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Igor KRAVCHUK¹

BUSINESS MODELS IN BANKING BUSINESS: SYSTEMATIC LITERATURE REVIEW AND RESEARCH AGENDA

The purpose of paper is (1) to systematize the existing developments in this topic (pointing out the main sub-streams of past research), and (2) to identify knowledge gaps concerning methods, theories, and constructs based on the compiled information and to provide detailed directions for future research.

The research was conducted based on bibliometric review and framework-based review categories in domain-based methodology.

Results and main contribution of the paper: The main sub-streams of past research are cooperative banks; crisis, stability, supervisory and risk; ESG; financial performance; innovation; and Islamic banking. Research gaps that can become areas of future scientific research are (1) the significance and the impact on banking business models such issues as geopolitical factors, innovations, pandemics and other “black swans”, current ESG trends and regulations; (2) the development of a methodology for a composite indicator of the effectiveness of business models and theoretical foundations of banking business modeling.

Keywords: bank, business model, bibliometric analysis, framework-based review.

1. INTRODUCTION

The banking business is one of the most significant elements of the modern economy, which on the one hand, is the financial engine of economic growth, and on the other – through the effect of contagion when the financial condition of banking institutions worsens, it can have a significant negative impact on the financial stability of the economy.

Consider current dynamic changes in various sectors of society (in particular information technology, environmental policy, and others), as well as “black swans” in the form of the COVID-19 pandemic and Russia’s war against Ukraine, bank managers encounter the task of timely response to existing challenges, in particular when developing and modifying business models for the banking activity. The objective of the scientists is to identify existing banking business models and factors that influence their design and modification, to develop a methodology for evaluating the effectiveness of business

¹ Igor Kravchuk, Bydgoszcz University of Science and Technology, Poland; e-mail: igor.kravchuk@pbs.edu.pl. ORCID: 0000-0003-2556-8877.

models, and proposals for constructing new business models of banks, taking into account current trends in various sectors of society.

The initial articles that strictly deal with banking business models, among those indexed in the ScienceDirect database (Elsevier), were published only in 2001 (Hensmans et al., 2001) and in Web of Science – in 2005 (DeYoung, 2005), but their number has increased significantly in recent years (figure 1).

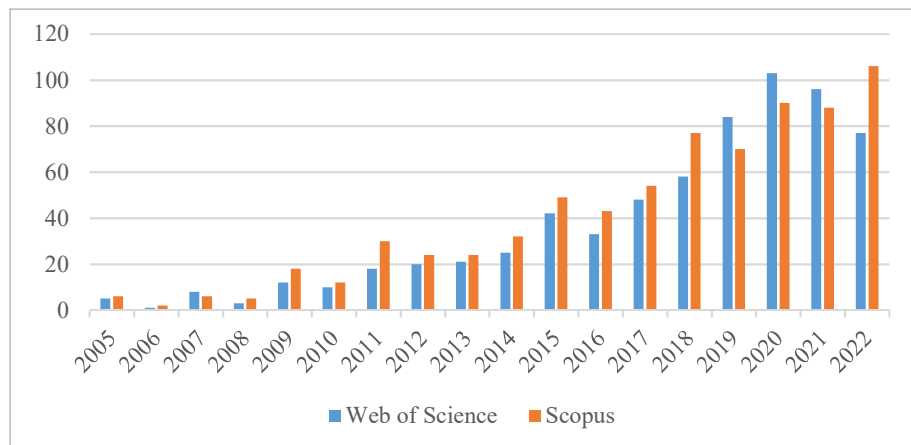


Figure 1. Annual publications concerning banking business models

Source: own preparation based on data from the Web of Science and Scopus databases.

Based on data from the Web of Science database, when applying the relevant keyword “business model*” (01.01.1960-17.07.2023; categories: economics, management), we get 8852 publications, of which 440 are review articles. If we narrow the relevant keyword to “business model*” AND “bank*”, we get 683 results, of which nine are review articles (only two reviews are partially meaningfully related to the banking business models). Inácio and Delai (2022) carried out a systematic literature review (content analysis of 63 papers) concerning, to some extent, the sustainability of banking business models. McKillop et al. (2020) offer a review of the economics and finance literature on financial cooperatives (in particular business models of cooperatives banks) published over the last five decades.

The scarcity of comprehensive review articles on scientific research of business models of banking institutions was the reason for writing this article, the aims of which are (1) to systematize the existing developments in this topic (pointing out the main sub-streams of past research), (2) to identify knowledge gaps concerning methods, theories, and constructs based on the compiled information and to provide detailed and specific directions for future research.

2. METHODOLOGY AND DATA

The research methodology was selected and formed based on recommendations from publications such as Paul and Criado (2020), Kraus et al. (2020), Palmatier et al. (2018), Evers et al. (2023).

The systematic literature review is „a review of an existing body of literature that follows a transparent and reproducible methodology in searching, assessing its quality and synthesizing it, with a high level of objectivity” (Kraus et al., 2020).

The research was conducted based on bibliometric review and framework-based review categories in domain-based methodology. The bibliometric review was performed using the bibliometrix R-tool (Aria, Cuccurullo, 2017). The framework-based review is based on a modification of the well-known framework – TCCM (Theory, Construct, Characteristics and Methodology), used in particular by Evers et al. (2023), Nelaeva and Nilssen (2022), Paul and Rosado-Serrano (2019). In the article is offered its own framework – SACMC (Sub-streams of research, Aim, Context, Methodology, Conclusion and Contribution) for implementing content analysis.

Search strategy includes (1) database: Web of Science; (2) generic keyword: “business model*” AND “bank*”; (3) searched method: TITLE-ABS-KEY (by title, keyword, and abstract).

Using a generic keyword in the Web of Science was found 1572 articles. In the next stage, publications were selected based on the inclusion and exclusion criteria (table 1).

Table 1. Screening criteria

Criterion	Inclusion	Exclusion	Number of articles after applying the criterion
Timespan:	modern publication (01.01.2018 – 01.06.2023)	older publication	878
Categories of publications	economics, management	any other categories	471
Document types:	article, book, review article	grey literature (such as working papers, conference proceedings etc.) and others	388
Focus	<i>stricte</i> banking business model	not relevant for business model of banks (such as parabanks etc.)	136
Citations	article, that has 1 or more citations	article without citations	101
Language of publications	English	any other language	98
Access	access to the full text	only abstract	79

Source: own preparation.

