UDC 339.7:336.71]:004.89
DOI https://10.33111/iep.eng.2024.40.04

Green and Digital Transformation of the Global Financial Services Market: Functional and Trend Modifications of the Banking Sector

Denys Ilnytskyy[1],
Yaroslava Stoliarchuk[2],
Volodymyr Khomanets [3]
Yurii Solodkovskyy[4],
Mykhailo Nechyporchuk[5]

ABSTRACT. The article is devoted to the emergence of neobanking, which has become one of the factors of intensified competition in the global financial services market (GFSM), as well as a form of realisation of the innovative potential of new technologies under a liberal regulatory regime. The paper demonstrates that the green and digital transformations of the global economy are manifested in the changes observed in the global banking sector (GBS), which can significantly change the disposition of the GFSM actors, the architecture of financial ecosystems and world financial order in general. Authors reveal the dominance in the scientific discourse of issues related to the digital transformation of the GBS, which will have short- and medium-term consequences, as opposed to the green transformation, which will have an impact in the medium and long term. It is revealed that the scientific basis for the transformation of the global banking sector is based on a wide range of general and special theories and the latest concepts, among which the concept of neobanking occupies a leading place. It is found that the applied use of digitalisation tools leads to diversification and growth in the number of leading countries in the structure of the GBS, where the EU and the USA prevail

[1] **Denys Ilnytskyy** — Doctor of Economics, Professor of the Department of International Economics of Kyiv National Economic University named after Vadym Hetman. Sphere of scientific interests: sustainable development, knowledge economy, global scientific and educational space, information resources, intellectual property & innovations, economic infrastructure, international economic integration, network economy, green economy. E-mail address: ilnytskyy@kneu.edu.ua. ORCID: https://orcid.org/0000-0001-8528-7845

[2] **Yaroslava Stoliarchuk** — Doctor of Economics, Head of the Department of International Economics of Kyiv National Economic University named after Vadym Hetman. Sphere of scientific interests: global economic development and its asymmetries, global financial market, international economic integration and transnationalisation of national economies, international investment and innovation, global labour market and international labour migration. E-mail address: stolyaroslava@kneu.edu.ua. ORCID: https://orcid.org/0000-0001-9124-6310

[3] **Volodymyr Khomanets** — PhD in Economics, Ambassador Extraordinary and Plenipotentiary of Ukraine to the Republic of Tunisia and the State of Libya with concurrent appointment. Sphere of scientific interests: deglobalisation, new model of the international economic order, global economic integration, national security of states, economic diplomacy. E-mail: khomanets@gmail.com. ORCID: https://orcid.org/0009-0004-0564-374X

[4] **Yurii Solodkovskyy** — PhD in Economics, Associate Professor, Dean of the Faculty of International Economics and Management of Kyiv National Economic University named after Vadym Hetman. Sphere of scientific interests: service economy, international trade in services. E-mail: fmeim@kneu.edu.ua. ORCID: https://orcid.org/0009-0003-0933-3426

[5] **Mykhailo Nechyporchuk** — PhD student at the Department of International Economics of Kyiv National Economic University named after Vadym Hetman, Director of River Mal Shopping Centre, Free Ukraine News Agency LLC. Sphere of scientific interests: finance, retail, financial innovation, digital economy. E-mail: mn@rivermall.ua ORCID: https://orcid.org/0009-0006-2865-549X

IEP, No. 40 (2024) pp. 101–133

ISSN 1811-9832/2024/No. 1 (40)

in terms of digitalisation. It is determined that the virtual mode of operation of neobanks provides them with significant competitive advantages in the GFSM and, by increasing inclusiveness, opens up new market niches, one of the evidences of which is a significant increase in the number of neobank clients, and the key factors of the relevant transformations are presented. It is identified that the active competition of banks with fintech companies leads to changes in the structure of the GBS workforce, where the share of skilled workers with programming skills is growing, and the emergence of various neobanking services and smart solutions. The paper identifies a number of functional and trend modifications of the GBS, including the dynamic increase in the market capitalization of digital banks and the concentration of neobank capital; deepening of ecosystem cooperation between neobanks and traditional banking institutions and deepening of competitive formats of interaction, including modernization of business models of interbank relations; active introduction of artificial intelligence technologies by neobanks into their operations; deepening of integration of cryptocurrencies and blockchain technologies into the functioning of the GBS. It has been found that in the context of sustainable development, the key trends in the transformation of the GBS are changes in the ethical foundations of banking institutions and organisational systems of institutional management, as well as the introduction of new financial instruments (green bonds). It is summarised that banking institutions and specialised financial institutions are losing their absolute monopoly on the provision of payment services and are being somewhat pushed out of the market by active innovators — large technology companies and fintech start-ups. It is determined that further development of the world financial order and the GFSM as an integral ecosystem will require a qualitative update of the principles and values of banking institutions, as well as further investment in innovative solutions.
KEYWORDS: global political economy, international finance, institutionalism, digitalisation, smartization, neobanking, artificial intelligence, technology, sustainable development, green finance, world financial order.

Introduction

The green and digital transformations are having a significant impact on the structure of the global economy, which is going through a period of qualitative renewal. The banking and business services sector accounts for a significant share in the structure of global GDP (according to various estimates, it reaches 20-25per cent), although there are asymmetries at the national level, which in 2023 ranged from 1.2per cent in Tajikistan and 59.8per cent in Andorra, 34.7 per cent in the UK, 32 per cent in France, and 25.2 per cent in Germany[6] . The relevance of studying the trends in the banking sector is that it is the second largest in the world after the high-tech sector in terms of the impact made by the use of AI tools, which allows banking market operators to increase revenues by 2.8 per cent to 4.7 per cent[7].

[6] *Share of finance and business services in GDP*. United Nations Economic Commission for Europe. 2024. Retrieved 01-08-2024. https://w3.unece.org/PXWeb/en/CountryRanking?IndicatorCode=9.

[7] *The AI Index 2024 Annual Report.* Stanford University, Stanford, CA, April 2024. URL: https://aiindex.stanford.edu/wp-content/uploads/2024/05/HAI_AI-Index-Report-2024.pdf.

The large importance and high dynamics of the banking sector create an environment of heightened uncertainty that affects both the development of banks and entities that use banking services. Banks are beginning to implement strategies that have not been seen in this sector of the economy before. An example of this is the Green Link Digital Bank in Singapore, founded in 2022, which has defined its mission as enabling consumers to have sustainable value chains. In general, high-level experts agree that the current stage of economic and market development (as well as their regulation), including the banking sector, is characterised by volatility, uncertainty, complexity and ambiguity, which is known as VUCA[8] . Although the Ukrainian government has assigned the role of developing the operating platform to digitalisation, it should probably be about modernising both business models and corporate governance[9]. To overcome uncertainty in the period of systemic transformation, it is advisable to scientifically study, generalise and systematise development trends.

It is obvious that strategic transformations, albeit to varying degrees, cover all key dimensions of banks' functioning in national and international markets. We are talking about such aspects as trust, loyalty, customer and partner satisfaction, service quality and competitiveness, operational efficiency and productivity, security, credit risks and financial crises, financial stability and deregulation, research and technological innovation. The changes even affect the key purpose of banks as a business (making a profit), which is complemented by a contribution to sustainable development. Therefore, we have to consider digitalisation as an imperative[10] of the global economy development, as revealed by D. Lukianenko, D. Pavlovsky and O. Sydorenko, which leads to the formation of a smart economy in all sectors. In addition, the digital imperative, together with the imperative of sustainable development, should probably form the prerequisites for the transition to a mature economy on a planetary scale and overcoming its boundaries with access to the scale of outer and/or interplanetary space.

The fundamental processes of digitalisation of the global financial system over the past decade have caused profound transformational changes in the global banking landscape, primarily in terms of a significant expansion of the range of services offered to customers through mobile application channels, the dynamic development of a network of virtual banks, the reprofiling of traditional financial institutions to provide digital banking services, the liberalisation of the system of state regulation of digital banking,

[8] Kumar, K., Arokiaraj, K. A., Gupta, A., Gandra, P. K., Chatterjee, R., & Vishwakarma, R. K. Digital and Green Banking Transformation towards Environmental Sustainability. *Journal of Informatics Education and Research*. 2023. *No. 3*(2). C.2168-2172. URL: https://doi.org/10.52783/jier.v3i2.362.

[9] *Principles of strategic reform of the state banking sector (strategic principles).* Ministry of Finance of Ukraine. 2020. 21 C. URL: https://www.mof.gov.ua/storage/files/20200814%20SOB%20Strategy.pdf.

[10] Lukianenko, D., Pavlovsky, D., Sydorenko, O. Digital imperative of the global economy development. *International Economic Policy*. 2023. No. 2(39). C.7-26

and a fundamental change in consumer attitudes towards digital financial technologies. These trends, automation and acceleration of business operations, being driven by the intensive implementation of digital platforms, distributed ledger systems and cloud technologies, reflect the powerful impact of modern innovative technologies on existing customer banking systems, the growing market demand for social and internet networks, online shopping and universal search engines, as well as the emergence of a fundamentally new generation of mobile applications and innovative smartphones. This has fundamentally modernised the world financial order and the global banking sector, putting it at the forefront of digital transformation among other sectors of the economy and creating strong interbank pressure on competitive relations in the global financial sector.

Ultimately, it is a matter of competition not only between banking institutions themselves, but also their competition with technology companies, which now act as systemic players in the banking sector at all levels. The natural result of these processes was a deep convergence of fintech companies and banks, implemented on *the* institutional platform *of digital banks*, or so-called *neobanks*, *mobile banks* or *challenger banks*. The wide variety of alternative definitions of these types of banks is indicative of both their novelty and the active search for forms recognised by the market and society, which is currently being studied only in a limited way and is characterised by a lack of reliable, scientifically based statistical and analytical data.

The study of scientific publications has revealed at least two clusters of keywords related to the processes of transformation of banking (Fig. 1). These are the digital transformation cluster and the green transformation cluster of global banking. The visualisation of the interrelationships suggests that digital transformations are more studied than green ones, and that there are other factors and trends in the transformation of global banking that are not directly related to the former, but have no less impact on the development of this sector. We attribute the predominance of the digital dimension to its predominantly technological focus. Whereas green changes are mainly fundamental and qualitative in nature.

Studies of green and digital transformation processes cover the changes taking place in the global banking sector to varying degrees. An analysis of publications on the selected topics revealed a significant asymmetry in their distribution in the global banking sector (Fig. 1). As we can see, digital transformation prevails among the keywords in studies that also refer to banking. In terms of the intensity of the relationship between keywords, "fintech" ranks 4th with 39, "digital transformation" ranks 9th with 27, "climate change" ranks 18th with 18, "innovation" ranks 19th with 18, "digitalisation" ranks 20th with 17, "blockchain" ranks 27th with 12, "mobile banking" ranks 34th with 8, "sustainable development" ranks 35th with 8, and "internet banking" ranks 37th with 4.

