

## FROM DATA TO TRENDS: A BIBLIOMETRIC ANALYSIS COVERING 2016-2022

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**Abstract:** Digital banking represents the transformation of traditional banking through the integration of emerging technologies, enabling customers to access financial services online. Therefore, banks must align with the modern needs of their clients, in order to increase their competitiveness on the market. In recent years, key concepts such as digitization, digitalization and digital transformation have emerged as fundamental stages in the development of digital banking. In this context, this bibliometric study applies a quantitative bibliometric approach to investigate how the research landscape surrounding digital banking systems has evolved from 2016 to 2022, with particular emphasis on the influence of the COVID-19 pandemic. The analysis draws on data extracted from Clarivate Analytics' Web of Science database and employs VOSviewer software to map temporal patterns, identify clusters, and highlight prominent authors and journals. The findings reveal that the COVID-19 crisis corresponded with a marked increase in publications, suggesting an intensified academic interest spurred by the rapid digitalization of financial services. Moreover, contemporary research trends and key areas of interest among researchers have been systematically identified and examined.

**Keywords:** digitization, digitalization, digital transformation, digital banking, bibliometric analysis

**JEL classification:** G21

### 1. Introduction

Nowadays, organizations are increasingly focused on improving efficiency, maintaining flexibility and reducing costs. Thus, these objectives hinge on a fundamental digital progress. This emphasis has brought to the forefront three interconnected concepts: digitization, digitalization, and digital transformation. Digitization refers to the conversion of analog materials into digital formats (Legner, 2017), effectively bridging the gap between the physical world and software systems. (Bloomberg, 2018) On the other hand, digitalization capitalizes on these newly digitized resources to enhance existing business processes, create modern opportunities, and optimize decision-making through data-driven insights. (McAfee, 2009) Ultimately, digital transformation represents a comprehensive overhaul of a company's operations, customer engagement, and business models (Iansiti, 2014), leveraging digital technologies to deliver fundamental and often disruptive changes across the organization. (Paavola, 2017)

While digitization and digitalization each offer distinct advantages – ranging from greater accessibility of information to streamlined workflows – digital transformation calls for deeper cultural and strategic movements. It can involve major investments in software, hardware, and employee training, and its impact varies greatly by region due to differing levels of digital literacy and infrastructure. At its core, digital transformation focuses on reimagining how value is created and monetized, ensuring companies remain relevant and competitive in a rapidly evolving digital landscape.

Building on the theoretical foundations previously outlined, it becomes relevant to analyse how these concepts – digitization, digitalization and digital transformation – are linked with the academic

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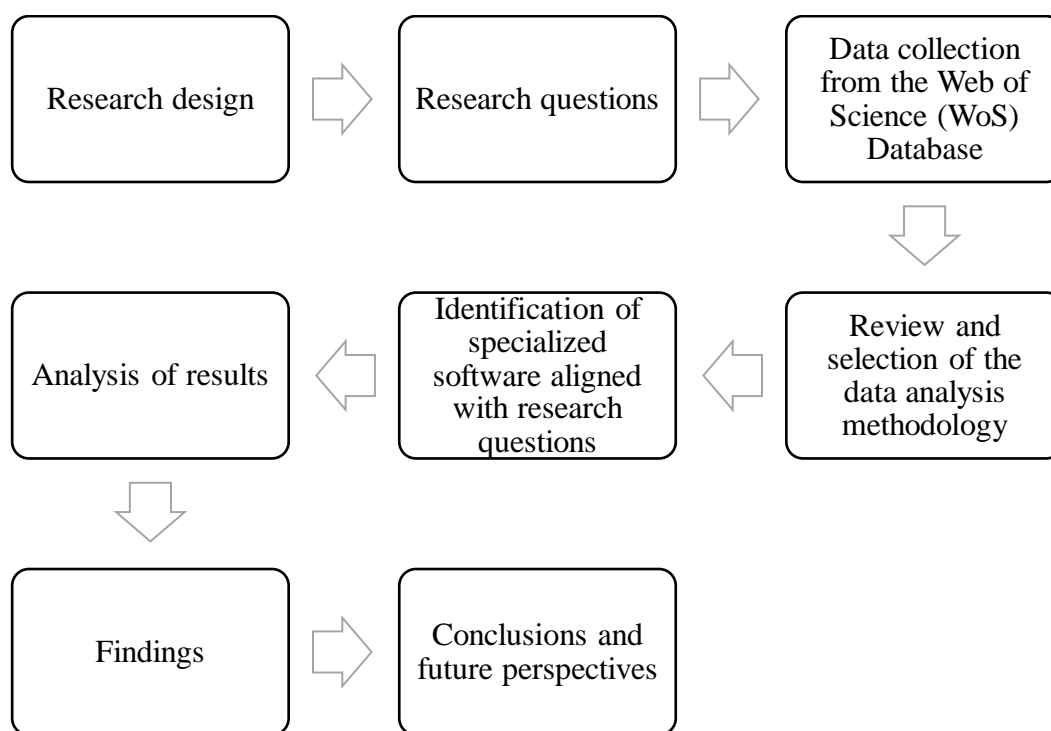
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community. In order to achieve this goal, the literature analysis employs a bibliometric method, enabling a quantitative and systematic evaluation of the scientific papers. However, a bibliometric analysis represents a rigorous methodology for quantifying the research within a given field. The various statistical instruments are used to examine the citation patterns, the interconnectedness of research papers, authorship trends and so on. Robust insights are generated through the help of visual mappings. In 1969, Pritchard introduced the term "bibliometric analysis," and since then, numerous authors have made significant contributions to the study of analyzing specialized literature (Boakye, 2022). Through graphical representations, clusters, and correlations, published works are highlighted. This type of analysis can be conducted by retrieving works from different databases or by using a combination of databases.