3. BIBLIOMETRIC REVIEW

The first component of the review was its bibliometric side, using a bibliometrix R-tool. Bibliometric reviews analyse an extensive amount of published research by using statistical tools, thus to figure out trends and citations and/or co-citations of a particular theme (Paul, Criado, 2020).

3.1. Descriptive analysis

A list of results for the bibliometric analysis conducted on a dataset of 79 studies, indexed in the Web of Science database from 2018 to 01.06.2023, is presented in Table 2.

Table 2. Main descriptive statistics

Description	Results
Timespan	2018-2023
Sources (Journals, Books, etc.)	60
Documents	79
Annual Growth Rate %	-28,89
Document Average Age	2,84
Average citations per doc	11,99
Authors	199
Authors of single-authored docs	10
Co-Authors per Doc	2,72
International co-authorships %	46,84

Source: own preparation based on data from the Web of Science database and the *bibliometrix* R-tool.

Table 2 shows that 79 papers are distributed across 60 sources with an average citation per document of 11,99. There are only ten authors with single-authored documents.

3.2. Performance analysis

In this section, the importance of various research, such as journals, authors, countries, and articles are analysed.

The sample included publications from 33 countries (Table 3), which indicate a broad international dimension (from all continents) of interest in the problems of the banking business models. Italy and the United Kingdom were the most productive.

Table 3. Most productive countries by country of origin of the corresponding author of the article

Country	Articles	SCP*	MCP**	Country	Articles	SCP*	MCP**
Italy	12	7	5	Spain	2	0	2
United Kingdom	10	6	4	United Arab Emirates	2	0	2
Germany	4	0	4	Ukraine	2	1	1
Vietnam	4	3	1	USA	2	1	1
Indonesia	3	2	1	Brazil	1	1	0
Switzerland	3	1	2	Croatia	1	1	0
Australia	2	0	2	Denmark	1	0	1
Belgium	2	0	2	Hungary	1	1	0
Canada	2	0	2	India	1	1	0
China	2	1	1	Kuwait	1	0	1

Table 3 (cont.). Most productive countries by country of origin of the corresponding author of the article

Country	Articles	SCP*	MCP**	Country	Articles	SCP*	MCP**
Czech Republic	2	2	0	Pakistan	1	0	1
France	2	2	0	Portugal	1	1	0
Ireland	2	1	1	Qatar	1	0	1
Malaysia	2	2	0	Saudi Arabia	1	0	1
Netherlands	2	1	1	South Africa	1	1	0
Poland	2	2	0	Sweden	1	1	0
Romania	2	2	0				

* SCP – Single Country Publications, ** MCP – Multiple Country Publications.

Source: own preparation based on data from the Web of Science database and the *bibliometrix* R-tool.

Based on the analysis with *bibliometrix* R-tool, it was determined that the most cited publications were from Italy (171 citations), the United Kingdom (132 citations), China (131 citations), and Germany (100 citations).

As for bibliographic analysis in the context of journals, most articles (5) concerning the banking business models in the selected timespan are published in well-known journals such as Journal of Banking & Finance and Sustainability (Figure 2).

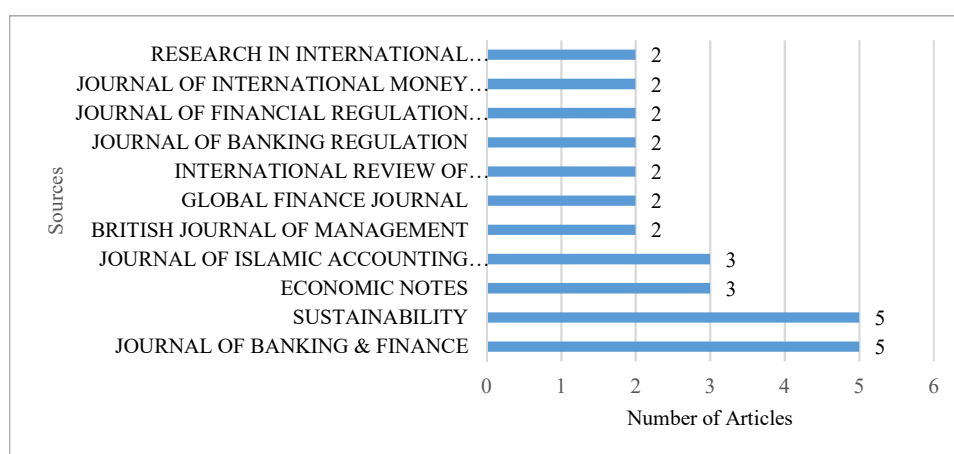


Figure 2. Most relevant sources

Source: own preparation based on data from the Web of Science database and the *bibliometrix* R-tool.

As for citations (more than 100 citations in references in scientific articles of the sample), the most influential scientific journals are Journal of Banking & Finance, Journal of Financial Economics, and Journal of Finance (Figure 3).



Figure 3. Most cited sources

Source: own preparation based on data from the Web of Science database and the *bibliometrix* R-tool.

In the context of authors of studies in the sample, we can observe only ten authors with two cited publications (R. Ayadi, T. Barbu, I. Boitan, V. Dang, M. Elnahass, M. Farne, L. Gambacorta, J. Huyhn, P. Molyneux).

The most cited (more than 20 times) are 11 works (Table 4), among which the leader in the citation is an article by Yip and Bocken (2018) regarding sustainable business models in the banking industry. The topic of ESG (Environmental, Social and Corporate Governance) was also explored by Gangi et al. (2019).

Table 4. Most global sited documents

Paper	Total Citations	Total Citations per year
Yip and Bocken 2018)	130	21,67
Gangi et al. (2019)	79	15,80
Niemand et al. (2021)	56	18,67
Nawaz (2019)	42	8,40
Molyneux et al. (2019)	40	8,00
McKillop et al. (2020)	39	9,75
Boot et al. 2021)	37	12,33
Azmi et al. (2019)	34	6,80
Paltrinieri et al. (2021)	33	11,00
Borri and Di Giorgio (2022)	22	11,00
Elnahass et al. (2018)	21	3,50

Source: own preparation based on data from the Web of Science database and the *bibliometrix* R-tool.