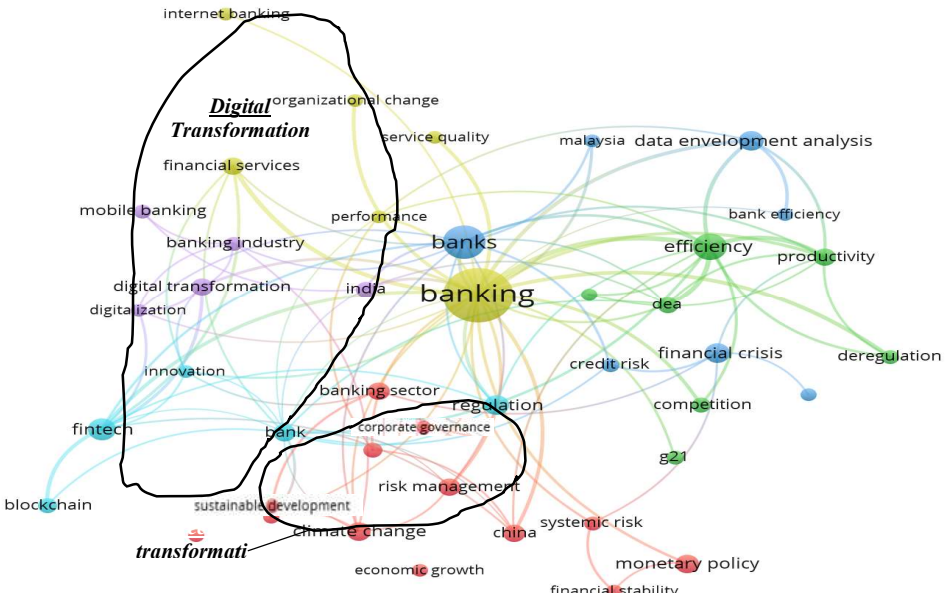

Figure 1. Network of keywords related to banking transformation[11]

The above arguments allowed us to formulate the actual **purpose** of the study. It consists in a reasoned systematisation of the key functional and trend modifications of the global banking sector.

The methodology of this article is based on the use of secondary sources of scientific information, such as publications of domestic and foreign scholars, current materials of leading neobanks, and analytical reports of leading international institutions. In addition, the argumentation of the paper is based on information from international databases and ratings, which have carried out a specialised search and processing of primary sources. The authors used the traditional case study method for concepts that are not sufficiently studied and not yet adopted in public practice, such as neobanking. The authors' own generalisations and systematisation of the leading processes of digitalisation of the global banking sector complement the sources and materials studied.

Scientific basis for the transformation of the global banking sector

The massive introduction of technological solutions in the financial sector of the economy has been called the process of democratisation of finance, as it

[11] Compiled based on the Scopus database and keywords (banking, bank, transformation) of the most cited publications and VOSViewer software

has allowed fintech to involve a significant number of economic actors who previously did not have this opportunity. Much has been written about this by theorists from countries with developed financial sectors, in particular Labour M. and Defrenn N.[12] . Just as the emergence of mobile communications broke the monopoly of fixed-line telephone operators several decades ago, the financial sector is currently undergoing a change in institutional architecture.

The dominant theoretical framework for the development of neobanks, which include both completely new institutions capable of providing banking services and traditional banks capable of offering banking services of new quality and using new technical solutions, is the theory of financial intermediation. There is a fairly wide range of works by scholars from different countries, in particular Avianto V., Asgari T., Vibovo V., Diner F., Naimi-Sadigha A., Rabiei M., Shanti R. and Љрбček M.[13];[14];[15]. Recently, as argued by Werner R. and Stark J., the concept of disintermediation has begun to take shape as a theory, which tries to reveal the distinctive features of financial services without the direct involvement of intermediaries [16];[17].

A number of other major theories complement the theoretical basis of neobanking. As demonstrated by Bianco A. and Sardoni C., the development of financial technologies uses the principles of innovation theory, the successful management of which allows offering the latest services, solutions and business models[18]. Accordingly, the theory of competitiveness is also necessary here, which is extremely relevant for the banking sector in view of the bankruptcies of banks that could not withstand the pressure from competitors and the outflow of customers for various reasons, including the COVID-19 pandemic and wars[19]. The theory of behavioural finance tries to answer the question of consumers' choice between traditional and new opportunities, services and players in the banking market[20].

In the era of virtualisation of business activities, network theory deserves special attention, as it is also one of the bridges between banking and telecommunications development. Veveghe L., Lee J. and Thomsett M.

---

[12] Laboure, M., & Deffrennes, N. *Democratising Finance: The Radical Promise of Fintech*. Harvard University Press, 2022. URL: https://doi.org/10.2307/j.ctv2bndf28.

[13] Shanti, R. Avianto, W. & Wibowo, W. A Systematic Review on Banking Digital Transformation. *Jurnal Ad'ministrare*. 2022. No. 9. 543 c. DOI:10.26858/ja.v9i2.40584.

[14] Diener, F., Špaček, M. Digital Transformation in Banking: A Managerial Perspective on Barriers to change. *Sustainability*. 2021. No. 13*(4). C.*20-32.

[15] Naimi-Sadigh, A., Asgari, T., Rabiei, M. Digital transformation in the value chain disruption of banking services. *Journal of the Knowledge Economy*. 2021. No. 13*(2). C.*1212-1242.

[16] Werner, R. A lost century in economics: Three theories of banking and the conclusive evidence. *International Review of Financial Analysis*. 2016. No. 46. C.361-379.

[17] Stark, J. Digital transformation at a bank. *Decision engineering.* 2020. C.67-72.

[18] Bianco, A. D., Sardoni, C. Banking theories and macroeconomics. *Journal of Post Keynesian Economics*. 2018. No. 41(2). C.165-184.

[19] Ndlovu, T., Echchabi, A., Boulkeroua, M., Ndiweni, E., Sibanda, W. Digital technology disruption on bank business models. *International Journal of Business Performance Management*. 2020. No. 21*(1/2).* C.184-190.

[20] Sharma, A., & Kumar, A. A review paper on behavioural finance: study of emerging trends. *Qualitative research in financial markets*. 2020. No. *12*(2). C.137-157.

supplemented the theory by justifying the importance of infrastructure for the development of mobile banking and the corresponding regulatory environment[21]. As Sardar S. and Anjaria K. have proved, neobanks have become a phenomenon of transformation of the financial sector structure, the future of which is unthinkable without their network, where banks compete for different groups of consumers and partners[22]. Moreover, the global trade network and the development of Internet commerce rely on the opportunities offered by neobanks, which has been widely studied in most countries and demonstrated by Kusnavi, K., Pandiangan, V. and Rahardi, M.[23]. Therefore, neobanks are a form of virtualisation of banking services with their automation and smartification, while their functioning serves as a mechanism for modernisation of world financial order.

The systems theory adds to the theoretical and methodological framework for the development of the banking sector an optimistic view of the growth of systemic stability due to the ability of neobanks to contribute to financial stability and regulatory mechanisms in the financial services market. These views are widely represented in the scientific discourse, in particular, in the works of Ndlovu T., Echchabi A., Bulkerua M., Xia S., Vale P., Zhang N. and others[24];[25]. Moreover, the conceptual framework of sustainable development is another dimension that accompanies digitalisation and contributes to the qualitative renewal of financial products and services that have been modernised through digital technologies. Indeed, even as proven by Tsuo L. and Strauss J., investments in digitalisation have a positive impact on the sustainable performance of commercial banks[26]. Therefore, banks that have implemented effective digital solutions and services are turning into agents of sustainable ecosystems, promoting sustainable development of their customers and partners, as well as national economies and the global economy as a whole.

At the conceptual level, there is a wide plurality of views, complemented by the recognition of the dominance of two defining trends, green and digital transformation, in the development of the global banking sector. Alongside the IT sector, the banking sector is one where extensive ex-

---

[21] Wewege, L., Lee, J., Thomsett, M. Disruptions and Digital Banking Trends. *Journal of Applied Finance and Banking*. 2020. No. 10. C.1-12.

[22] Sardar, S., Anjaria, K. The Future Of Banking: How Neo Banks Are Changing The Industry. *International Journal of Management Public Policy and Research*. 2023. No. 2(2). C.32-41.

[23] Kusnawi, K., Rahardi, M., Pandiangan, V. Sentiment Analysis of Neobank Digital Banking using Support Vector Machine Algorithm in Indonesia. *JOIV: International Journal on Informatics Visualisation*. 2023. No. 7(2). C.377-389.

[24] Ndlovu, T., Echchabi, A., Boulkeroua, M., Ndiweni, E., Sibanda, W. Digital technology disruption on bank business models. *International Journal of Business Performance Management*. 2020. No. 21*(1/2).* C.184-190.

[25] Sia, S. K., Weill, P., Zhang, N. Designing a Future-Ready Enterprise: The Digital Transformation of DBS Bank. *California Management Review*. 2021. No. 63*(3). C.*35-57.

[26] Zuo, L., Strauss, J., Zuo, L. The Digitalisation Transformation of Commercial Banks and Its Impact on Sustainable Efficiency Improvements through Investment in Science and Technology. *Sustainability*. 2021. No. 13*(19). C.* 11-28.

perimentation is taking place, both in terms of offering new products and services to markets and in terms of regulation, which together require categorical identification. The network of interrelationships of concepts in neobanking studies demonstrates their diversity against the background of the dominance of a number of key concepts that are likely to be decisive in the near future (Figure 2). These include internet banking, online and e-banking, electronic and virtual banking, as well as security, risk, trust and behavioural dimensions of financial activities.

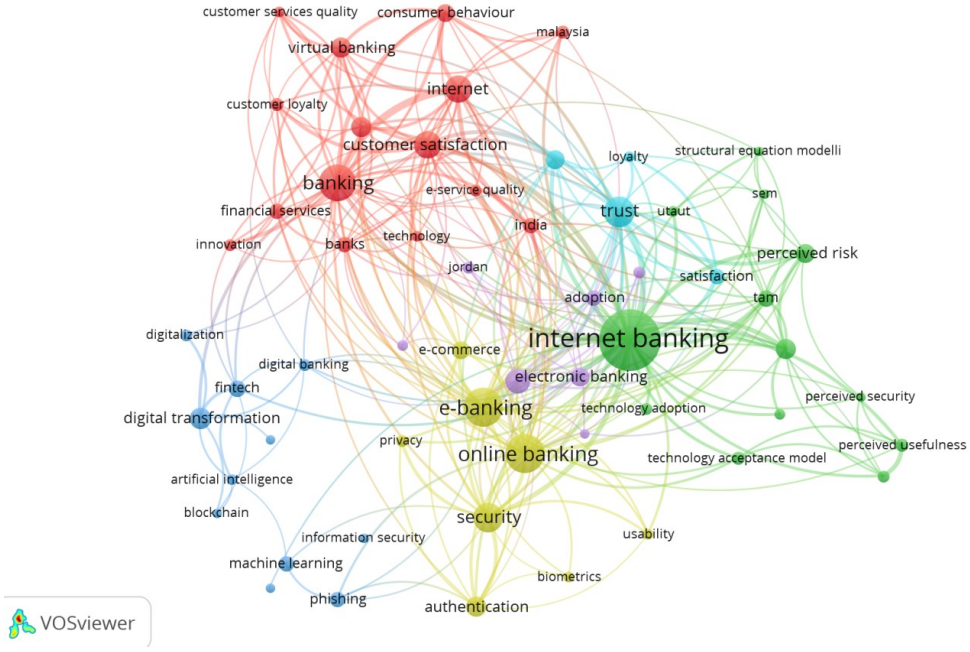

Fig. 2 Network of keyword interrelationships[27] of neobanking research

Domestic scientists are actively involved in the scientific discourse on the development of neobanking, primarily through the generalisation of best practices and theoretical concepts, as was done by Guba, M. O., Linnik, A. O., Kolesnyk, D. S. and Guley, A.[28; 29] . For example, Garyaga L. and Kulish R., Stashchuk O. and Martyniuk R. have actualised the impor-

[27] Key words used to search for studies of neobanking activities (neobank, neobanking, neo-banking, e-banking, online banking, online banking, Internet banking, digital bank, digitalisation of bank, bank digitalisation, online banking, digital transformation, banking) in the Scopus database.