## 2. General overview of the bibliometric analysis

The methodological framework for this bibliometric analysis is outlined in Figure 1. It can be observed a specific view of the research process, from contouring the research design, to collecting data and analyzing the findings.

**Figure 1: The conceptual architecture underpinning the bibliometric study**



Source: Authors' own contribution

## 3. Research questions

Research questions serve to clarify the purpose by articulating the central idea of the research. In this analysis, the guiding questions are further detailed as follows:

- a. To what extent has the digital component been integrated into the banking system?
- b. How has the research on the digital banking system evolved over time?
- c. Which principal factors drive the advancement of digitization in the banking sector?
- d. Which fields are actively engaged with the digital banking system?
- e. What are the most prominent research trends concerning the digitization, digitalization, and digital transformation of the banking system?

- f. Which researchers exhibit the strongest focus on digital banking?
- g. In which countries does the digital dimension of banking demonstrate the highest level of maturity?

However, these research questions clarify the framework for an extensive exploration of the digitization, digitalization and digital transformation pattern in the banking sector. By investigating these aspects in an integrated manner, the current research paper aims to come up with valuable insights about the fast-paced landscape of the digital banking.

#### 4. Data source and analysis software

The literature study utilizes electronic data published on the topic of the digital banking system from January 1, 2016 to December 31, 2021. The research papers are found in the Web of Science (WoS) database by Clarivate Analytics. The search engine was configured to analyze a series of keywords, capturing the core concepts of the investigated topic.

The data analysis was conducted by VOSviewer version 1.6.18, Java version 1.8.0\_341 (Oracle Corporation). This software was chosen to facilitate efficient data processing and to produce visually compelling graphical outputs.

#### 5. Web of Science setup

The proposed keywords and search string on the Web of Science platform identified the most relevant works published on the topic of the digital banking system. The query created is as follows:

(((((ALL=(digital)) OR ALL=(digitisation)) OR ALL=(digitalisation)) OR ALL=(digital transformation)) AND ALL=(bank)) OR ALL=(banking))

### 6. Results

#### 6.1. Overall analysis

Using the specified keywords in the Web of Science database yielded 97,592 research papers published between January 1, 2016, and December 31, 2021, of which only a part is openly accessible – 38,218. An initial analysis presents that 2020 was the year that accounts the largest number of publications (18,215), whereas 2016 has the fewest (11,880). Most of the identified research papers are articles (77,287), proceedings (15,146), book chapters (4,216), followed by reviews (2,727).

Without additional refinements, the field in which the published works fall are varied and not limited to the domain of economic sciences. As shown in Figure 2, there are works published on the topic of the Environmental Sciences (4,566), Telecommunication (2,416), Law (2,010), Ecology (1,990), Water Resources (1,792), and Political Science (1,564). Within the domain of economic sciences, Economics appears 18,490 times, Business Finance 14,570, Business 6,846, and Management 5,571. After applying refining filters, 34,963 works remain.

To enhance the relevance of the bibliometric analysis, the study is restricted to a single field - Business Finance, with 14,570 results. Subsequently, in an effort to ensure more impactful findings, only open-access publications are retained, narrowing a dataset of 4,527 entries.

**Figure 2: Fields represented by analyzed Web of Science research papers (results limit – 20)**



Source: (WoS, 2022)

The 4,527 refined articles are predominantly written in English. However, the next most common language is Ukrainian, with 33 publications, as shown in Table 1.