Highly cited are works on the specifics of the Islamic banking model (Nawaz, 2019; Azmi et al., 2019; Paltrinieri et al., 2021; Elnahass et al., 2018) or cooperative banking (McKillop et al., 2020), as well as the impact of innovations (Niemand et al., 2021; Boot et al., 2021), crisis (Borri, Di Giorgio, 2022) or evaluating the effectiveness (Molyneux et al., 2019) of the banking business models.

3.3. Science mapping

In this aspect, the bibliometric review built by the co-occurrence network reflects several clusters of scientific research from our sample related to social responsibility, performance and risk, impact (concerning business model, revenue diversification, credit), mergers, Islamic banks, and crisis (Figure 4).

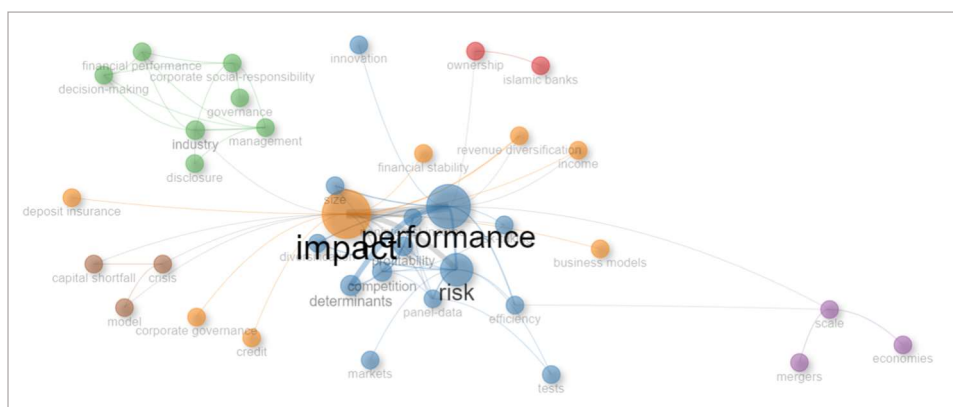


Figure 4. Co-occurrence network

Source: own preparation based on data from the Web of Science database and the *bibliometrix* R-tool.

In the next section, a content analysis of the sample will be performed, given that “some researchers, however, remain somewhat sceptical regarding the overall impact of bibliometric analyses” (Paul, Criado, 2020).

4. FRAMEWORK-BASED REVIEW

The study of selected 79 scientific articles in the content analysis aspect will help to reflect the development of research on business models of banking institutions. To do this, by modifying the approaches to the framework-based review (Nelaeva, Nilssen, 2022; Evers et al., 2023; Paul, Rosado-Serrano, 2019), in this article is proposed framework SCAMC (Sub-streams of research, Aim, Context, Methodology, Conclusion, and contribution), the elements of which will allow systematizing the existing works in the context of research areas, analyze the banking institutions of which regions are most interested in researchers, the aims of studies, the range of research methods, and also learn about the achievements and contribution of scientists to the development of the modern paradigm of understanding the business models of banking institutions (Table 5).

Table 5. SCAMS-framework

Author	Aim	Context*	Method**	Conclusion and contribution
Cooperative banks				
Diener (2020)	analyses the effects of human resources development on costs of banks.	E	QN	BM*** design of savings and cooperative banks is of secondary importance.
Barbu and Boitan (2019a)	analyses the strengths and challenges associated with a different BM.	E	QN	The results emphasized which cooperative member organizations still follow the original cooperative BM and mission, and which of them have migrated towards a more commercial banking one.
McKillop et al. (2020)	a review of the literature on published over the course of last five decades.	M	QL	The review has identified the power of cooperation, in the attainment of their common goals. It has highlighted the importance of relationship lending as a feature of BM development.
Kuc and Tepy (2018)	assesses the financial performance of credit unions.	E	QN	Authors reveal worse performance of Czech credit unions in terms of both profitability and stability compared to their European peers. Big credit unions in the Czech Republic have assumed a non-sustainable BM.
Venanzi and Matteucci (2022)	explores cooperative banks.	E	QN	Larger cooperative banks are more homogeneous among themselves and adopt a stable and recognizable BM and they still represent a good model of financial sustainability.
Crisis, stability, supervisory and risk				
Lucas et al. (2019)	studies to which extent banks' BMs adapt to low interest rates	E	QN	The global financial crisis and the euro area sovereign debt crisis had a substantial yet different impact on banks with different BMs. Changes in the yield curve predict changes in average BM characteristics.
Borri and Di Giorgio (2022)	studies the systemic risk contribution of the large publicly traded banks	E	QN	Banks significantly contribute to systemic risk, but larger banks, and banks with a BM more exposed to securities and derivatives trading in financial markets, contribute more.
van Oordt and Zhou (2019)	estimates how banks' BMs affect systemic risk	U	QN	Some characteristics of bank business models have a similar relationship to both tail risk and systemic risk.
Chiorazzo et al. (2018)	tests whether small traditional banks are more likely to survive than nontraditional banks	U	QN	Community banks adhering to the traditional banking BM have proven to be more resilient than other community banks under both normal and stressful economic conditions.

Table 5 (cont.). SCAMS-framework

Author	Aim	Context*	Method**	Conclusion and contribution
Crisis, stability, supervisory and risk				
Galletta and Mazzù (2019)	detects whether bank size and capital affect liquidity risk, and if there are significant differences between BMs	E	QN	The banking size increases the liquidity risk. For savings banks, income diversification raises the liquidity risk while investment banks reliant on non-deposit funding decrease the exposure to that risk.
Iwanicz-Drozdowska et al. (2021)	points to the factors which determined the share of deposits in the banks' funding structure	E	QN	The global financial crisis was one of the main factors that influenced the banks' funding models. The paper reports that the set of determinants affecting the banks' funding policies were different in the crisis in comparison to periods before and after the crisis.
Ayadi (2019)	analyses on BMs in banking, essential to understand bank businesses pre- and post-financial crisis and how they evolve in the financial system	M	QN	Book provided an overview on the evolving role of banks in the financial system. It explained how the BMs analysis could form part of the financial stability assessment framework and serve as a policy tool in terms of prevention, remedy and resolution.
de Haan and Kakes (2020)	documents banks' performance and explores the nexus between bank characteristics and fragility	E	QN	Large, market-oriented banks were particularly hit by the 2007-2009 global financial crisis whereas smaller, retail-oriented banks weathered these years relatively well. In subsequent years, retail-oriented banks were most affected.
Gambacorta et al. (2019)	investigates the foreign funding mix of globally active banks.	M	QN	Results add to those in other studies supporting the view that cross border interbank funding – that is, funding from unrelated banks – is the main adjustment channel in times of heightened global risk.
Argimon et al. (2019)	studies the relation between international transmission of monetary policy and global financial institutions' BMs	M	QN	Authors focus on the importance of BMs in the transmission of monetary policy.
Tran (2020)	investigates the association between functional diversification and bank liquidity creation	U	QN	Author document evidence of lower liquidity creation for higher diversification. The effect of moving into nontraditional activities on liquidity creation is more apparent with large banks and less pronounced with small banks.
Lueg et al. (2019)	identifies BMs	M	QN	Authors analytically define "bank BM" and add a theoretical basis.

