approach to the interpretation of the concept of «bank business model», as well as its definition and analysis. Some scientists understand the business model as a set of qualitative indicators: the essential elements of a bank's business, strategy, activity logic, the other focuses on quantitative characteristics: assets structure, liabilities, capital, efficiency and results. The business model of the bank can be considered as a complex character that combines both the critical qualitative and vital quantitative indicators of the bank's activity, its place in the banking services market, orientation to confident its segments, as well as the specific features of work in constantly changing conditions of the internal and external environment and taking into account the risk factors. The business model is a selected segment of the bank's activity, that is characterised by a system of financial indicators that reflect efficiency, risk profile, other features of the bank's viability and sustainability, and therefore the ability to generate an acceptable level of revenue in the long term.

Based on the analysis, it was found that most scientists use clustering to determine the business model of the bank. Moreover, the volume of coefficients, the degree of their detail, the analysed period, the number of cluster groups in different works differ. Based on the analysis of scientific literature, we proposed own set of indicators that allow to identify and analyse a bank's business model and to form, based on such analysis, a risk profile of a group of banks which belong to one business model. Based on the clustering with using neural networks and construction of Kohonen's self-organising maps, 10 clusters of banks with their essential characteristics and, accordingly, ten business models were identified.

Most of the types of business models which we received can be attributed to universal according to the National Bank of Ukraine classification. At the same time, each type has characteristics that determine the viability and sustainability of the bank's strategy and risk profile of the banks. Banks with a high share of foreign currency funds need special attention. There is a high probability of losing the solvency of these banks in the conditions of a volatile exchange rate. Also, the banks whose business model is characterised by the most significant volume of government bonds in the national and foreign currency in the structure of assets need study. Each of the described business models has its own set of risks, based on its main activities, which allows forming a risk profile of each bank and accordingly develop specific measures for their control and minimisation. Improvement of the method proposed by the author is a prospect for further researches on this topic. The method of structural and functional groups of banks proposed in the article can be extended for the analysis of business models of any country and the study of complex economic systems consisting of many objects and characterised by multidimensional arrays of financial indicators. Authors propose to use this method to investigate the risks of stock market abuse. (Zarutska, 2018).

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Інноваційні підходи до оцінювання бізнес-моделей сучасних банків

Новим підходом до визначення фінансового стану та фінансової стійкості як окремого банку, так і всієї банківської системи, є аналіз бізнес-моделей банків. Визначення та аналіз бізнес-моделей банків дозволяє краще зрозуміти їх фінансово-економічну діяльність, ризик-апетит та систему управління. Сьогодні спостерігається значне зростання інтересу науковців до аналізу бізнес-моделей українських банків, що пояснюється переходом Національного банку України до нагляду за банками на основі SREP. Такий аналіз передбачає здійснення перевірки бізнес-моделей банків на предмет їх життєздатності та стійкості. Проте, точного визначення поняття не надає жодний регуляторний акт. Не сформовано й єдиного підходу серед науковців та дослідників. У той же час, традиційних методик, які зосереджувалися на аналізі достатності капіталу банку, його ліквідності та дотриманні обов'язкових економічних нормативів НБУ, в умовах сьогодення вже замало. У статті розглянуто основні теоретико-методичні підходи до тлумачення поняття «бізнес-модель банку», її визначення та аналізу. Проведене дослідження показало, що більшість дослідників використовує методи кластерного аналізу із різноманітними наборами змінних, кількості кластерних груп та бізнес-моделей. Для визначення бізнес-моделей українських банків, їх аналізу та формування на цій основі профілю ризику кожного банку, авторами запропоновано інноваційну методику структурно-функціональних груп банків (СФГБ-метод). Метод базується на використанні нейронних мереж, зокрема самоорганізуючих карт Кохонена (СОК). Для проведення кластерного аналізу запропоновано використання системи фінансових показників, що розраховуються Національним банком України у системі SREP. Аналіз кластерів дозволив виділити 10 бізнес-моделей українських банків. У статті розкрито особливості кожного кластеру та його схильність до ризиків. Розподіл банків за кластерами та їх місце на карті значною мірою залежить від структури його активів, зобов'язань, доходів та витрат, валютної позиції, а також інших якісних та кількісних індикаторів. Проведене дослідження підтвердило, що саме визначення бізнес-моделей банків дозволяє сформувати основу для запровадження диференційованого підходу до банківського регулювання та нагляду з урахуванням суттєвих характеристик кожного банку, його профілю ризику та основних відмінних рис.

Ключові слова: бізнес-модель банку, інноваційний підхід, профілю ризиків банку, структурно-функціональні групи.

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