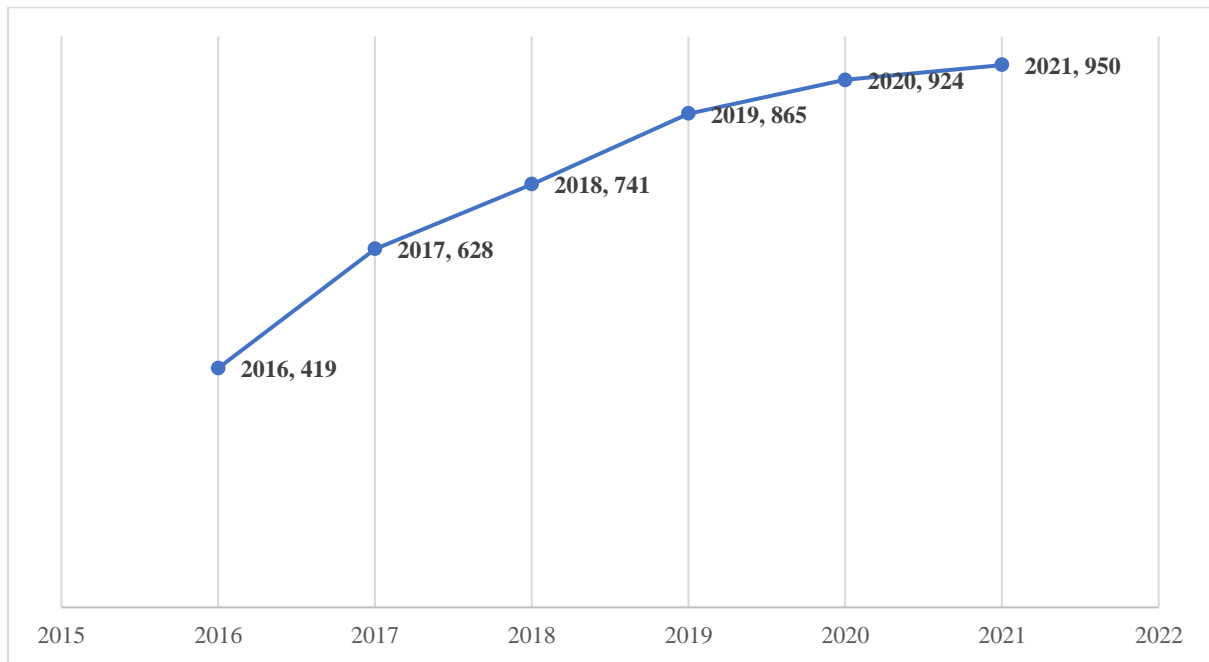
**Table 1: Distribution of Analyzed Works by Language**

Language	Number of papers	Percentage
English	4.461	98,542%
Ukrainian	33	0,729%
Portuguese	19	0,420%
Spanish	11	0,243%
Malay	1	0,022%
Russian	1	0,022%
Turkish	1	0,022%

Source: (WoS, 2022)

The digital banking system has continued to gain momentum with each passing year. In 2016, there were 419 publications on this topic, and in 2017, the number rised to 628. Figure 3 shows a linear increase, culminating in 2021 with 950 research works. It is plausible that the coming years will open new horizons for research on this topic, as the possibilities for implementing technology in banking grow at the same rapid pace as the technology itself.

**Figure 3: Temporal evolution of publications on the digital banking system topic**

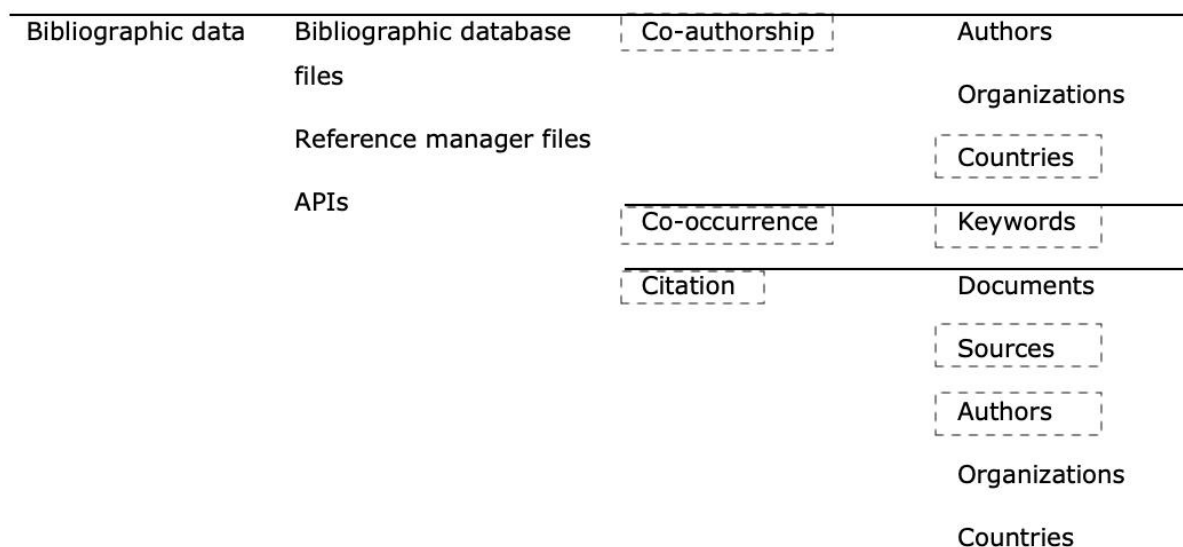


Source: Authors’ own contributions based on (WoS, 2022)

The bibliometric analysis is conducted in four directions, as shown in Figure 4: Co-authorship – Countries, Co-occurrence – Keywords, Citation – Sources, and Citation – Authors.

The rationale for this selection is grounded in its direct relevance to the proposed topic of digital banking system. These three areas – co-authorship, co-occurrence, and citations – best reflect the interest of researchers in the analyzed field, which can ultimately create a framework of findings and possibilities for future research.