Table 5 (cont.). SCAMS-framework

Author	Aim	Context*	Method**	Conclusion and contribution
Crisis, stability, supervisory and risk				
Marques and Alves (2020)	proposes a clustering ensemble approach to distinguish banks	E	QN	Authors provide a formal definition of “banking BM”; identify five strategic dimensions along which banks assume a long-term position relative to their peers; examine the level of similarity of banks operating with the same long-term BM; provide some evidence regarding the level of persistency of banks in terms of their BM.
Zarutka et al. (2020)	improves theoretical and methodological approaches to the definition and analysis of BMs of Ukrainian banks	E	QN	Authors propose a method of using differentiated supervisory approaches for different banks, which is based on the use of structural and functional analysis of bank groups.
Cantú et al. (2022)	investigates how the banking systems and their characteristics have affected the drivers of credit supply	L	QN	Large and well-capitalised banks with low risk indicators, stable sources of funding and a commercial BM generally supply more credit.
Vinas (2021)	analyses the credit supply of commercial banks and universal banks in France	E	QN	Universal banks and commercial banks had a similar credit supply prior to the crisis. During the 2008 financial crisis, universal banks had a strongly lower credit supply, leading to real effects on firms’ investment.
Nguyen et al. (2021)	determines the extent of the influence of BMs on banks’ stability.	As	QN	Authors find significant and negative impacts of a diversification model in which banks shift toward non-interest and fees-based activities.
Tanzi et al. (2018)	examines the BM of the niche players (focused on the distribution of investment services)	E	QN	The highest net profitability is found in the niche players group; the global players, as risk-takers, achieve lower remuneration. The originality mainly regards the BM risk perspective and the focus of the distribution of investment services.
Lopez-Penabad et al. (2022)	studies the impact of negative interest rates on the profitability and risk taking of banks.	E	QN	The effects of the implementation of negative interest rates policy affect bank profitability and risk taking differently, depending on the BM.
Infante et al. (2020)	analyses whether the BMs used by these banks affect the use of derivatives	E	QN	Authors examine some characteristics that delineate the bank’s BM into account.

Table 5 (cont.). SCAMS-framework

Author	Aim	Context*	Method**	Conclusion and contribution
Crisis, stability, supervisory and risk				
Everett et al. (2020)	investigates the effects of BMs on their foreign assets	E	QN	G-SIBs were markedly different from other bank types, as they not only increased their extra-euro area positions, but also contributed to maintaining cross-border flows within the euro area.
Ercegovic et al. (2020)	examines impact of various determinants of bank BMs on the bank risk	E	QN	Banks in which BM wholesale characteristics are dominant are more exposed to business risk in periods of market shocks.
Mynenko and Savchenko (2018)	identifies BMs typical of the banking system of Ukraine	E	QN	Certain banking groups are implementing similar BMs and risk concentration areas.
Sudrajad (2021)	examines to what extent is the impact of Basel II adoption on bank BMs in ASEAN countries	As	QN	Under the Basel II accord, banks have adjusted their BMs by diversifying their sources of income to avoid the obligation for keeping more capital
Grossmann and Scholz (2019)	examines liquidity-induced equity risks, triggered by exemplary rating shifts	E	QN	Retail banks bear significantly lower funding cost risks than wholesale and trading banks.
ESG				
Mehera and Ordonez-Ponce (2021)	explores the adoption of thematic components of a shared value BM by an bank; and develops an alternative BM	Au	QL	The study concludes by recommending an extended version of the shared value BM to enhance social and economic value creation based on stakeholder engagement.
Györi et al. (2021)	examines the MagNet Hungarian Community Bank's approach as a values-based bank	E	QL	These results can contribute to the operational improvement of both the investigated bank and other values-based banks and provide a good practice example for embedding values into BMs for more effective and efficient crisis and risk management.
Inácio and Delai (2022)	identifies the sustainability issues that have been evaluated in the banking sector.	NA	QL	Both the sustainable banking construct and its domain are still not clearly defined and standardized and that they are partially developed.
Nosratabadi et al. (2020)	studies sustainable BM for the banking sector.	E	QL	Sustainability of the Norwegian and German banks' BMs is higher than in other countries.
Costa-Climent and Martínez-Climent (2018)	focuses on banks that have designed their activities and investments to contribute to sustainability.	NA	QL	show the existence of a range of BMs that arise following different responses by different types of banks (considering primary objective of sustainable banks).

Table 5 (cont.). SCAMS-framework

Author	Aim	Context*	Method**	Conclusion and contribution
ESG				
Jatmiko et al. (2023)	scrutinizes the ethicality of Islamic banks' (IBs') BM	As	QN	Unethical issues are still prevalent in the IBs' modes of financing. Authors develop a theoretical method to audit IBs' idiosyncratic balance sheet structures.
Cornée et al. (2020)	how can social bank (SBs) survive without subsidies in the banking market?	E	QN	The results confirm that SBs benefit from a lower cost of funding, from both owners and deposit holders, and that they charge borrowers below-market interest rates.
Badunenko et al. (2021)	proposes approach to analyze banks' abilities to achieve a sustainable BM	E	QN	Authors present a new framework to analyze the effect of a BM on bank performance (measured by a state-of-the-art stochastic frontier model).
Barbu and Boitan (2019b)	measures the degree of efficiency of ethical, sustainable banks	E	QN	The results emphasize ethical banks' comparative performance, in terms of efficiency, and allow the identification of resembling peers whose monitoring may help the bank in achieving a further efficiency status.
Yip and Bocken (2018)	explores generic archetypes of BMs supporting sustainability.	As	M	Eight sustainable BM archetypes for banking are developed and validated
Gangi et al. (2019)	investigates how the CSR engagement of banks impacts their financial performance.	E	QN	The results support a win-win vision of the relationship between the social and financial performance of banks.
Karkowska (2020)	how does diversification of traditional activities of commercial banks affect their sustainability?	E	QN	The study contributes to the ongoing discussion on the recognized profitability and sustainability nexus as an important part of sustainable finance that may be a powerful solution to financial crises.
Khattak (2021)	investigates the impact of sustainability performance on the bank's performance in Muslim countries	M	QN	Authors found that banks with higher sustainability performance tend to have better financial performance.
Chang et al. (2022)	evaluates relative efficiency scores under the business activities of the Industrial and Commercial Bank of China	As	QN	Performance has improved as the Industrial and Commercial Bank of China has focused more on long-term society contributions.