[28] Guba, M. O., Linnik, A. O., Kolesnyk, D. S. Development of neobanks in Ukraine and the world. *Regional Economics and Management*. 2019. No. *2(24)*. 71-73.

[29] Digital transformation of the domestic banking environment in the context of the development of the fintech ecosystem. *Ukrainian Journal of Applied Economics*. 2019. No. 4*(1)*. 6-15.

tance of financial security and cybersecurity of banking institutions[30]. Although not so long ago, digitalisation was not clearly identified and was viewed through the prism of automation and the impact of technology on the development of the global banking system[31]. Digitalisation was considered by S. Sidenko in the system of factors of development of international financial centres[32]. Zaverbnyi A. and Sokulskyi N. studied the external factors of digitalisation of the banking system in Ukraine on the example of the pandemic[33], and Naumenkova S. and Mishchenko S. studied the problems of digital transformation of the banking system more widely[34]. Thanks to the work of Kapilar K., we can realise that neobanking has gone through a number of stages of development, namely:

- Initial stage — 1989-2000 — the emergence of the concept of remote service with elements of Internet banking;
- Conceptualisation stage — 2000-2010 — development of the online banking concept, including mobile and Internet banking;
- Concept refinement stage — 2010 to date — the concept of open banking and the concept of digital transformation of banking[35].

Thus, the continuing green and digital transformations of the global banking sector already have a fairly diversified theoretical basis. However, the diversity of concepts and approaches necessitates their streamlining, which, in our view, will become possible as the dynamism of transformations decreases and key global trends are systematised.

Applied digital transformation of the global banking sector

For many countries, harnessing the potential of digital banks is a unique opportunity to take a better position in the architecture of the global financial sector. In particular, while the TOP 100 largest banks in the world, with total assets exceeding USD 117 trillion, are represented by only 24 countries, the ranking of the best digital banks includes 38 countries (Table 1). At the same time, some countries with strong traditional banks are not represented among digital banks. It is also evident that the

[30] Financial security of banking activity in the context of digitalisation. *Problems of Economics*. 2019. No. 4. C. 163-171. https://doi.org/10.32983/2222-0712-2019-4-163-171.

[31] Mozgovyi, O., Pavliuk, O. Regulatory environment of the world banking system development. *International Economic Policy*, 2017. No. 1. C. 28-45.

[32] Sidenko, S. Modern trends in the development of international financial centres. International Economic Policy. 2022. No. 2. C.77-92. *URL: http://iepjournal. com/journals/37/2022_37_4_Sidenko.pdf*

[33] Pandemic as a catalyst for the digitalisation of the banking system in Ukraine. *Investments: practice and experience.* 2021. *No. 2.* 5-9.

[34] *Problems of digital transformation of the banking system*. Publishing House "Baltija Publishing". 2021. URL: http://www.baltijapublishing.lv/omp/index.php/bp/catalog/download/135/3938/8226-1.

[35] Kapliar, K., Maslova N., Hnoievyi V. Risks of the Neobanks' Actions in the Context of the Economic Adjustment. *WSEAS Transactions on Information Science and Applications*. 2024. No. *21*. C.11-22. DOI: 10.37394/23209.2024.21.2

strategies for the development of national banking sectors and their participation in the global financial space differ, which leads to both different representation of countries and the degree of concentration of bank capital.

Table 1

POSITIONS OF COUNTRIES IN THE GLOBAL RANKINGS OF THE TOP 100 BANKS

Indicators / Countries	traditional banks			digital banks
	Total assets, billion US dollars	**share in the top 100**	**number in the top 100**	**number in the top 100**
Australia	2 986,24	2,54%	4	3
Austria	372,67	0,32%	1	—
Argentina	—	—	—	1
Bahrain	—	—	—	1
Belgium	383,47	0,33%	1	—
Brazil	1 775,49	1,51%	4	3
United Kingdom	8 086,41	6,88%	6	11
Hong Kong	—	—	—	5
Denmark	542,81	0,46%	1	2
India	1 244,39	1,06%	2	3
Indonesia	—	—	—	4
Spain	3 514,74	2,99%	3	2
Italy	1 939,64	1,65%	2	1
Canada	5 752,27	4,89%	5	1
Qatar	338,14	0,29%	1	1
China	37 666,17	32,03%	20	8
Korea, South	2 666,20	2,27%	6	3
Lithuania	—	—	—	1
Malta	—	—	—	1
Nigeria	—	—	—	2
Netherlands	2 174,52	1,85%	3	3
Germany	3 103,11	2,64%	4	2
Norway	339,21	0,29%	1	1
UAE	—	—	—	1
SOUTH AFRICA	—	—	—	1
RF	908,73	0,77%	2	1
Singapore	1 398,25	1,19%	3	4
USA	17 317,59	14,73%	12	9
Taiwan	—	—	—	1
Thailand	—	—	—	1
Turkey	—	—	—	1

Indicators / Countries	traditional banks			digital banks
	Total assets, billion US dollars	**share in the top 100**	**number in the top 100**	**number in the top 100**
Ukraine	—	—	—	**1**
Philippines	–	–	–	3
Finland	662,71	0,56%	1	1
France	11 107,54	9,45%	6	7
Czech Republic	–	–	–	1
Chile	–	–	–	1
Switzerland	2 070,12	1,76%	2	1
Sweden	710,58	0,60%	2	2
Japan	10 531,59	8,96%	8	6

Source: compiled by the authors based on [36];[37].

Countries with less developed banking sectors and lower banking coverage have begun to actively use the potential of fintech to bridge the gap. This is most evident in countries such as Hong Kong, Indonesia, Nigeria, the Philippines, Singapore, and Singapore (Table 1). According to T. Yagrich and A. Amon, the greatest progress in the development of neobanks in countries depends on such indicators as the number of ATMs and bank terminals, data from the S&P 500, and the size of the rural population[38]. In this way, digitalisation helps to bridge the gaps in socio-economic development between countries.

It should be acknowledged that the volume of assets and scale of operations of traditional banks and digital banks differ significantly, sometimes by several times. This is due to a number of reasons that determine the competitive position of financial institutions in the banking services market. However, we will not dwell on them in this study, as they are worthy of a thorough disclosure. However, it can be acknowledged that in many cases, neobanks can be seen as platforms for experimenting with new instruments that can be adapted within traditional banks or become a competitive advantage for neobanks.

Embodying the deep integration of innovative financial technologies into banking activities, digital banks are created almost from scratch on innovative technological platforms and represent unique digital banking platforms for customer service online through mobile applications and without the physical presence of the latter in bank branches. Such a virtual mode of operation of

[36] *The world's largest banks by assets*. S&P Global. 2024. URL: https://www.spglobal.com/marketintelligence/en/news-insights/research/the-worlds-largest-banks-by-assets-2024.

[37] World's Top 100 Digital Banks Ranking 2023. *TABInsights*. 2024. URL: https://tabinsights.com/best-digital-bank-rankings/global-digital-bank-rankings-2023.

[38] Jagrič, T., Amon, A. Key factors of neobanking's occurrence. *Mednarodno Innovativno Poslovanje*. 2023. No. 15(1). C.1-12.

neobanks provides them with *significant competitive advantages in the global financial services market*, primarily in terms of significant qualitative improvement of traditional banking services to consumers through uninterrupted online operation, use of technologies for convenient opening of current and savings accounts, and removal of a number of barriers to customer access to a wide range of banking services Special attention should also be paid to the *significant competitive advantages of* digital banks that demonstrate their contribution to the achievement of sustainable development goals, such as minimising their operating costs due to the absence of branch networks and paperwork; for the most common types of transactions, a significant increase in the speed of customer service and significantly lower banking service tariffs compared to traditional banks; and the use of highly customised approaches to servicing a wide variety of customer groups[39].

In other words, in the context of the systemic digitalisation of all forms of economic activity, *the current generation of neobanking institutions is gradually losing the inherent features and characteristics of traditional banks and is increasingly moving its transactions beyond the financial sector itself*. The point is that while until relatively recently banking institutions could extensively increase the value of their profits solely by modernising standard corporate strategies and business models for customer banking, the quality of the models of interaction between neobanks and their customers is now undergoing profound transformations[40]. For example, it is neobanks that, through online banking technologies and the use of websites and mobile applications, enable their customers to receive an almost full range of traditional banking operations related to credit, settlement and investment services, maintenance of their savings, deposit and credit accounts, ensuring the receipt of money transfers, insurance and stock exchange operations, and a number of other services.

In addition, most modern digital banks are actively using innovative customer service formats in their operations, such as crowdfunding platforms, crowdsourcing, financial advisory robots, cryptocurrency payments, instant payments using chips, etc. It is no coincidence that the dynamic development of the technological base of neobanking institutions with the development of fundamentally new fintech services has become the most powerful driver of the steady increase in their competitive position in the global banking market in recent years[41].

---

[39] Liu, E. X. Stay Competitive in the Digital Age: The Future of Banks. *IMF Working Paper*. 2021. No. 2021/046. 42 p. URL: https://www.imf.org/-/media/Files/Publications/WP/2021/English/wpiea2021046-print-pdf.

[40] Irshak O. S., Tvorydlo O. I. Development of neobanks in Ukraine. *Economy and society*. 2022. Issue 36. 8 c. URL: https://economyandsociety.in.ua/index.php/ journal/article/view/1135/1093.

[41] Mamchuk, A. *Development of neobanks in the world and in Ukraine*. Development of scientific thought of post-industrial society: modern discourse: materials of the IV International Scientific Conference, Vinnytsia, 1 July, 2022 / International Centre for Scientific Research. Vinnytsia: European Scientific Platform, 2022. P. 50 URL: https://archive.mcnd.org.ua/index.php/conference-proceeding/article/view/130 .

Neobanking: the quantitative dimension

The scale of neobanks' activities to date is evidenced, in particular, by their number, which is limited by the methodological unpreparedness of national regulators and international supervisors. In recent years (as of January 2022), more than 400 neobanks have been established worldwide, and several dozen more are in the process of launching operations in the global financial market. As of the beginning of 2022, 397 digital banks were already operating in the market, and the highest dynamics of their establishment was observed in 2019-2020 (when 83 and 94 new neobank institutions started their operations, respectively) (Fig. 3). Although Irshak O. and Tvorydlo O. argue that this was a natural reaction of the global financial sector to the Covid-19 pandemic crisis, we understand the importance of technological readiness of national innovation systems, competitive pressure of the market environment and regulatory liberalism[42].