**Figure 4: Configuring the bibliometric analysis in VOSViewer**



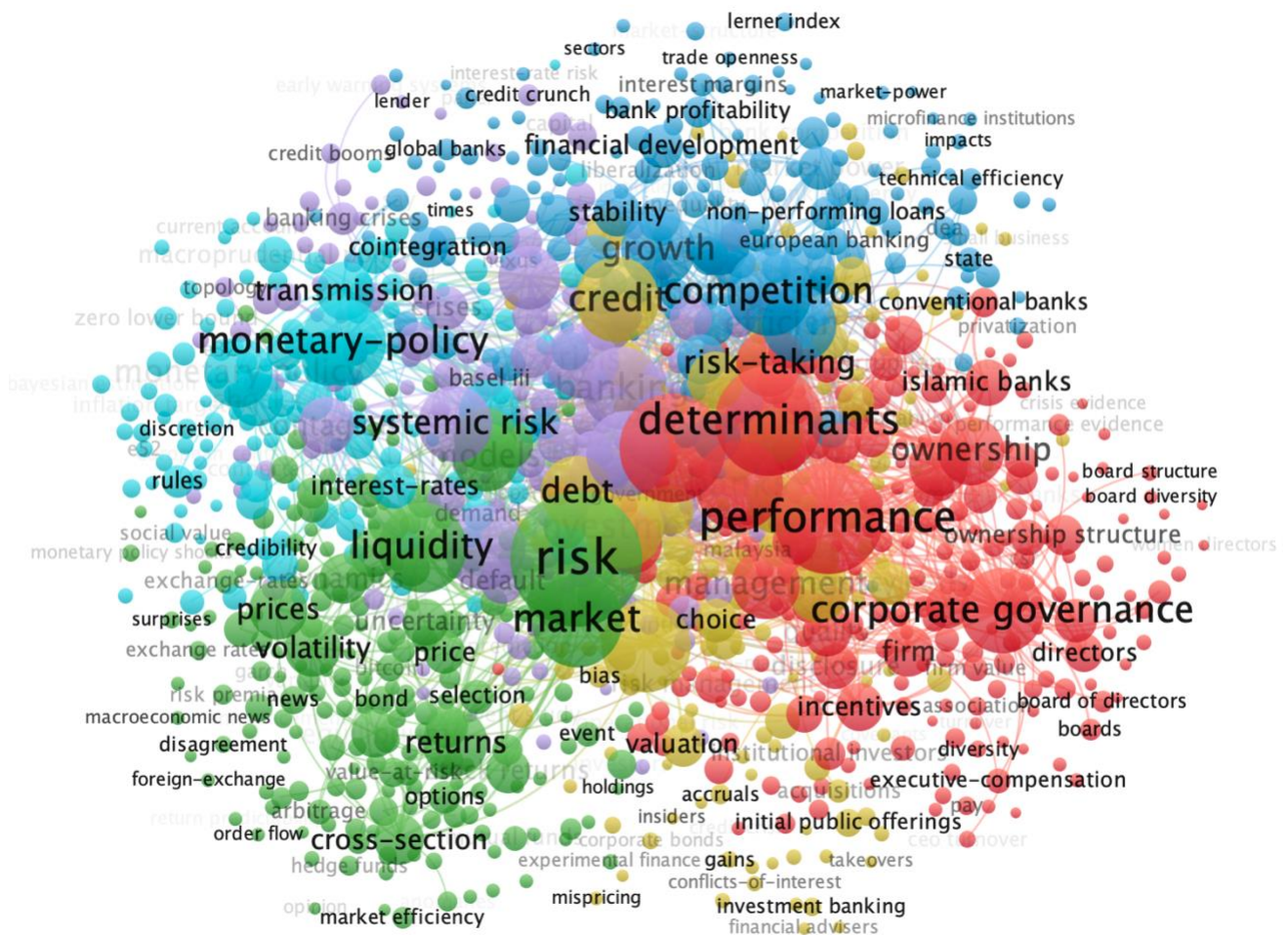
Source: Authors’ contribution based on (Jan van Eck, 2022)

6.2. Interpretation of results

6.2.1. Analysis of keywords

To analyze the keywords, a minimum occurrence threshold of five instances was applied. As a result, out of the initial 12,442 keywords, 1,326 met this criterion. Figure 5 illustrates the interconnections among the keywords and their respective frequencies of occurrence. Important to mention, *risk* emerges as the most frequently mentioned term, appearing 606 times across the analyzed research papers. This suggests a strong focus on digital banking systems in relation with the associated risks. However, 6 keywords clusters have been identified, each represented by a different color.

Figure 5: Distribution of keywords



Source: Authors' contribution based on (WoS, 2022)

Cluster 1 (Red) – consists of 222 key terms, among which the most prominent due to their frequency are "determinants," "performance," "corporate governance," "risk-taking," "Islamic banks," "incentives," "firm," "directors," "ownership," "conventional banks," "executive compensation," "boards," and "diversity." These keywords are dominated by the idea of performance and strategic management in the banking sector. Analyzing this cluster reveals the strong connection that the banking environment has with governance and the influence that the managerial process can achieve. Of particular interest is the very specific keyword "Islamic banks," indicating that the topic of Islamic banking in the context of the digital sphere is of significant interest.