Table 5 (cont.). SCAMS-framework

Author	Aim	Context*	Method**	Conclusion and contribution
ESG				
Mykhayliv and Zauner (2018)	studies social banks vs conventional banks (considering performance)	M	QN	Social banks are relatively more economically efficient than the G-SIBs since in all regressions the overheads to total asset ratio is significantly lower for social banks than for the G-SIBs.
Financial performance				
Ayadi et al. (2021)	evaluates BM migrations of banks	E	QN	Departing from the previous literature that focused on the analysis of the relationship between BMs and some accounting measures, authors focus on the determinants of migration. They also investigate the effects of migrations on bank performance.
Molyneux et al. (2019)	investigates the influence of negative interest rate policy (NIRP) on bank margins and profitability	M	QN	Bank margins and profits fell in NIRP-adopter countries compared to countries that did not adopt the policy. This adverse NIRP effect depends on bank specific-characteristics such as size, funding structure, BMs, assets repricing and product – line specialization.
Molyneux et al. (2020)	examines how NIRP (negative interest rate policy) has performed with respect to achieving an increase in bank lending	M	QN	Bank lending was weaker in NIRP-adopter countries. This effect have been stronger for banks that were smaller, more dependent on retail deposit funding, less well capitalized, had BMs reliant on interest income, and operated in more competitive markets
Sudrajad and Hübner (2019)	studies the nexus between market power and BMs of banks and examines the impact of BMs on banking stability and performance	As	QN	Authors find that banks with a strong capital base but lower net interest margin perform better in translating their market power into generating non-traditional income; document that banks with higher market power tend to increase non-deposit short-term funding in their financing mix.
Huynh and Dang (2021)	examines how loan portfolio diversification drives bank returns, mainly focusing on the conditioning roles of BMs and market power in this nexus	As	QN	Authors find that increased sectoral loan portfolio diversification reduces bank returns, but not all banks are equally affected. Banks that adopted a BM towards non-interest activities are hurt less from loan portfolio diversification, and bank market power may mitigate the detrimental effects of loan portfolio diversification on bank returns.

Table 5 (cont.). SCAMS-framework

Author	Aim	Context*	Method**	Conclusion and contribution
Financial performance				
Di Patti and Palazzo (2019)	investigates the impact of macroeconomic conditions on the profitability of banks according to the BM	E	QN	Studies relating bank profitability to macroeconomic conditions should take the heterogeneity of BMs into account.
Asmild et al. (2022)	analyses the difference in the pattern of inefficiency between the older family-dominated banks and the newer non-family-owned banks in Bangladesh	As	QN	There are few significant differences in the levels of variable-specific efficiency scores between the two subgroups.
Paulet (2018)	measures how the actual regulation affects banking margin and/or profitability.	E	QN	Banking liquidity regulation has transformed banks' BM and hampered entrepreneurial finance by reducing credit distribution.
Fayman et al. (2021)	examines performance of US Community banks and Non-Community banks post the Great Recession.	U	QN	Community banks, compared with their larger counterparts, tend to maintain higher levels of liquidity and lower levels of capital, and demonstrate a greater dependence on core deposits, Community banks should not be considered a homogenous group operating under a singular BM.
Farnè and Vouldis (2021)	identifies the main BMs of banks and studies how they differ with respect to performance, efficiency, credit risk and solvency.	E	QN	Evidence is provided that the sets of banks following the distinct four BMs differ with respect to performance and risk indicators.
Farnè and Vouldis (2020)	locates the banks' BM in a risk-return space.	E	QN	The main contribution of this study is the investigation of the link between banks' BMs and performance based on a rigorous econometric analysis which addresses also endogeneity issues
Jin et al. (2018)	examines the implications of banks' funding strategies for banks' earnings quality.	U	QN	Banks' funding strategy that relies more on retail deposits (conservative BM) increases banks' earnings quality.
Lagasio and Quaranta (2022)	analyses a link between the adoption of a specific BM and size, profitability, efficiency and risk profile.	E	QN	A bank BM is based on different endogenous factors (bank financial statements items and operating strategy) and can be linked to exogenous factors (financial crises, policies of central banks).
Dang and Huynh (2022)	examines the relationship between monetary policy and bank performance.	As	QN	Understanding the conditioning role of BMs in the monetary policy transmission through bank performance is a key contribution of this study.

Table 5 (cont.). SCAMS-framework

Author	Aim	Context*	Method**	Conclusion and contribution
Innovation				
Rajnak and Puschmann (2021)	derives a hypotheses model that connects IT innovations with the generic value disciplines of banks.	E	M	This paper connects blockchain technology research with BM research by demonstrating how the financial services industry is affected.
Boot et al. (2021)	examines innovation in the provision of financial services	NA	QL	Incumbent banks can exert market power through informational and spatial capture.
Niemand et al. (2021)	explains how banks can achieve superior performance in the digitalization age	E	QL	Banks that display high levels of entrepreneurial orientation report a higher level of performance.
Miranda and Balqiah (2020)	analyses the role of network externalities, innovation characteristics, and technological anxiety on the intention to use new forms of this financial BM.	As	M	Online bank managers should address the significant relationship within their marketing strategy in making managerial decisions. In a practical application, this research will help in gauging the impact of branding components of their BM.
Louw and Nieuwenhuizen (2020)	examines differences between traditional and digital-only banks' BMs	Af	QL	Authors highlight the importance of a mobile-first approach not only to traditional and digital-only banking services strategies but also to digital BM formulation in general.
Ramdani et al. (2022)	explores how investments banks adjust their BMs in response to internal and external challenges	As	QL	Investment banks can achieve resilience by adjusting their BMs through continuous activity changes in response to internal and external challenges.
Pramani and Iyer (2023)	explores the impediments to adoption of the payments banks by the financially excluded customer segments.	As	QL	The primary factors contributing to low adoption by the customer segments studied here, namely migrant labor and small vendors, have been identified as lack of awareness, lack of trust and lack of perceived need for their products/services.
Sund et al. (2021)	investigates challenges encountered by innovation labs in the retail banking industry	E	QL	Innovation labs are constrained not only by existing resources and capabilities, but also by the need to satisfy both top management and managers in the core business units.