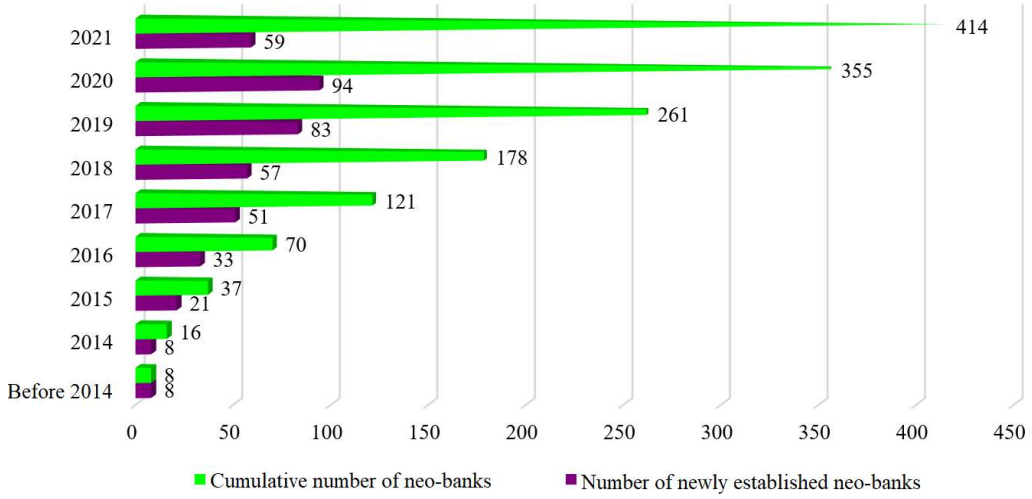

Figure 3. Dynamics of creation and number of digital banks in the world

Source: compiled by the authors based on data from[43].

As for *the capitalisation of the global neobanking services market*, in 2023 it was estimated at USD 98.4 billion. It is projected to grow to USD

[42] Irshak, O., Tvorydlo, O. Development of neobanks in Ukraine. *Economy and Society*. 2022. Issue 36. C. 3. URL: https://economyandsociety.in.ua/index.php/ journal/article/view/1135/1093.

[43] Stegmeier, C., Verburg, M. The Future of Neobanking. How can Neobanks unlock profitable growth? Whitepaper. *Strategy & Marketing Consultants*. May 2022. URL: https://www.simon-kucher.com/en/insights/future-neobanking-how-can-neobanks-unlock-profitable-growth.

3.4 trillion by 2032, with an average annual growth rate of 48.6% over the period[44]. At the same time, the global value of financial transactions of neobanks increased from USD 0.2 trillion to about USD 5 trillion per year in 2017-2023. According to forecast estimates, it will reach almost USD 10.5 trillion by 2028, with an average annual growth rate of 13.2 per cent over the period[45] . At the same time, the average cost of transactions per user in the neobanking services market increased from USD 12.4 in 2017 to USD 19.4 in 2018. The average cost of transactions per user in the neobanking services market increased from USD 12.4 in 2017 to USD 19.8 in 2023[46], and in 2028 it will be about USD 27 (Fig. 4).

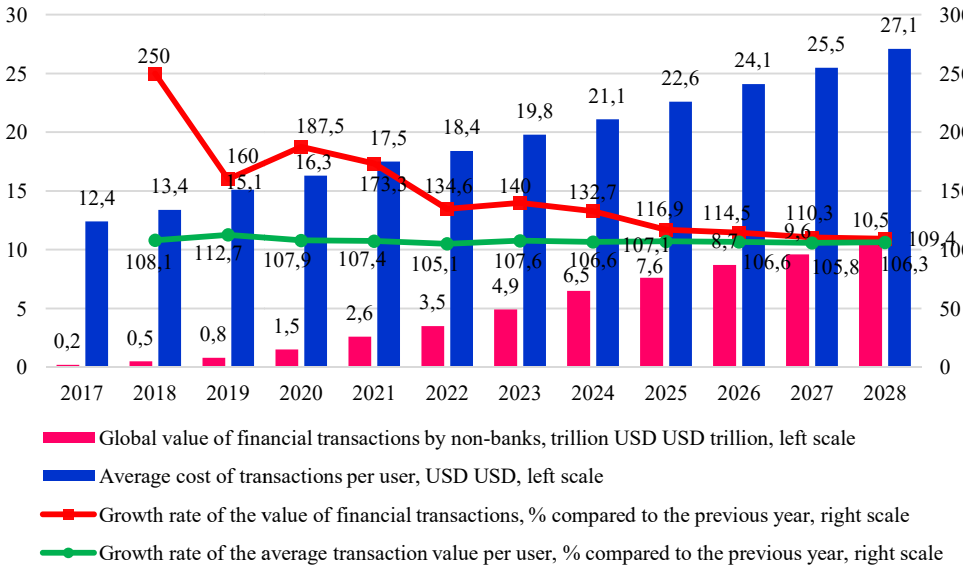

Figure 4. Global volumes of financial transactions by neobanks and the average actual and projected cost of transactions per user

Source: calculated and developed by the authors based on data from[47];[48].

[44] Neobanking Market Size, Share & Industry Analysis, By Account Type (Personal and Business), By Service (Savings/Checking Accounts, Payments & Money Transfers, Mobile Banking, Loans/Insurance/Investments, and Others), and Regional Forecast, 2024 -2032. *Fortune Business Insights*. 150 c. URL: https://www.fortunebusinessinsights.com/neobanking-market-109076

[45] Transaction value of neobanks worldwide from 2017 to 2023, with forecasts from 2024 to 2028 (in billion U.S. dollars). Statista. The Statistical Portal. https://www.statista.com/statistics/1228241/neobanks-global-market-size/

[46] Neobanking — Worldwide. Statista. The Statistical Portal. https://www.statista.com/outlook/dmo/fintech/neobanking/worldwide

[47] Transaction value of neobanks worldwide from 2017 to 2023, with forecasts from 2024 to 2028 (in billion U.S. dollars). Statista. The Statistical Portal. https://www.statista.com/statistics/1228241/neobanks-global-market-size/

[48] Neobanking — Worldwide. Statista. The Statistical Portal. https://www.statista.com/outlook/dmo/fintech/neobanking/worldwide

Global experience shows that one of the most developed neobanking services markets today is the European region. Among the reasons for its leading position on the global map of neobanking services, the main role was played by the EU's regulatory reforms of the payment services system under the first and second directives (PSD1 and PSD2), as well as the current banking licensing regime. For example, the first neobank institution, Atom Bank, was founded in the UK in 2014, and a year later, another digital bank, Monzo, was launched in the country, where only passport or driver's licence data is required to open an account or receive standard banking services via mobile applications. In general, the number of European neobanks increased from 57 to 162 in 2014-2022, with an average annual growth rate of 14 per cent over the period. In particular, as of the first quarter of 2023, the top 10 largest Moven neobanks in Europe provided banking services to more than 64 million customers with a market penetration rate of 7 to 10 per cent, with a forecast growth of this indicator to 14 per cent by 2027[49].

In contrast, the United States, even though the first neobanks were founded much earlier (2009 — Simple Bank, 2011 — Moven, etc.), is significantly behind Europe in terms of key indicators of the development of the neobanking segment of the financial market. Some researchers see the main reasons for this lagging behind primarily in the significant lack of a favourable legislative regime for the development of neobanks, significant problems in the procedures for obtaining banking licences and various permits, and high barriers to the creation of fintech start-ups[50] . Others blame delays in the centralised introduction of digital currencies[51] .

It is well known that one of the most generalised indicators of the competitive position of neobanks in the global financial market is the *quantitative indicators of their customer base*. In describing them, we should first of all note *a significant increase in the number of clients of neobanks*, which is evidence, on the one hand, of the growing market demand for customer-oriented digital banking services and increased investment in the fintech industry; and, on the other hand, of a significant strengthening of its regulatory support and the dynamic development of digital public infrastructure. A powerful catalyst for the dynamic reorientation of the global financial market towards the expansion of the neobanking services segment was the Covid-19 pandemic, which significantly accelerated the proliferation of smartphones in line with the dominant global trend of digitalisation

[49] The number of neobank users in the world has reached one billion. Fintechinsider. https://fintechinsider.com.ua/kilkist-korystuvachiv-neobankiv-u-sviti-syagnula-odnogo-milyarda/

[50] Kamenets, A. *Neobanks: advantages and disadvantages over traditional banks.* Modern challenges of sustainable business development: abstracts of the International scientific conference — Zhytomyr: Zhytomyr Polytechnic, 2020. C.291-292. URL: https://conf.ztu.edu.ua/wp-content/uploads/2021/02/zbirnyk_tez_05_06_11_2021.pdf.

[51] Mack, N. Obstacles to Successful Introduction of a US Central Bank Digital Currency. *Journal of Business & Technology Law*. 2022. No. *18*, C.35.

of all spheres of human life. As a result, global consumers of banking services are increasingly using digital technologies in their daily lives — from making virtual payments and online insurance transactions to investing, placing funds on mobile deposits, identifying themselves on social media, receiving digital receipts in real time, etc. — which is leading to a change in the financial culture of society.

Case studies of global market leadership

Several case studies that will be discussed below should help to better understand the contribution of digitalisation to the development of individual banks. Studying the progress of the world's largest banks allows us to better understand the general trends in the transformation of the global banking sector. It is based on the cases of leading banking institutions that the Basel Committee, which in the context of green transformation focuses mainly on methodological issues of climate change and the spread of green bonds[52], has already identified three leading channels of digital transformation of the banking sector, namely:

- diversification of the range of financial services and products, as well as channels of their offer and distribution;
- the emergence of new providers of financial services and products;
- Increased use of digital innovations in risk management, mitigation and oversight[53].

The Industrial and Commercial Bank of China[54] (ICBC), the world's first largest bank by assets, emphasises that the key priorities for modernising its business model at the current stage include the smartification of risk control, harnessing the potential of digital growth drivers, diversified structure and environmental principles[55]. In the 9-committee management structure of PKBK, we note the Digital Finance Committee and the Green Finance Committee, which demonstrate the soundness of strategic views and the importance of green and digital transformations, ESG and social responsibility for the development of both this bank and the global banking sector in general.

Despite its obvious specialisation, the world's second largest agricultural bank by assets, Agricultural Bank of China[56] (Agricultural Bank of China),

---

[52] Bolton, P. *The green swan: Central banking and financial stability in the age of climate change*. January 2020. 115 p. URL: https://www.bis.org/publ/othp31.pdf

[53] Digitalisation of finance. *BIS: Basel Committee on Banking Supervision*. May 2024. 46 p. URL: https://www.bis.org/bcbs/publ/d575.pdf.

[54] Industrial and Commercial Bank of China

[55] *Annual Report 2023*. Industrial and Commercial Bank of China. 2024. 327 p. URL: https://v.icbc.com.cn/userfiles/Resources/ICBCLTD/download/2024/Announcement20240426_2.pdf.

[56] Agricultural Bank of China

is actively developing mobile banking, online banking, and self-service banking as channels for offering innovative financial products and services to improve their quality and market expansion. Moreover, SBC is actively developing green investment, green finance and green banking, which are an important component of its contribution to sustainable social development, as evidenced by the 18 per cent increase in green bond investments in 2023 to about USD 20 billion[57]. It is worth noting that the effective use of digital technologies has allowed the WBK to cover 32,000 schools and 6,200 hospitals with institutional interaction through smart initiatives, which demonstrates the desire to create an inclusive financial space.