Cluster 2 (Green) – is notable with 202 key terms that refer to various situations through the lens of financial indicators. The digital banking system is also linked to the capital market and investor behavior, characterized by certainty/uncertainty, volatility, and a strong improbability in investment decisions, whether in the capital market or in the real estate market, fix a mix. The evolution of money is noted by keywords such as gold, euro, and dollar and is updated at the present time, cryptocurrency. Among the key terms are: anomalies, announcements, asset allocation, asset prices, asset returns, aversion, behavioral finance, COVID-19 pandemic, cryptocurrency, decision, disagreement, dynamics, equilibrium, equity markets, dollar, euro, exchange rates, experimental finance, federal reserve, financial markets, frequency, forecasts, gold, hedge funds, market efficiency, market equilibrium, market liquidity, market risk, market value, mutual funds, optimization, portfolio, predictability, real estate, return, risk, stock market, stochastic volatility, trading volume, uncertainty, volatility, volume, wealth.

Cluster 3 (Blue) – brings 158 specific keywords: Africa, Asia, Bangladesh, Latin America, Sub-Saharan Africa, Vietnam, China, Chinese banks, European banking, European banks, foreign banks, global banks, international banking, bank competition, bank credit, bank efficiency, bank ownership, bank profitability, bank stability, business models, capital flows, capital ratio, cost efficiency, credit allocation, diversification, efficiency, economies, emerging markets, financial access, financial development, financial inclusion, global financial crisis, impacts, income inequality, market power, microfinance, poverty, productivity, prosperity score, scale economies, transition, technology, unit-root. First of all, the specificity of the digital banking theme on some geographical regions is noted. The high interest in these research areas is correlated with bank efficiency, profitability, and stability.

Cluster 4 (Yellow) – stands out with 151 key terms, including: access to finance, accuracy, asymmetric information, bank debt, bank financing, bank lending, bank loans, bank market power, business groups, cash flow, collateral, conflicts-of-interest, connections, contracts, corporate, corporate diversification, credit, credit constraints, credit ratings, creditor rights, debt, debt maturity, discrimination, finance, financial advisers, financial intermediation, financial constraints, financial structure, firm size, government, government-owned banks, information, initial public offerings, investment banks, liability, loan pricing, loan spreads, maturity, market competition, protection, renegotiation, rights, sales, syndicated loan, taxes, valuation, venture capital. This cluster draws attention to banking products and services, as well as the operations of credit institutions. Certain keywords refer to the process of granting loans or the establishment of deposits, as well as to the banking department dedicated to legal entities. The digital influence has rethought common banking processes, partially or completely changing traditional banking products and services.

Cluster 5 (Purple) – with 144 key terms, examines banking stability, risks associated with digital transformation, capital requirements, and the possibility of serious financial problems emerging: bank capital, bank failures, bank liquidity, bank regulation, bank risk, banking crisis, banking stability, bankruptcy, bankruptcy prediction, Basel II, Basel III, capital adequacy, capital regulation, capital requirements, capital shortfall, central banking, complexity, contagion, corporate debt, cost of credit, counterparty risk, credit booms, credit crunch, credit risk, credit spreads, default, default prediction, default risk, deposit insurance, depression, discipline, early warning systems, European Central Bank, exposures, fail, failure, federal reserve, financial contagion, financial dependence, financial fragility, financial innovation, financial ratios, financial stability, FinTech, forecasting, fragility, great depression, insolvency risk, interest rate risk, leading indicators, liquidity regulation, liquidity risk, machine learning, moral hazard, prediction, ratios, requirements, Turkey, United States. Like Cluster 4, geographical specificity is notable here, this time with terms such as Turkey and the United States. Additionally, the appearance of specific keywords related to technology – FinTech, machine learning, financial innovation – creates a comprehensive picture of the impact of digital progress.

Cluster 6 (Blue) – with 123 key terms, concludes the general framework of the digital banking system: Brazil, Japan, bubbles, business cycle, central bank, central bank communication, central bank independence, central bank transparency, climate change, communication, convergence, coordination, credit cycles, credit supply, current account, demand, debt crisis, economic policy uncertainty,