Table 5 (cont.). SCAMS-framework

Author	Aim	Context*	Method**	Conclusion and contribution
Innovation				
Broby (2021)	explains the impact of financial technology and the Internet on the nature of banking.	NA	QL	Four strategies were proposed to navigate the evolving competitive landscape (for incumbents to address customer retention; for challengers to peruse a low-cost digital experience; for niche players to provide banking as a service; and for social media platforms to develop payment platforms).
Eriksson et al. (2020)	investigates the viability of the relationship-oriented BM.	E	QN	The relationship banking model generates non-interest revenue, but not revenue on net interest spread. The fine-grained client-level data also allows the investigation on how the effect of trust on client-level performance differs among client groups with different cognitive characteristics.
Islamic banking				
Nawaz (2019)	examines impact of investments in human capital and the corporate governance mechanism on the market performance of Islamic banks	M	QN	Investments in human capital to have a significant positive impact on the market value in the pre- and post-financial crisis period.
Azmi et al. (2019)	investigates the nexus of competition and stability	M	QN	Authors found no difference in the impact of competition and diversification on the stability of conventional and Islamic banks.
Paltrinieri et al. (2021)	examines difference in diversification effects on profitability between Islamic and conventional banks	As	QN	Authors find that diversification provides lower rewards for Islamic banks than conventional banks, with effects that are stronger for accounting-based measures rather than market-based metrics.
Elnahass et al. (2018)	examines institutional characteristics distinguishing Islamic from conventional banks	As	QN	Results provide significant evidence of capital and earnings management practices via loan loss provisions in conventional banks. Islamic banks tend not to use loan loss provisions in either capital or earnings management.
Elnahass et al. (2020)	examines whether board busyness is differently valued by investors engaging with the Islamic versus conventional banking sectors	M	QN	In conventional banks, board busyness is significantly and positively valued by the stock market. They find no supporting evidence on the market valuations of board busyness in Islamic banks.

Table 5 (cont.). SCAMS-framework

Author	Aim	Context*	Method**	Conclusion and contribution
Islamic banking				
Alhammadi et al. (2020)	shows how BM is key aspect of corporate governance	As	QL	Authors illustrate how an apparently successful BM may fail due to an inherent instability that could have been identified through the application of careful risk analysis (including stress testing) in the choice and ongoing evaluation of the BM, which robust corporate governance and strategic guidance require.
Rizwan et al. (2022)	examines differences in the systemic risk profiles of conventional and Islamic banks during the COVID-19 pandemic	As	QN	Comparative analysis shows that Islamic banks have similar systemic vulnerabilities to systematic and idiosyncratic factors. However, Islamic banks pose significantly less spillover to others relative to conventional banks while earning abnormal returns.
Raouf and Ahmed (2022)	examines the specific role of risk governance in promoting financial stability in banks	As	QN	The BMs of Islamic banks have features that can enhance stability, poor risk governance can potentially negate this positive feature.
Sakti and Mohamad (2018)	examines how Indonesian Islamic banks differ from conventional banks in terms of their BM, asset quality, stability and efficiency	As	QN	Islamic banks are relatively more efficient than conventional banks, as shown by their higher overall efficiency, as well as technical efficiency
Hidayat et al. (2021)	evaluates how conventional and Islamic banks trade off risk, efficiency and financial performance in their BMs.	As	QN	Islamic and conventional banks differ not in the levels of efficiency, risk and profitability, but rather in how risk and efficiency influence banks' financial performance.

* E – Europe, As – Asia, U – USA, M – Mixed sample of regions, L – Latin America, Af – Africa, Au – Australia, NA – article without sample of banks in some region, ** QN – quantitative methods, QL – qualitative methods, *** BM – business model.

Source: own preparation based on data from the Web of Science.

4.1. Sub-streams of research

Considering the importance of the external environment for interaction with banks, especially during crisis periods (in particular, during the global financial crisis in 2007–2009), the largest group of articles in recent years concerned business models of banking institutions with such a research area as crisis, macroeconomic and financial stability, effective supervision in the banking sector and risk management (31.6% of all publications in the sample). Other areas of research on banking business models are the question of ESG (19.7% of publications) and the profitability of their activities (17.7%). The number of

articles on the role of innovation (in particular, fintech) in banking modeling is also growing (7.9%). Researchers are also interested in specific banking models – Islamic banking and cooperative banks (Figure 5).

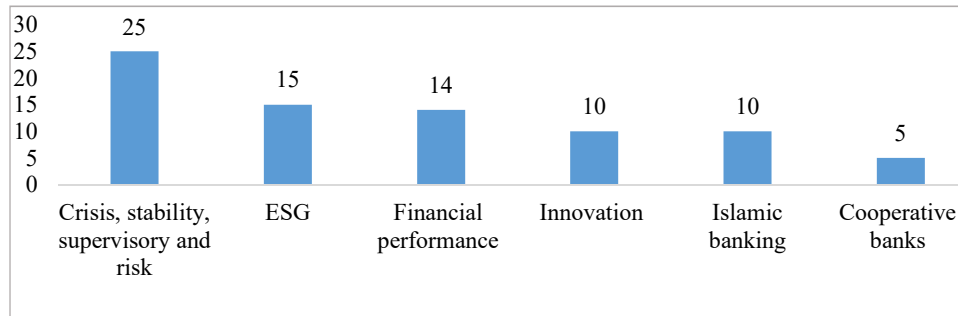


Figure 5. Sub-streams of research in sample

Source: Prepared by Author based on data from the Web of Science.