By the end of 2023, more than 75 per cent of households that were Bank of America customers in 15 countries were actively using the bank's digital platforms, and the AI-powered virtual assistant Erica® had 1.9 billion interactions with 40 million customers[58]. In 2021-2023, the bank has already raised and secured capital worth USD 560 billion. The bank is on track to raise USD 1.5 trillion in sustainable finance. USD 1.5 trillion by 2030. This strong performance has been made possible both by the use of digital solutions and the readiness of customers, as well as by the bank's willingness to compete with digital banks to harness the potential of fintech and make a significant contribution to the achievement of sustainable development goals.

People and neobanking: employees, partners and customers

Finally, the rapid decline in the number of traditional bank branches and customer visits to bank branches in recent decades deserves special attention in the context of analysing the reasons for the significant expansion of the number of neobank customers, which is increasingly prompting banking institutions to move their operations to the virtual environment through the use of cloud technologies, information messaging applications, chatbots based on artificial intelligence, software services to simulate human conversations. In terms of specific figures, according to the World Bank Group, in the pre-digital period of 2005-2017 alone, the number of banking service outlets per 100,000 adults in many countries decreased by 30-60 per cent. In particular, in Sweden and Luxembourg, this figure was 30 per cent, Germany — 36 per cent, Spain — 40 per cent, Denmark — 58 per cent, respectively[59]. In general, in 2017-2022, the number of bank

[57] *Annual Report 2023*. Agricultural Bank of China. 2024. 356 p. URL: https://www.abchina.com/en/investor-relations/performance-reports/annual-reports/202404/P020240426659355378697.pdf.

[58] *Annual report 2023*. Bank of America. 2024. 236 p. URL: https://d1io3yog0oux5.cloudfront.net/_9190fc4b4a493ac1ed4a741fda82af49/bankofamerica/db/867/10038/annual_report/BAC+2023+Annual+Report.pdf.

[59] The number of bank branches is decreasing. *Centre for Economic Research and Forecasting "Financial Pulse"*. 2018. http://finpuls.com/ru/banking/releases/news/Bankovskih-otdeleniy-stanovitsya-vse-menshe.htm

branches in the world decreased by 36 per cent, which resulted in a 30-50 per cent reduction in their operating expenses, although against the background of a simultaneous 10-30 per cent reduction in revenues due to increased interbank competition in the market and increased transparency of banking services to customers[60].

In turn, data from *Wells Fargo* analysts show that by 2026, modern digital technologies will displace more than 100,000 employees of banking institutions (primarily managers, operators and call centre staff)[61], who will be forced to find new areas and sectors of the economy to apply their labour force. At the same time, banking institutions themselves, in order to maintain their competitive position in the market, will need employees of a qualitatively new formation, capable not only of quickly adapting to the constantly changing technological environment of banking services, but also of effectively competing with fintech companies and global innovation giants such as Alphabet (Google), Microsoft, Meta Platforms (Facebook), Apple or Amazon.

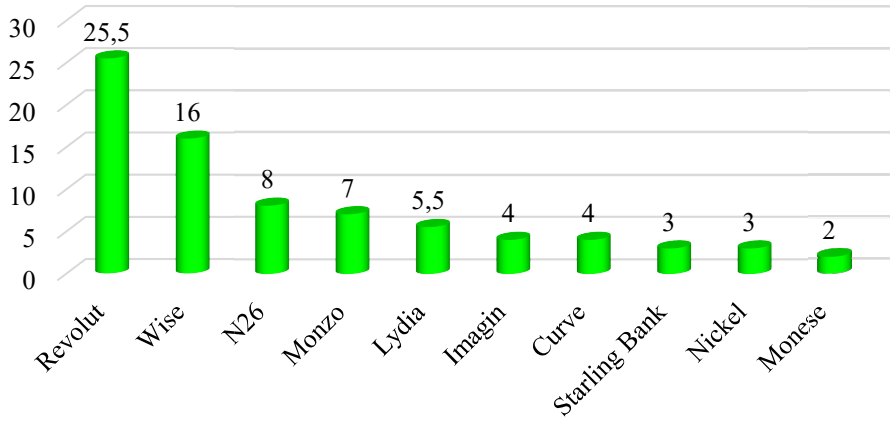

Figure 5. Leading neobanks in Europe
in 2022 by number of clients, million people

Source: compiled by the authors based on data from[62].

[60] Markevych, K. *Neobanks vs traditional banks: how neobanks are changing financial systems*. Razumkov Centre. 17 February 2022. URL: https://razumkov.org.ua/statti/neobanky-vs-tradytsiini-banky-iak-neobanky-zminiuiut-finansovu-systemy#a3

[61] Surane, J. '*Developers Are the New Bankers': Wells Fargo Analysts Predict Wave of Job Cuts*. Bloomberg, 28 September 2021. https://www.bloomberg.com/news/articles/2021-09-28/-developers-are-the-new-bankers-mayo-predicts-wave-of-job-cuts

[62] Leading neobanks in Europe in 2022, by number of customers (in millions). Statista. The Statistical Portal. https://www.statista.com/statistics/971163/customers-of-selected-european-neobanks-and-challenger-banks/

Given these dynamics, it is quite natural that the total number of users of neobanking services in 2022 in the United States of America was 41.4 million (with a prospect of growth to 78.4 million by 2027), in Brazil — 38.2 million (74.6 million), in the UK — 14.2 million (28.2 million), in France — 6.9 million (14.1 million), and in Japan — 3.9 million (7.6 million, respectively)[63]. In general, according to the report of the payment company BPC and the consulting company Fincog, the total number of clients of neobanking institutions is currently about 1 billion people[64]. As shown in Fig. 5, the largest operators of the global market of neobanking services are currently the following global players: Revolut (25.5 million customers in 2022), Wise (16 million), N26 (8 million), Monzo (7 million), Lydia (5.5 million), Imagin (4 million).

In 2022, the total number of customers of the world's Top 10 largest neobanks was 78 million[65]. As of March 2024, Revolut's customer base reached a record high of 40 million people, while in the United States of America, Chime, a neobank, took the leading position in terms of customer base in 2023 with 21 million people[66].

Global neobanking: functional and trend modifications

In the context of the methodological foundations of dialectics and a systematic approach to analysing the peculiarities of the functioning of the global financial sector in the context of digitalisation of *global* economic development, *we specify the key functional and trend modifications of global digital banking, which reflect its scale and structural landscape in aggregate, and also play a primary role in the digital innovation of the global financial system and the world financial order.* First of all, it is worth noting *the dynamic increase in the market capitalisation of digital banks*. As shown in Fig. 6, the total capitalisation of the top 10 largest global neobanks was USD 188 billion in 2022. SEE[67].

Moreover, today there are about four dozen neobanks in the world with a market capitalisation of more than USD 1 bln. The largest number of them is concentrated in North America (11), the United Kingdom (8), Latin America (6), and continental Europe (5) (Figure 7). This indicates

---

[63] Number of neobanking users worldwide in 2022 and 2027, by selected country (in millions). Statista. The Statistical Portal. https://www.statista.com/forecasts/1401382/neobanking-users-by-country.

[64] The number of neobank users in the world has reached one billion. *Fintechinsider*. https://fintechinsider.com.ua/kilkist-korystuvachiv-neobankiv-u-sviti-syagnula-odnogo-milyarda/

[65] *Note*. Calculated by the author on the basis of Fig. 5

[66] Transaction value of neobanks worldwide from 2017 to 2023, with forecasts from 2024 to 2028 (in billion U.S. dollars). Statista. The Statistical Portal. https://www.statista.com/statistics/1228241/neobanks-global-market-size/

[67] *Author's note*. Calculated by the author on the basis of Fig. 6

the *growing global concentration of neobank capital and the concentration of global market power in this segment in the hands of a small number of the largest digital banks.*

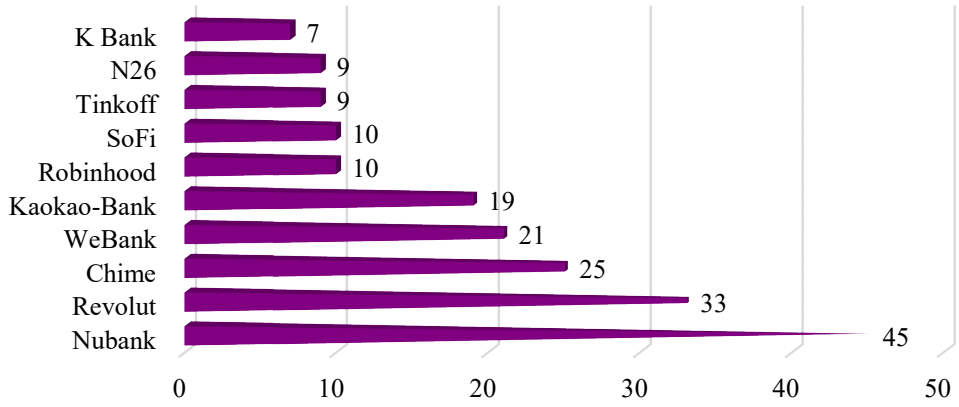

Fig. 6. Market capitalisation of the Top 10 largest digital banks in 2022, billion USD

Source: compiled by the authors based on data from[68].

The main drivers of the growth in the capitalisation of digital banks are primarily related to the dynamic implementation of fintech solutions in the global banking ecosystem and the deep technological modernisation of digital platforms used in international banking practice. The process of digitalisation of all banking processes and systematic automation of traditional financial services, which opens up virtually unlimited opportunities for customers to access banking services through electronic platforms, also play an important stimulating role.

The next trend in the operation of digital banks, which has become evident in recent years and is systematically transforming the global neobanking services market, is *the deepening of their cooperation with traditional banking institutions.* Thus, while currently performing a wide range of traditional banking operations, digital banks in most cases either do not hold separate banking licences and thus have to cooperate with licensed banks; or operate on the basis of the latter as their online subsidiaries, purchasing wholesale banking services from them and selling them at retail to their customers.

[68] Top 10 Neobanks Worldwide, by Market Capitalisation, 2022 (billions). *Emarketer*. https://www.emarketer.com/chart/257463/top-10-neobanks-worldwide-by-market-capitalization-2022-billions

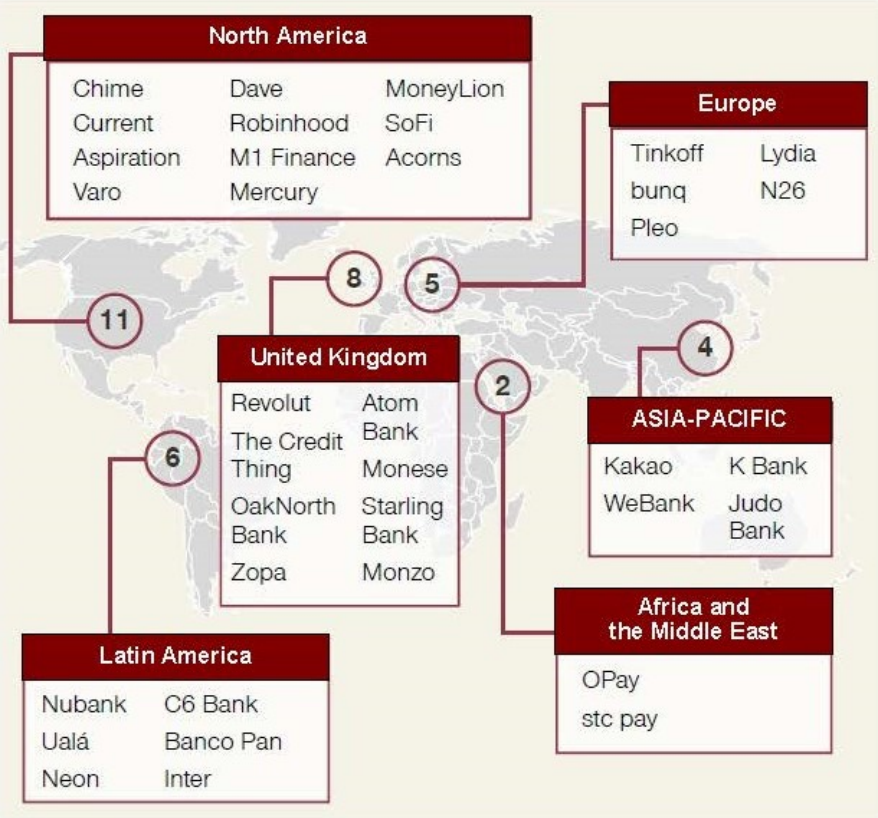

Figure 7. Regional location of the world's largest neobanks with a market capitalisation of over USD 1 billion in 2022

Source: compiled by the authors based on data from[69], p. 7.