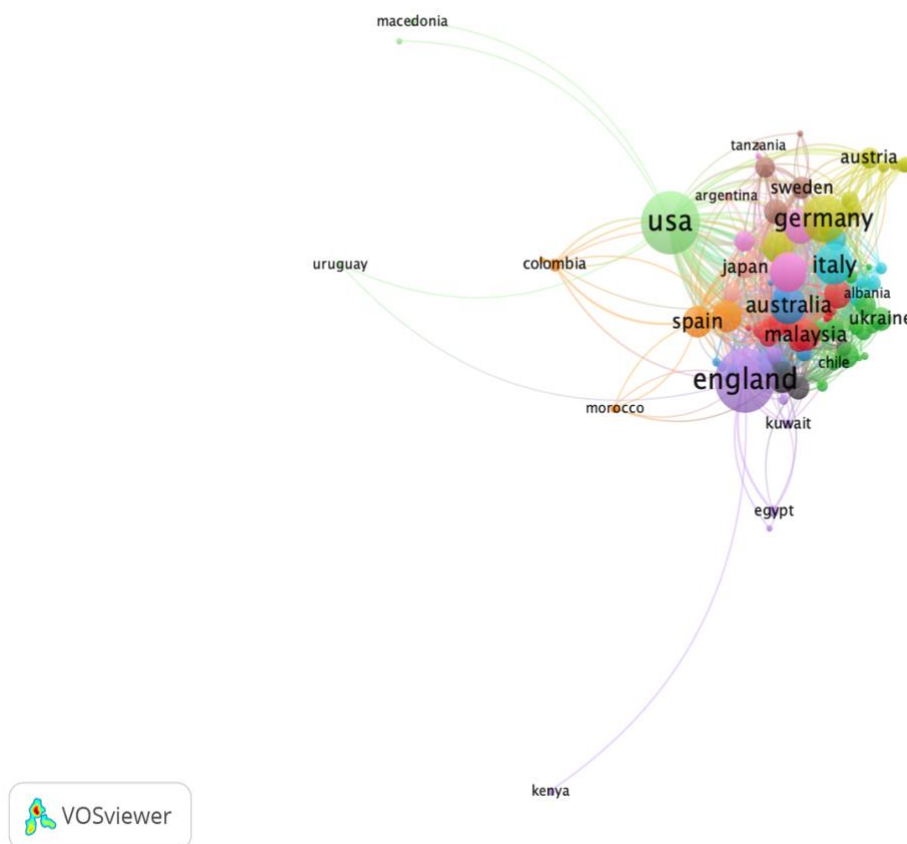
employment, euro area, European Union, eurozone, exchange rate, financial accelerator, fiscal policy, fluctuations, forward guidance, great recession, house prices, household debt, inflation, inflation expectations, inflation targeting, interest rates, lending, lessons, liquidity constraints, loan growth, monetary policy, macroprudential policies, macroprudential regulations, mortgages, policy, prudential regulations, reforms, restrictions, shadow banking, social value, transparency, trend inflation, vector autoregression, welfare, zero lower bound. This cluster contains diverse terms without a general rule to group them. Geographic specificity is also observed here with terms like Brazil, European Union, and Japan, along with elements of macroeconomic nature.

**6.2.2. Analysis of authors’ countries of origin**

In Figure 6, it is visually presented the level of interest in the digital banking system based on the countries where the research papers were published. This analysis employed co-authorship as its method, employed a full counting technique, and used countries as the primary unit of analysis. Research papers listing more than 25 countries were excluded, and only those with at least three publications were retained, resulting in 95 out of an initial 121 countries meeting these criteria.

England registers the highest volume of publications – 1,145 over the five-year period – followed by the United States with 1,037. This robust level of interest likely stems from the accelerated digital progress witnessed in these regions, driving researchers to examine and document emerging trends. The analysis further identifies 12 distinct clusters, each of which will be discussed separately. Romania is situated in Cluster 6 (light blue), with 37 published documents and 18 international linkages.

**Figure 6: Author’s countries of origin**



Source: Authors’ contribution based on (WoS, 2022)



Cluster 1 (Red) comprises 15 countries exhibiting substantial publication activity: Brunei (6 links, 6 papers), Burkina Faso (3 links, 3 papers), Cameroon (7 links, 12 papers), Ghana (10 links, 13 papers), Hungary (20 links, 20 papers), India (20 links, 57 papers), Iraq (2 links, 4 papers), Latvia (5 links, 5 papers), Malaysia (32 link, 170 papers), Malta (9 links, 7 papers), New Zealand (23 links, 56 papers), Nigeria (15 links, 47 papers), Pakistan (34 links, 76 papers), South Africa (18 links, 63 papers), and Turkey (35 links, 142 papers). Malaysia and Turkey stand out with the highest number of publications in this cluster.

Cluster 2 (Green) is similar to Cluster 1, comprising 15 countries: Bosnia & Herzegovina (2 links, 6 papers), Bulgaria (5 links, 7 papers), Chile (15 links, 17 papers), Czech Republic (20 links, 46 papers), Finland (32 links, 65 papers), Greece (25 links, 95 papers), Iceland (7 links, 4 papers), Ireland (28 links, 57 paper), Israel (12 links, 19 papers), Northern Ireland (19 links, 14 papers), Poland (21 links, 75 papers), Russia (21 links, 31 papers), Slovakia (13 links, 20 papers), Slovenia (12 links, 4 papers), and Ukraine (7 links, 80 papers). Greece and Ukraine are at the forefront in terms of publications, however no country in this cluster exceeds 100 publications over the five-year analyzed period.

Cluster 3 (Blue) includes 12 countries: Australia (54 links, 287 papers), Bangladesh (12 links, 26 papers), Estonia (6 links, 7 papers), Jordan (6 links, 12 papers), Lebanon (2 links, 4 papers), Oman (10 links, 9 papers), Philippines (3 links, 3 papers), Qatar (14 links, 15 papers), Saudi Arabia (15 links, 38 papers), South Korea (25 links, 36 papers), Tunisia (17 links, 35 papers), and United Arab Emirates (24 links, 39 papers). Australia leads with 287 research papers, and 54 links.