4.2. Context

The most frequently studied institutions are banks in Europe (45.6%), significant attention also concerned to institutions from the Asian region (countries with an Islamic banking business model, China, ASEAN countries, etc.), and only five studies in the sample relate entirely to banks in the United States. There is low interest and/or low citation of publications regarding the banking business models in Africa, Latin America, and Australia (Figure 6).

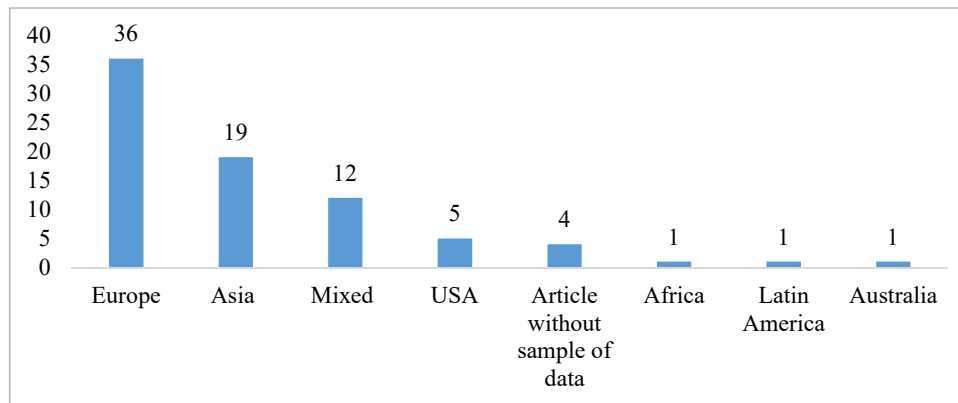


Figure 6. Geographical context of research subjects

Source: Prepared by Author based on data from the Web of Science.

4.3. Aim

The purposes formulated by the authors of publications can investigate in the context of sub-streams of research:

A. Cooperative banks. The authors investigate the strengths and challenges, performance or costs of this banking business model (BM).

B. Crisis, stability, supervisory and risk. The authors examine the impact of low-interest rates, systemic and liquidity risk on BM, survivability of different banking BM under normal and crisis economic conditions, the nexus between BM and banking funding structure, credit supply, foreign assets, derivatives, and the impact of regulation and monetary policy. Some articles aim to propose methodological approaches concerning the analysis of banking BM.

C. ESG. The authors explore components of a shared value BM, the sustainable business model in banks, social and ethical banks.

D. Financial performance. The authors study business model migrations of banks, the influence of different factors (monetary policy (in particular, the negative interest rate policy), regulation measures, loan portfolio, and funding strategies) on the profitability of banking BM.

E. Innovation. The authors examine the impact of IT innovations and financial technologies on banking BM, explore payment banks, innovation labs in the banks, and differences between digital and traditional banks.

F. Islamic banking. The authors study different characteristics distinguishing Islamic from conventional banking BM.

4.4. Methodology

An essential feature of modern scientific research in economics is their empirical nature with significant domination of quantitative methods. It is also concerning the banking business models – 65 (82.3%) articles from the sample used quantitative research methods (Table 5). Among these methods, regression analysis dominates (71%), in particular, the use of GMM panel regressions, vector autoregression, panel vector-error correction model, GARCH, logistic and Tobit regressions, Z-score, CAPM using Fama and French's three-factor model and International CAPM.

Researchers also use cluster analysis (15.1%), including Kohonen's self-organizing maps, as well as principal component analysis, stochastic cost frontier model, data envelopment analysis, and ANOVA (Figure 7).

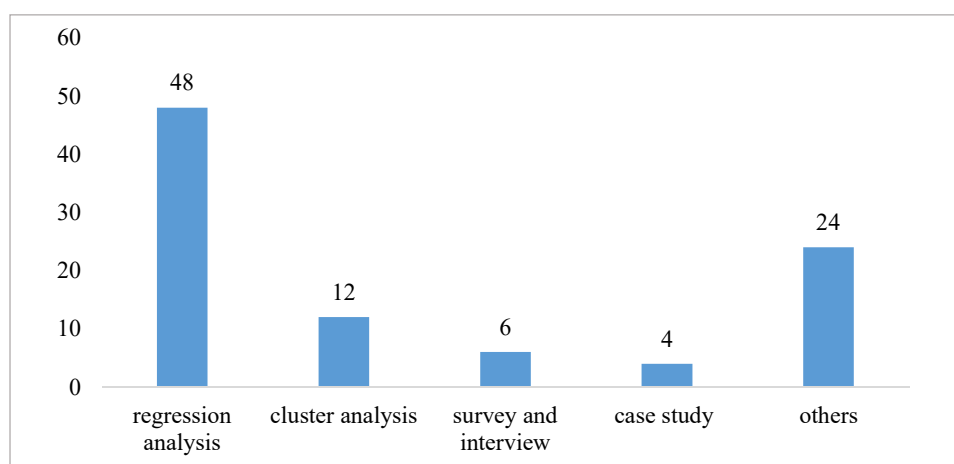


Figure 7. Research methods in studies of sample

Source: Prepared by Author based on data from the Web of Science.

In some studies also are used qualitative research methods – surveys (in particular cross-sectional surveys), interviews (in particular semi-structured interviews), case studies, Delphi-Analytic Hierarchy Process method, fuzzy logic methods, and Business Model Canvas method.

4.5. Conclusion and contribution

Key conclusions and contributions of the research sample of scientific articles are presented in Table. 5. Furthermore, we can observe that only a few researchers describe the essence of the banking business model. In particular, Lueg et al. (2019, p.2) note that “a valid and reliable measurement of business models is practically non-existent”.

Marques and Alves (2020) define a “banking business model” as a predominantly stable and long-term oriented organizational configuration that is adopted, with different levels of association, by a significant share of banks, resulting from a set of observable and interconnected managerial choices. Rajnak and Puschmann (2021) in their paper define the business model as “who” a firm’s customers are, “what” this firm is selling, “how” it produces its offering, and why its business provides “value”. The “why” dimension is used interchangeably with the term “value”.

Most studies use a quantitative approach at once to identify different banking business models without defining the business model. But in some works, we can see a definition of the bank’s business model based on a quantitative approach. Ayadi (2019) uses the activity-funding definition of a banking business model:

“In banks and other financial institutions, a pragmatic view of a business model is how these institutions manage their assets (activities) and liabilities (funding) over time to contribute to the financial system and the economy either by managing the risk (in their balance sheet and off-balance sheet or by accumulating it and transferring it to the system)”.