It is important to note that such a format of cooperation between neobanking institutions and traditional parent banks has been a common practice for the latter for almost two decades, providing them with a significant increase in market competitiveness and strengthening their financial stability. Examples include BNP Paribas, which operates in more than 70 countries and has opened a neobank subsidiary Hello bank; and New Zealand's ASB Bank, which opened a neobank Bank Direct in its structure but eventually integrated all the developments into its core business. In turn, one of the most innovative neobanks in Germany today, N26, allows its customers

[69] Stegmeier, C., Verburg, M. The Future of Neobanking. How can Neobanks unlock profitable growth? Whitepaper. *Strategy & Marketing Consultants*, (May 2022), URL: https://www.simon-kucher.com/en/insights/future-neobanking-how-can-neobanks-unlock-profitable-growth.

to open bank accounts using a mobile application, while keeping all the funds attracted on the accounts of its partner bank, Wirecard Bank. We can go on with similar examples. In this regard, it should be noted that improvements in communication, in particular the emergence of smartphones, and the systematic introduction of mobile banking services have helped neobanks to capture an increasingly large part of the customer base of traditional banking institutions. This is confirmed, in particular, by the fact that in the US, the share of customers using banking applications and mobile devices increased from 22 per cent in 2011 to 43 per cent in 2015[70], in 2022 their total number was 162.7 million, and by 2026 it will exceed 100 per cent of the economically active population and reach, according to expert estimates, almost 178 million[71].

At the same time, despite the rather fierce competition between neo- and traditional banks for the global customer base and the right to set global standards for consumer banking, these global financial market players are now fully aware of the critical importance of *synergistic integration of their activities and deepening of competitive formats of cooperation*. In particular, traditional banking institutions are able to gain sustainable ecosystem competitive advantages in the market through the use of flexible banking financial technologies, offering customers a wide range of digital banking services, fast, cheap and targeted presentation of them, and the use of fundamentally new marketing channels to attract new customers.

In other words, traditional banks are increasingly implementing digital solutions in their operations by actively updating and creating their own mobile applications, implementing corporate strategies and business models for Internet banking, shifting their operations to the plane of fiercer intrasector competition, and providing their customers with the most convenient and customised banking services based on unlimited access to data on the consumer behaviour of potential customers and increasing the level of their inclusion.

In turn, by deepening their cooperation with digital financial institutions, neobanks gain significant competitive advantages in the market from scaling their customer base, high consumer confidence in the services they receive, and compliance with all applicable regulatory requirements for bank capital adequacy. Thus, a natural result of the deepening cooperation between digital and traditional banking institutions is *the establishment and dynamic development of such business models of interbank cooperation*

[70] *Consumers and mobile financial services 2016.* Board of Governors of the Federal Reserve System, March 2016. C 5. URL: https://www.federalreserve.gov/econresdata/consumers-and-mobile-financial-services-report-201603.pdf.

[71] Number of active mobile banking users in the United States from 2015 to 2022 with forecast to 2026, by generation (in millions). Statista. The Statistical Portal. https://www.statista.com/statistics/1400710/mobile-banking-users-in-the-us-by-generation/ (accessed 19.07.2024).

as white-label digital banking solutions and Bank-as-a-Service (BaaS) platforms in recent years.

In particular, BaaS platforms seamlessly integrate the key components of the open banking concept on their technological platform, on the one hand, and deep convergent interaction of business activities of a company consuming banking services and fintech companies on the other. First and foremost, it is about banks leasing their own infrastructure capacities to their legal entity clients, namely licences, payment processing, payment card issuance, compliance control systems, etc. In this way, the implementation of the BaaS business model allows banking services to be seamlessly integrated into external end-user applications and *enterprise resource planning systems (ERP)*. For example, the German Solarisbank serves its European customers entirely through its own modular digital BaaS platform, which provides selective integration of all neobanking services available in its arsenal — from maintaining customer accounts to conducting payment transactions and opening payment cards[72].

The implementation of the BaaS business model not only allows for a significant increase in the number and speed of various financial transactions, but also ensures deep convergence of information systems of companies and banks based on an open banking *application programming interface (API)*, smart contracts and distributed ledger technologies. At the same time, all the necessary information data is transmitted via standard secure protocols in real time, in particular, neobank transactions are managed through separate mobile applications that provide trade finance, cash management, collection, factoring, etc.[73]. For example, in 2023, the key resource capabilities of the BaaS business model of US banks were streamlining business operations (32.5 per cent of respondents); diversifying revenue sources (23.2 per cent); reducing operating costs (8.3); ensuring compliance with regulatory compliance requirements (6.6 per cent); accelerating the launch of financial services (6.6 per cent) and implementing integrative solutions (6.1 per cent, respectively)[74].

It is no coincidence that the main ecosystem participants of modern neobanking platforms are groups of user information aggregators such as telecommunications operators, social networks, etc., which provide unlimited access to information about their customers, thus ensuring a significant improvement in the quality of credit products for consumers, organising cross-selling and functioning of scoring systems of large banking institutions, as well as forming packages of customised neobanking products for consumers.

---

[72] *Solarisbank*. Official website. URL: https://www.solarisbank.com/en/

[73] The Future of Neobanking: Emerging Trends and Opportunities in 2024. *DigiPay.Guru.* February 22, 2024. URL: https://www.digipay.guru/blog/neobanking-future-trends-opportunities/

[74] Most significant opportunities in Banking-as-a-Service (BaaS) for banks in the United States in 2023. Statista. The Statistical Portal. https://www.statista.com/statistics/1389757/significant-baas-opportunities-in-baas-at-us-banks/

It is worth noting that the processes of systemic digital transformation of the global financial market are increasingly encouraging its participants to form consortia in order to increase investment in the development and implementation of digital banking products and reduce transaction costs of their own business activities[75] .

It is also worth noting that the modern digital format of neobanking institutions' activities objectively requires deepening their cooperation with companies and firms in the high-tech sector of the economy. The latter, as international practice shows, are able to offer digital banks their own innovative technologies and products, the development of which requires both significant investment and creative solutions, which are not always simultaneously within the capabilities of neobanks. As an example, let's look at the Singaporean neobank DigiBankASIA, which in March 2021 entered into a partnership agreement with the American IT consulting company Xebia. The latter, with its extensive experience in the use of AI/ML digital technologies, the Internet of Things, virtual and augmented reality, cloud computing, DevOps, and big data analytics, is also a partner of UNOBank in the implementation of the project to develop the latter's digital intelligent customer experience platform Cognito[76].

Artificial intelligence in the service of neobanking

In a comprehensive description of the key trends in the functioning of digital banks, which are systematically transforming the global banking market, special attention should be paid to *the active implementation of artificial intelligence technologies by neobanks in their operations*. It should be noted that the latter is capable of ensuring the smooth operation of digital banking — from finding customers and introducing them to the services offered to developing personalised service packages for consumers and conducting predictive analytics. The enormous functional and resource capabilities of artificial intelligence in ensuring the smooth operation of digital banks are also related to the provision of hyper-personalised services to customers, increasing the efficiency of financial activities of neobanking institutions, reducing their operating costs through automation, as well as prompt detection of financial fraud and improving the efficiency of financial risk management[77]. Since 2014, JPMorgan Chase, the world's largest bank, has been using artificial intelligence and machine learning to not

[75] Beck, M. Extroverted financialisation: How US finance shapes European banking. *Review of International Political Economy*. 2022. No. *29*(5), C.1723-1745.

[76] *Neobanking Global Market Report 2024*. The Business Research Company. 2024. 200 c. https://www.researchandmarkets.com/report/direct-bank

[77] The Future of Neobanking: Emerging Trends and Opportunities in 2024. *DigiPay.Guru*. February 22, 2024. URL: https://www.digipay.guru/blog/neobanking-future-trends-opportunities/

only maintain its global leadership but also make the entire ecosystem more sustainable. The bank both implements and scales green solutions on its own and helps clients achieve their sustainability goals[78].

To support these thoughts, we will cite a number of cases. In particular, in December 2023 Neobank Bunq launched Finn generative artificial intelligence on its digital platform, which provides a switchable search function in the Bunq app. This neobanking service is currently available to 11 million users worldwide and provides them with ample opportunities to plan their own budgets and financial flows, as well as search for financial transactions and navigate the platform. Another example is the Chinese digital bank Webbank, which is now actively using artificial intelligence in its interaction with its customers, processing almost 98 per cent of their requests through chatbots, conversational designs, voice assistants and video consultations[79] . These examples of deep integration of artificial intelligence technologies into the operational activities of neobanks, in our opinion, eloquently confirm the crucial role of the latter in optimising user interaction with digital banks and position them as a powerful institutional platform for ensuring sustainable growth of the global banking market and strengthening the international competitive position of neobanking institutions in the global financial environment.

Neobanking and the latest financial market instruments

The large-scale virtualisation of the global FX market is driving another important trend in the transformation of digital banks, namely *the deeper integration of cryptocurrencies and blockchain technologies into the operation of neobanking platforms.* For example, a large number of neobanking institutions are actively implementing these tools to provide their customers with ample opportunities to manage their digital assets through the Neobanking app, open and use e-wallets, use cryptocurrencies as a legal asset class, and ensure high speed and security of transactions. For example, Revolut allows its customers to make cross-border payments and transparent cryptocurrency transactions without any restrictions and without hidden fees; and the Swiss neobank SEBA provides its customers with the opportunity to buy, sell and safely store digital assets through convenient fintech digital banking applications[80].

---

[78] *Powering Growth with Curiosity and Heart. Annual Report 2023. JPMorgan* Chase & Co. 2024. 364 p. URL: https://www.jpmorganchase.com/content/dam/jpmc/jpmorgan-chase-and-co/investor-relations/documents/annualreport-2023.pdf.

[79] Neobanking Market Size, Share & Industry Analysis, By Account Type (Personal and Business), By Service (Savings/Checking Accounts, Payments & Money Transfers, Mobile Banking, Loans/Insurance/Investments, and Others), and Regional Forecast, 2024 -2032. *Fortune Business Insights*. 150 c. URL: https://www.fortunebusinessinsights.com/neobanking-market-109076

[80] Ibid.