Cluster 4 (Yellow) consists of 11 countries: Austria (20 links, 63 papers), Brazil (19 links, 46 papers), Croatia (6 links, 12 papers), Denmark (26 links, 45 papers), Germany (45 links, 500 papers), Liechtenstein (3 links, 3 papers), Luxembourg (13 links, 15 papers), Mexico (14 links, 14 papers), Montenegro (2 links, 28 papers), Netherlands (42 links, 200 papers), and Serbia (9 links, 24 papers). Germany stands out with 500 papers, reflecting a strong interest in digital technology. However, there is limited collaboration with foreign authors, indicated by only 45 such links.

Cluster 5 (Purple) comprises 7 countries: Bahrain (10 links, 10 papers), Egypt (5 links, 14 papers), England (75 links, 1145 papers), Indonesia (18 links, 46 papers), Kenya (1 link, 5 papers), Kuwait (13 links, 8 papers), and Libya (4 links, 3 papers). England leads with the most publications, while Libya has the fewest with only three papers published. England also leads in international co-authorship connections.

Cluster 6 (Blue) is similar to the previous cluster, including 7 countries: Albania (2 links, 7 papers), Cyprus (18 links, 28 papers), Italy (52 links, 347 papers), Lithuania (17 links, 16 papers), Portugal (28 links, 75 papers), Romania (18 links, 37 papers), and Thailand (16 links, 15 papers). Italy exhibits the highest number of publications at 347, while Albania records the fewest, with only seven papers.

Cluster 7 (Orange) comprises 6 countries that stand out due to their notable engagement in digital banking system research: Canada (41 links, 179 papers), Colombia (8 links, 19 papers), Morocco (4 links, 5 papers), Peru (3 links, 5 papers), Spain (39 links, 170 papers), and Venezuela (2 links, 3 papers). Thus, Canada shows a strong interest in digital banking, promoting international author collaborations. Venezuela, Peru, and Morocco show less interest, possibly due to slower adaptation of technology.

Cluster 8 (Brown) includes 5 countries: Belgium (31 links, 101 papers), Norway (25 links, 65 papers), Rwanda (5 links, 3 papers), Sweden (26 links, 74 papers), and Tanzania (2 links, 4 papers). Belgium leads in the number of publications, while Norway shows a higher proportion of co-authored papers compared to total publications.

Cluster 9 (Pink) comprises 5 countries: Barbados (3 links, 3 papers), France (56 links, 292 papers), China (49 links, 302 papers), Singapore (18 links, 64 papers), and Switzerland (45 links, 244 papers). China, France, and Switzerland lead in the number of publications on digital banking.

Cluster 10 (Light pink) includes 4 countries: Argentina (8 links, 6 papers), Japan (24 links, 77 papers), Taiwan (15 links, 34 papers), and Vietnam (30 links, 97 papers). Japan and Vietnam have notable publication in this cluster.

Cluster 11 (Light green) presents 4 countries: Macedonia (1 link, 5 papers), Uganda (1 link, 3 papers), Uruguay (2 links, 3 papers), and USA (69 links, 1037 papers). The USA leads significantly with 1,037 papers, reflecting strong research interest and international collaboration.

Cluster 12 (Black) is similar to the last two clusters, includes 4 countries: Iran (14 links, 30 papers), Palestine (4 links, 6 papers), Scotland (45 links, 169 papers), and Wales (27 links, 82 papers).

### 6.2.3. Citation analysis

To investigate citation patterns, the current study correlates citations with the authors of pertinent publications, restricting the dataset to papers featuring no more than 25 co-authors. In pursuit of greater clarity is the visual representations, a minimum threshold of five publications per author was set, reducing the initial pool from 8,866 authors to 156, of whom 141 demonstrated interconnections.

Figure 7 depicts 12 distinct clusters representing the most frequently cited authors. Acharya, Viral V. emerges as the most highly cited author, contributing with 11 research papers within the examined timeframe. Kizys, Renatas follows closely, also publishing 11 research papers, albeit accruing only 460 citations. The extensive referencing of Acharya’s output suggests considerable scholarly interest in his contributions to digital banking systems.

Furthermore, the total link strength quantifies the overall strength of an author’s co-authorship links (Jan van Eck, 2022). Ongean, Steven stands out in this regard, achieving a total link strength of 109 across 28 publications on digital banking system, underscoring his significant collaborative network in the field.

**Figure 7: Cluster density by citation frequency**



Source: Authors’ contribution based on (WoS, 2022)