Zarutska et al. (2020) define the business model as a selected segment of the bank’s activity, that is characterised by a system of financial indicators that reflect efficiency, risk profile, other features of the bank’s viability and sustainability, and therefore the ability to generate an acceptable level of revenue in the long term. In article of Badunenko et al. (2021) the bank business model is defined in terms of the strategic framework in which the bank chooses its assets, funding, and income portfolios over time. Ercegovac et al. (2020) suggest that the basic concept of a bank business model is determined by diversification of business undertaken, the bank business objectives in budgeting assets and revenue structure, and bank funding structure.

Some researchers use basic definitions concerning the business model for their studies, adapting them to the banking sector. Lueg et al. (2019) use two theoretical foundations of business models (RBV and TCE) proposed by DaSilva and Trkman (2014) that suggest a more solid foundation in the resource based view (RBV) and transaction cost economics (TCE) and elicit that business models “represent a specific combination of resources which through transactions generate value for both customers and the organization”.

In some studies, the authors at once define the specific banking business models that are predominantly related to current trends in ESG. Nosratabadi et al. (2020) characterize sustainable banking business model as the achievement of sustainability goals in the business model. Costa-Climent and Martínez-Climent (2018) note that ethical banks are driven by an awareness of the destination of their funding activities and a willingness to

forgo profit in favor of social causes, conventional or commercial banks' primary interest is to maximize profits. Barbu and Boitan (2019b) suggest that ethical banks are in the spotlight as they are explicitly involved in channeling financial resources towards start-ups and investment projects characterized by the social, cultural and environmental value-added, by encouraging the development of responsible, durable projects.

In the sample of scientific research, we can also note that only a few papers describe elements of business models. For example, Nosratabadi et al. (2020) highlight nine components that make up the business model for the banking sector: value proposition, core competencies, financial aspects, business processes, target customers, resources, technology, customer interface, partner networks. Cornée et al. (2020) note that core business model comprises two pillars: benevolent ownership and specific intermediation mechanisms. Diener (2020) uses approach of Johnson et al. (2008) that elements of business model are customer value proposition, profit formula, key resources, and key processes. Yip and Bocken (2018) define the business models by three value components – the value proposition, value creation and delivery, and value capture (based on highly cited works of Osterwalder et al., 2005; Osterwalder, Pigneur, 2010; Richardson, 2008) and conduct value analysis of the eight financial sustainable business model archetypes.

5. FUTURE RESEARCH AGENDA

The analysis of the content of the cited scientific articles sample in recent years on banking business models, as well as new challenges to the functioning of the modern economy in the global dimension, allows us to identify research gaps that can become areas of future scientific research in this research area:

1. The significance of war and other geopolitical factors in the modification of banking business models. In the study sample, there was no research on this theme. It may be because the importance of geopolitical factors has increased significantly since February 2022 after Russia attacked Ukraine. Based on data from the Web of Science database (with search restrictions set only in economic disciplines), when applying the relevant keyword to “war*” AND “bank*”, we get 564 results (timespan 01.01.2022–26.07.2023), but when applying the relevant keyword “business model*” AND “war*” AND “bank*”, we get only 7 publications that are not significantly related to the study of the impact of war on banking business models.

In addition to the impact of military operations on the banking business models in Ukraine and Russia, the research domains may also include the following challenges to consider in business modeling in banking institutions:

- (a) geopolitical tensions in relations between EU and US, and China;
- (b) strengthening cooperation between the Gulf states and China;
- (c) the eventual expansion of geopolitical project in the form of BRICS;
- (d) the geopolitical struggle between US, EU, and China for influence in Africa.

An interesting area of research may be the development of a business model for foreign banks (in particular, EU and US) to enter the post-war financial system of Ukraine to finance the reconstruction of its economy.

2. The impact of modern information technologies and other innovations on the business models of banks. First of all, it is advisable to deepen the research of business models of the fintech sector regarding their possible adaptation by banking institutions or the development of new models of banks (in particular, online banks) as a response to the growth of competition from the fintech sector. Furthermore, obviously, the key research

area should be the impact of technologies such as artificial intelligence, distributed ledger technologies or machine learning on modeling of modern banking. An interesting research domain would be the development of proposals for modeling a new type of bank that would have the features of venture institutions, and this would contribute to the activation of financing for the startups' development. Another pertinent research theme is the development of potential scenarios for modifying banking business models, taking into account the expected introduction of digital money by central banks, as well as existing crypto assets in circulation.

3. The impact of pandemics and other "black swans" on the business models of banks. It follows from the analyzed sample that the impact of the COVID-19 pandemic is still poorly understood (Borri, Di Giorgio, 2022; Rizwan et al., 2022).

4. Influence of current ESG trends and regulations on banks' business models. Firstly, this concerns the EU banking sector, where several legal acts have already been implemented. Furthermore, the research area may be the impact of future changes in bank models in the EU considering the long-term Green Deal strategy. In addition to climatic factors, the issue of the relations between corporate governance and business models has not almost been the subject of research in scientific publications in recent years. A novelty area of research is also the model of ethical banks, which was described to a certain extent mainly for Islamic banking. Therefore, taking into account the cultural and historical aspects, it would be worth exploring the possibility of adapting the social doctrine of the Catholic Church to create a modern model of ethical banking. This research area should also consider the existing EU law regarding the functioning of European social entrepreneurship funds (EuSEF).

5. Development of a methodology for a composite indicator of the effectiveness of business models, which was not the subject of research in any scientific article from the analyzed sample. Such a composite indicator would also be an important tool for comparing the effectiveness of different business models, and factor analysis would allow determining the sensitivity of banks' business models to various challenges of the internal organization of banking activities and the changing external environment.

6. Development of theoretical foundations of banking business modeling. Considering the existing developments in the basic business models area, great opportunities are in developing a universal definition of the banking business model and its elements.

7. The impact of recent changes in the economies of countries on the business models of banks. First of all, the research subject should be the analysis of banking business models in conditions of high-interest rates (in particular, the study of the impact of inflation and monetary policy of central banks).

Thus, the research area on the business model in the banking sector contains a sufficient number of research gaps and is a future area of scientific research that will also have a significant practical effect on improving banking activities at the current stage of society development.

The author has read and agreed to the published version of the manuscript.

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