In turn, in 2023, the British payment company Zepz launched Sendwave Pay, a neobank digital product that streamlines the process of transferring funds to Africa through an FDIC-insured bank account. Thanks to this neobank service, account holders receive 25 per cent savings when making money transfers to countries such as Kenya, Ghana, Tanzania, Uganda, Nigeria and Liberia using funds in their accounts. In addition, Sendwave Pay's unique competitive advantages extend to reimbursement of fees paid by customers for using their Sendwave Pay debit cards outside the US, as well as earning a monthly income of 0.51 per cent on their account balance at[81].

When assessing the effects of the deeper integration of cryptocurrencies and blockchain technologies into the functioning of neobanking platforms, it should be noted that the synergistic impact of such innovations essentially undermines banking financial technologies, significantly expanding the resource opportunities for digital banks not only for quantitative and structural growth, but also for innovative competitive development. In addition, due to the dynamic spread of cryptocurrency assets in the global payment circulation, the *integration of neobanking activities with decentralised finance* is significantly deepening, resulting in the widespread use of services such as yield farming, cryptocurrency lending, tokenised financial assets and automated smart contracts[82].

In a systematic analysis of the key trends in the functioning of digital banks, *which* are systematically transforming the global banking market, we cannot ignore *the dynamic growth of the global scale of open banking transactions*. It represents a fundamentally new model of operation for banks and other financial institutions, based on software developers being able to create financial products and services and then combine them within common digital ecosystems. At the same time, financial institutions provide such developers with access to customer data using open technologies for data exchange between information systems through standardised interaction protocols. Better knowledge management ensures not only a comprehensive analysis by neobanks of the financial needs of each individual client, but also maximum customisation (personalisation) of the financial products and services offered to them, including as part of their package offers.

Let's look at the numbers: in 2023, the global value of open banking transactions was USD 57 billion. It will exceed USD 330 billion by 2027[83].

---

[81] Sendwave launches new banking product targeting Kenya's diaspora in the US. *Aptan Tech*, 18 September 2023. https://aptantech.com/2023/09/18/sendwave-launches-new-banking-product-targeting-kenyas-diaspora-in-the-us/

[82] The Future of Neobanking: Emerging Trends and Opportunities in 2024. *DigiPay.Guru.* February 22, 2024. URL: https://www.digipay.guru/blog/neobanking-future-trends-opportunities/

[83] Rookes, J. Open Banking Payments to Surpass $330bn by 2027, as Bill Payments Drive Adoption. *Jupiper Research*, 2 August 2023. URL: https://www.juniperresearch.com/resources/infographics/open-banking-payments-forecast-infographic/

At the same time, it is expected that in the coming years the number of calls to the open banking application programming interface, which is known to be an important technological channel for the secure exchange of information data within digital banking, will also increase significantly (up to 580 billion in 2027[84]). As for the dynamics of the number of users of open banking services, their global number was about 24.7 million in 2020 (including 12.2 million in Europe alone), and by 2024 it will reach 132.2 million (63.8 million respectively)[85]. This demonstrates not only the dynamic expansion of open banking operations due to the convenience and simplicity of their conduct, but also their deep integration into various financial ecosystems, the integration of digital banks with investment platforms, insurance companies, embedded finance, and accounting software.

The steady increase in the scale and diversification of digital banks' activities is giving rise to another important trend in the development of the neobanking segment of the global financial market, namely, *the diversification of their sources of income through the implementation of business models for premium subscriptions, embedded financing, affiliate partnerships, data monetisation, banking services through digital platforms for small and medium-sized businesses, etc*. For example, digital banks currently have significant resource potential to generate additional income from providing reliable neobanking services to the business sector by opening online business accounts, digital invoicing, accepting payments and automated accounting of various financial transactions, providing small and medium-sized companies with low-cost deposits, etc.

In addition to interest income, a significant source of incoming financial flows for any digital bank is also the client fees they charge. Despite the fact that some neobanks declare their absence, they all receive a portion of the interbank commission. At the same time, the sustainability of this kind of business model in the long term is still quite questionable, given the following circumstances

- *First*, the reduction of interbank fees under pressure from government regulators of national financial markets in the US, EU and Canada;
- *Second*, the objective need for digital banks to redistribute the interbank commission received in favour of traditional banking institutions whose licences they use;
- *third*, a significant lack of fee and commission income received by neobanks to achieve break-even and business growth[86].

---

[84] Open banking — statistics & facts. Statista. The Statistical Portal. https://www.statista.com/topics/11010/open-banking/#editorsPicks

[85] Number of open banking users worldwide in 2020 with forecasts from 2021 to 2024, by region (in millions). Statista. The Statistical Portal. https://www.statista.com/statistics/1228771/open-banking-users-worldwide/

[86] Kamenets, A. *Neobanks: advantages and disadvantages over traditional banks.* Modern challenges of sustainable business development: abstracts of the International scientific conference — Zhytomyr: Zhytomyr Polytechnic, 2020. C.291-292. URL: https://conf.ztu.edu.ua/wp-content/uploads/2021/02/zbirnyk_tez_05_06_11_2021.pdf.

Instead, embedded finance (or contextual marketing) is directly related to the deep "embedding" of their own services by neobanks in non-financial platforms operating in various segments of the global market. These services include payments, lending, subscription management, insurance, microloans, investment transactions, digital wallets, bill payment and personal data verification, etc.[87]. Taken together, they open up wide resource opportunities for significant diversification of the product and type structure of the global neobanking services market and its transfer to a qualitatively higher level of development.

At the same time, the significant intensification of interbank competition and the rapid dynamisation of financial globalisation processes are causing a *deep diversification of the entity structure of participants in the global neobanking services market.* In order to expand and diversify their customer base and increase their competitive position in the market, they are forced to develop and offer consumers diversified packages of innovative financial products at the lowest prices. Thus, the use of low interest rates on credit instruments by neobanks is a key to their dynamic expansion of their customer base. However, this circumstance also leads to a simultaneous increase in the riskiness of digital banks' loan portfolios, an increase in the value of overdue debt and loan defaults, and a decrease in their resource potential for generating income from the difference between interest earned on loans and interest paid on deposits. Consequently, in the event of customer account closures, digital banks find themselves in a more difficult position than traditional banking institutions.

Conclusions

Summarising the above, we can state that as digital technologies (big data analytics, artificial intelligence, cloud computing, distributed ledger systems, etc.) and innovative financial instruments increasingly penetrate all areas of economic activity, banking institutions and specialised financial institutions are losing their absolute monopoly on payment services and are gradually being pushed out of the market by large technology companies and fintech start-ups. The latter, using banking and their own infrastructure capacities, are pursuing a policy of dynamic development of digital ecosystems in the global coordinates and are becoming active actors in the global financial market.

Under such conditions, the issue of introducing innovative technologies and modern methods of organising and managing customer banking services

[87] The Future of Neobanking: Emerging Trends and Opportunities in 2024. *DigiPay.Guru.* February 22, 2024. URL: https://www.digipay.guru/blog/neobanking-future-trends-opportunities/

in the global banking industry aimed at enhancing the competitive position of financial institutions in the global market, as well as qualitatively updating the principles and values of banking institutions, which include the priority of sustainable development as a guarantee of long-term business, is becoming increasingly relevant. National regulators and representatives of the banking sector should take into account the latest trends to maintain and improve their positions in the architecture of the global financial sector, the world financial order and the global economy as a whole.

Thus, the emergence and dynamic development of digital banks over the past decade has become a powerful driver of systemic innovation of the global banking system and its transition to a qualitatively higher level of development. The growing demand of the global market for financial instruments offered by neobanking institutions is primarily due to a significant increase in technological requirements of customers for effective management of their own assets in real time and using information and communication technologies. This issue is of particular relevance in the context of a significant intensification of competition between traditional and digital banks, which is a powerful driver not only of deep qualitative diversification of banking services offered to global consumers, but also of their maximum focus on customer needs and implementation of effective platform ecosystem solutions in the banking sector. In such circumstances, further growth in the consumer value of financial services provided by digital banks is primarily associated with the improvement of their quality, further dynamic development of alternative financial services, and overcoming the narrow specialisation of banking institutions to meet the needs of small and medium-sized businesses.

Further research on this topic should confirm or refute the continuity of the identified trends, as well as identify the latest trends and factors that led to their emergence. It is expected that the results of this study will be a strong argument for the effective use of artificial intelligence to improve the quality of banking services and address current challenges of socio-economic development through smartification and the priority of sustainable development.

*This article was translated from its original in Ukrainian.

References

1. "Leading Neobanks in Europe in 2022, by Number of Customers (in Millions)." Statista. The Statistic Portal. Accessed March 25, 2024. https://www.statista.com/statistics/971163/customers-of-selected-european-neobanks-and-challenger-banks/.

2. "Most Significant Opportunities in Banking-as-a-Service (BaaS) for Banks in the United States in 2023." Statista. The Statistic Portal. Accessed March 28,

2024. https://www.statista.com/statistics/1389757/significant-baas-opportunities-in-baas-at-us-banks/.

3. "Neobanking — Worldwide." Statista. The Statistic Portal. Accessed March 26, 2024. https://www.statista.com/outlook/dmo/fintech/neobanking/worldwide.

4. "Number of Active Mobile Banking Users in the United States from 2015 to 2022 with Forecast to 2026, by Generation (in Millions)." Statista. The Statistic Portal. Accessed March 29, 2024. https://www.statista.com/statistics/1400710/mobile-banking-users-in-the-us-by-generation/.

5. "Number of Neobanking Users Worldwide in 2022 and 2027, by Selected Country (in Millions)." Statista. The Statistic Portal. Accessed March 25, 2024. https://www.statista.com/forecasts/1401382/neobanking-users-by-country.

6. "Open Banking — Statistics & Facts." Statista. The Statistic Portal. Accessed March 26, 2024. https://www.statista.com/topics/11010/open-banking/#editorsPicks.

7. "Sendwave Launches New Banking Product Targeting Kenya's Diaspora in the US." *Aptan Tech*, September 18, 2023. Accessed March 29, 2024. https://aptantech.com/2023/09/18/sendwave-launches-new-banking-product-targeting-kenyas-diaspora-in-the-us/.

8. "Share of Finance and Business Services in GDP." *United Nations Economic Commission for Europe*, 2024. Accessed May 1, 2024. https://w3.unece.org/PXWeb/en/CountryRanking?IndicatorCode=9.

9. *Annual Report 2023*. Agricultural Bank of China (2024): 356. https://www.abchina.com/en/investor-relations/performance-reports/annual-reports/202404/P020240426659355378697.pdf.

10. *Annual Report 2023*. Bank of America (2024): 236. https://d1io3yog0oux5.cloudfront.net/_9190fc4b4a493ac1ed4a741fda82af49/bankofamerica/db/867/10038/annual_report/BAC+2023+Annual+Report.pdf.

11. *Annual Report 2023*. Industrial and Commercial Bank of China (2024): 327. https://v.icbc.com.cn/userfiles/Resources/ICBCLTD/download/2024/ Announcement20240426_2.pdf.

12. Beck, M. "Extroverted Financialization: How US Finance Shapes European Banking." *Review of International Political Economy* 29, no. 5 (2022): 1723-1745.

13. Bianco, A., and C. Sardoni. "Banking Theories and Macroeconomics." *Journal of Post Keynesian Economics* 41, no. 2 (2018): 165-184.

14. Center for Economic Research and Forecasting. "There Are Fewer and Fewer Bank Branches." *Financial Pulse* (2018). Accessed March 26, 2024. http://finpuls.com/ru/banking/releases/news/Bankovskih-otdeleniy-stanovitsya-vse-menshe.htm. [In Russian].

15. *Consumers and Mobile Financial Services 2016*. Board of Governors of Federal Reserve System (March 2016): 86. https://www.federalreserve.gov/ econresdata/consumers-and-mobile-financial-services-report-201603.pdf.

16. Diener, F., and M. Јbpaček. "Digital Transformation in Banking: A Managerial Perspective on Barriers to Change." *Sustainability* 13, no. 4 (2021): 20-32.

17. *Digitalisation of Finance*. BIS: Basel Committee on Banking Supervision (May 2024): 46. https://www.bis.org/bcbs/publ/d575.pdf.

18. *Emarketer*. “Top 10 Neobanks Worldwide, by Market Capitalization, 2022 (Billions).” Accessed March 26, 2024. https://www.emarketer.com/chart/257463/ top-10-neobanks-worldwide-by-market-capitalization-2022-billions.

19. Fintechinsider. "The Number of Neobank Users in the World Has Reached One Billion." Accessed March 26, 2024. https://fintechinsider.com.ua/kilkist-korystuvachiv-neobankiv-u-sviti-syagnula-odnogo-milyarda/. [In Ukrainian].

20. Garyaga, L., and R. Kulish. "Financial Security of Banking Activities in the Minds of Digitalization." *Problems of Economy*, no. 4 (2019): 163–171. https://doi.org/10.32983/2222-0712-2019-4-163-171. [In Ukrainian].

21. Guba, M.O., A.O. Linnyk, and D.S. Kolesnyk. "Development of Neobanks in Ukraine and the World." *Regional Economy and Management*, no. 2(24) (2019): 71-73. [In Ukrainian].

22. Guley, A., and S. Guley. "Digital Transformation of the Domestic Banking Environment in the Context of Fintech Ecosystem Development." *Ukrainian Journal of Applied Economics*, no. 4(1) (2019): 6-15. [In Ukrainian].

23. Irshak, O., and O. Tvorydlo. "Development of Neobanks in Ukraine." *Economy and Society*, vol. 36 (2022): 8. https://economyandsociety.in.ua/ index.php/journal/article/view/1135/1093. Accessed March 25, 2024. [In Ukrainian].

24. Jagrič, T., and A. Amon. "Key Factors of Neobanking’s Occurrence." *Mednarodno Inovativno Poslovanje* 15, no. 1 (2023): 1-12.

25. Kamenets, A. "Neobanks: Advantages and Disadvantages Over Traditional Banks." In *Modern Challenges of Sustainable Business Development: Theses of Speeches of the International Scientific Conference*. Zhytomyr: Zhytomyr Polytechnic, 2020, 291-292. https://conf.ztu.edu.ua/wp-content/uploads/2021/02/zbirnyk_tez_05_06_11_2021.pdf. [In Ukrainian].

26. Kapliar, K., N. Maslova, and V. Hnoievyi. "Risks of the Neobanks’ Activities in the Conditions of the Economy Digitalization." *WSEAS Transactions on Information Science and Applications* 21 (2024): 11-22. https://doi.org/10.37394/23209.2024.21.2.

27. Kumar, K., Arokiaraj, K., Gupta, A., Gandra, P., Chatterjee, R., and Vishwakarma, R. "Digital and Green Banking Transformation towards Environmental Sustainability." *Journal of Informatics Education and Research* 3, no. 2 (2023): 2168-2172. https://doi.org/10.52783/jier.v3i2.362.

28. Kusnawi, K., Rahardi, M., and Pandiangan, V. "Sentiment Analysis of Neobank Digital Banking Using Support Vector Machine Algorithm in Indonesia." *JOIV: International Journal on Informatics Visualization* 7, no. 2 (2023): 377-389.

29. Laboure, M., and Deffrennes, N. *Democratizing Finance: The Radical Promise of Fintech*. Harvard University Press, 2022. https://doi.org/10.2307/j.ctv2bndf28.

30. Liu, E. X. "Stay Competitive in the Digital Age: The Future of Banks." *IMF Working Paper* no. 2021/046 (2021): 42. https://www.imf.org/-/media/Files/Publications/WP/2021/English/wpiea2021046-print-pdf.

31. Lukyanenko, D., D. Pavlovsky, and O. Sydorenko. "The Digital Imperative for the Development of the Global Economy." *International Economic Policy*, no. 2(39) (2023): 7-26. [In Ukrainian].

32. Mack, N. "Obstacles to Successful Introduction of a US Central Bank Digital Currency." *Journal of Business & Technology Law* 18 (2022): 35.

33. Mamchuk, A. "Development of Neobanks in the World and in Ukraine." In *The Development of Scientific Thought in the Post-Industrial Society: Modern Discourse: Materials of the IV International Scientific Conference*, Vinnytsia, July 1, 2022. Vinnytsia: European Scientific Platform, 2022. https://archive.mcnd.org.ua/index.php/conference-proceeding/article/view/130. [In Ukrainian].

34. Markevich, K. "Neobanks vs Traditional Banks: How Neobanks Are Changing the Financial System." *Razumkov Center*, February 17, 2022. https://razumkov.org.ua/statti/neobanky-vs-tradytsiini-banky-iak-neobanky-zminiuiut-finansovu-systemy#a3. Accessed March 26, 2024. [In Ukrainian].

35. Ministry of Finance of Ukraine. *Principles of Strategic Reform of the State Banking Sector (Strategic Principles)*. 2020, p. 21. https://www.mof.gov.ua/storage/files/20200814%20SOB%20Strategy.pdf. [In Ukrainian].

36. Mozgoviy, O., and O. Pavlyuk. "Regulatory Environment for the Development of the Global Banking System." *International Economic Policy*, no. 1 (2017): 28-45. [In Ukrainian].

37. Naimi-Sadigh, A., Asgari, T., and Rabiei, M. "Digital Transformation in the Value Chain Disruption of Banking Services." *Journal of the Knowledge Economy* 13, no. 2 (2021): 1212-1242.

38. Naumenkova, S., and S. Mishchenko. *Problems of Digital Transformation of the Banking System*. Publishing House "Baltija Publishing," 2021. http://www.baltijapublishing.lv/omp/index.php/bp/catalog/download/135/3938/8226-1. [In Ukrainian].

39. Ndlovu, T., Echchabi, A., Boulkeroua, M., Ndiweni, E., and Sibanda, W. "Digital Technology Disruption on Bank Business Models." *International Journal of Business Performance Management* 21, no. 1/2 (2020): 184-190.

40. *Neobanking Global Market Report 2024*. The Business Research Company, 2024. Accessed March 29, 2024. https://www.researchandmarkets.com/report/direct-bank.

41. *Neobanking Market Size, Share & Industry Analysis, By Account Type (Personal and Business), By Service (Savings/Checking Accounts, Payments & Money Transfers, Mobile Banking, Loans/Insurance/Investments, and Others), and Regional Forecast, 2024-2032*. Fortune Business Insights. Accessed March 26, 2024. https://www.fortunebusinessinsights.com/neobanking-market-109076.

42. *Powering Growth with Curiosity and Heart. Annual Report 2023*. JPMorgan Chase & Co., 2024. Accessed March 29, 2024. https://www.jpmorganchase.com/content/dam/jpmc/jpmorgan-chase-and-co/investor-relations/documents/annualreport-2023.pdf.

43. Rookes, J. "Open Banking Payments to Surpass $330bn by 2027, as Bill Payments Drive Adoption." Jupiper Research, August 2, 2023. Accessed March 26, 2024. https://www.juniperresearch.com/resources/infographics/open-banking-payments-forecast-infographic/.

44. Sardar, S., and K. Anjaria. "The Future of Banking: How Neo Banks Are Changing the Industry." *International Journal of Management Public Policy and Research* 2, no. 2 (2023): 32-41.

45. Shanti, R., W. Avianto, and W. Wibowo. "A Systematic Review on Banking Digital Transformation." *Jurnal Ad'ministrare* 9 (2022): 543. https://doi.org/10.26858/ja.v9i2.40584.

46. Sharma, A., and A. Kumar. "A Review Paper on Behavioral Finance: Study of Emerging Trends." *Qualitative Research in Financial Markets* 12, no. 2 (2020): 137-157.

47. Sia, S. K., P. Weill, and N. Zhang. "Designing a Future-Ready Enterprise: The Digital Transformation of DBS Bank." *California Management Review* 63, no. 3 (2021): 35-57.

48. *Solarisbank.* Official webpage. Accessed March 29, 2024. https://www.solarisbank.com/en/.

49. Stark, J. "Digital Transformation at a Bank." *Decision Engineering* (2020): 67-72.

50. Stegmeier, C., and M. Verburg. *The Future of Neobanking: How Can Neobanks Unlock Profitable Growth?* Whitepaper. Strategy & Marketing Consultants, May 2022. https://www.simon-kucher.com/en/insights/future-neobanking-how-can-neobanks-unlock-profitable-growth.

51. Surane, J. "'Developers Are the New Bankers': Wells Fargo Analysts Predict Wave of Job Cuts." *Bloomberg*, September 28, 2021. Accessed March 26, 2024. https://www.bloomberg.com/news/articles/2021-09-28/-developers-are-the-new-bankers-mayo-predicts-wave-of-job-cuts.

52. *The AI Index 2024 Annual Report.* Stanford University, Stanford, CA, April 2024. https://aiindex.stanford.edu/wp-content/uploads/2024/05/HAI_AI-Index-Report-2024.pdf.

53. *The Future of Neobanking: Emerging Trends and Opportunities in 2024*. DigiPay.Guru, February 22, 2024. Accessed March 26, 2024. https://www.digipay.guru/blog/neobanking-future-trends-opportunities/.

54. *The World's Largest Banks by Assets*. S&P Global, 2024. https://www.spglobal.com/marketintelligence/en/news-insights/research/the-worlds-largest-banks-by-assets-2024.

55. *Transaction Value of Neobanks Worldwide from 2017 to 2023, with Forecasts from 2024 to 2028 (in Billion U.S. Dollars)*. Statista. Accessed March 25, 2024. https://www.statista.com/statistics/1228241/neobanks-global-market-size/.

56. Werner, Richard. "A Lost Century in Economics: Three Theories of Banking and the Conclusive Evidence." *International Review of Financial Analysis* 46 (2016): 361-379.

57. Wewege, Lucas, Jonathan Lee, and Mark Thomsett. "Disruptions and Digital Banking Trends." *Journal of Applied Finance and Banking* 10 (2020): 1-12.

58. *World's Top 100 Digital Banks Ranking 2023*. TABInsights, 2024. https://tabinsights.com/best-digital-bank-rankings/global-digital-bank-rankings-2023.

59. Zaverbnyi, A., and N. Sokulskyi. "The Pandemic as a Catalyst for Digitalization of the Banking System in Ukraine." *Investments: Practice and Experience*, no. 2 (2021): 5-9. [In Ukrainian].

60. Zuo, L., Jonathan Strauss, and L. Zuo. "The Digitalization Transformation of Commercial Banks and Its Impact on Sustainable Efficiency Improvements through Investment in Science and Technology." *Sustainability* 13, no. 19 (2021): 11-28.

Received: April 5, 2024
Accepted: May 20, 2024
Released: July 15, 2024