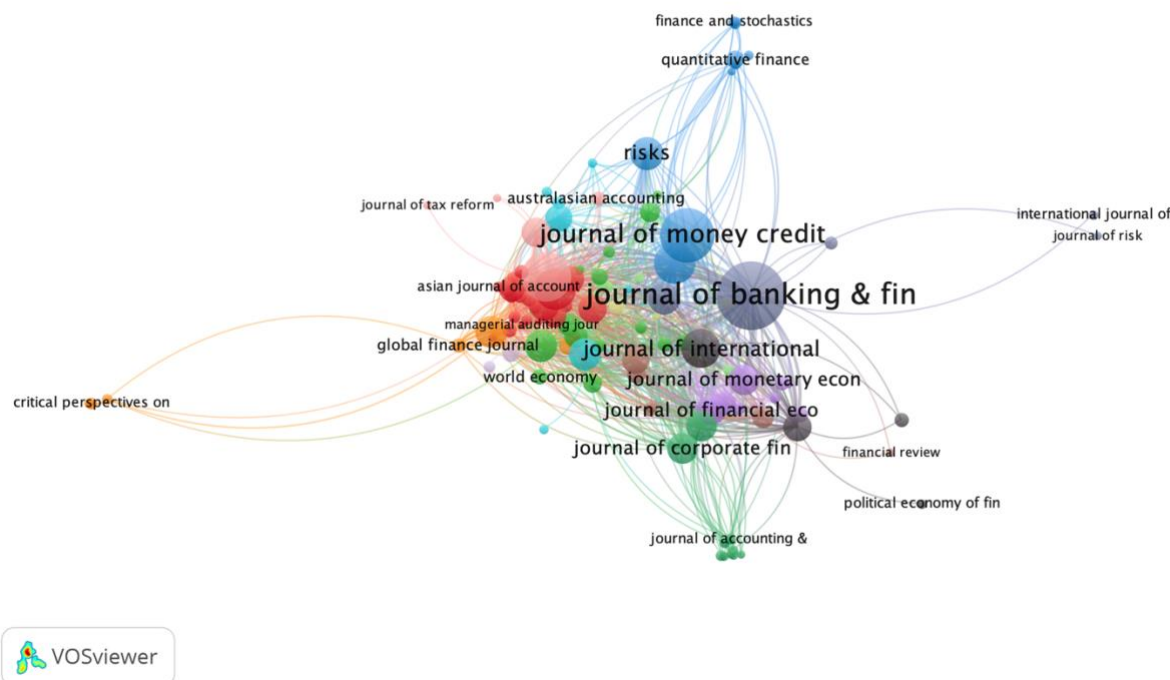
### 6.2.4. Analysis of bibliographic sources

Citation analysis can also be approached by examining the publication venues for the research in question. Only sources publishing a minimum of five papers and receiving at least three citations

during the chosen timeframe were considered, reducing the total of 280, to 117 sources. Among these, 113 exhibit interconnectivity, and a total of 14 clusters were identified.

To enhance the clarity of the findings, the number of papers published was selected as the primary impact factor in cluster formation, with Figure 8 underscoring the journals that have produced the most extensive literature on digital banking systems.

**Figure 8: Visualization of citation patterns in bibliographic sources**



Source: Authors' contribution based on (WoS, 2022)

Cluster 1 (Red) features 25 journals, with Finance Research Letters (69 papers), Financial Innovation (57 papers), Isra International Journal of Islamic Finance (60 papers), Journal of Central Banking Theory and Practice (156 papers), Research in International Business and Finance (76 papers).

Cluster 2 (Green) includes 15 journals, among which European Journal of Finance (89 papers), International Review of Economics & Finance (51 papers), Journal of Financial Services Research (43 papers), Pacific-Basin Finance Journal (30 papers), Quantitative Finance and Economics (33 papers).

Cluster 3 (Blue) comprises 11 journals, predominantly represented by Journal of Financial Stability (156 papers), and Journal of Money Credit and Banking (289 papers).

Cluster 4 (Dark Yellow) consists of 10 sources, notably Journal of Corporate Finance (87 papers), and Review of Financial Studies (86 papers).

Cluster 5 (Purple) encompasses 8 journals, with Journal of Financial Economics (81 papers), Journal of Monetary Economics (82 papers), and Journal of Financial and Quantitative Analysis (48 papers).

Cluster 6 (Turquoise) includes 7 journals, notably International Review of Financial Analysis (95 papers) and Journal of Banking Regulation (65 papers).

Cluster 7 (Orange) comprises 7 sources, among which International Journal of Finance & Economics (89 papers) și North America Journal of Economics and Finance (27 papers).

Cluster 8 (Brown) spans 6 journals, led by Journal of Financial Intermediation (68 papers), Journal of Finance (39 papers), and Review of Quantitative Finance and Accounting (31 papers).

Cluster 9 (Gray) includes 5 sources, with Journal of Banking & Finance alone accounting for 483 relevant publications.

Cluster 10 (Light pink) features 5 journals, notably Journal of Risk and Financial Management (233 papers), and International Journal of Financial Studies (80 papers).

Cluster 11 (Light green) comprises similarly 5 research sources, but contains fewer articles focused on the core subject. Studies in Economics and Finance and Review of Corporate Finance Studies each feature 14 relevant publications.

Cluster 12 (Black) comprises 4 journals, led by Journal of International Money and Finance, with 141 papers and 229 linking ties to other journals in the dataset.

Cluster 13 (Yellow) encompasses 3 journals - Journal of Empirical Finance (20 papers), Annals of Finance (13 papers), and Journal of Management Science and Engineering (5 papers).

Cluster 14 (Light purple) is limited to 2 journals and 35 articles: British Accounting Review (23 papers), and Indonesian Journal of Sustainability Accounting and Management (12 papers).

## 7. Conclusions

A quantitative bibliometric methodology was selected to examine academic engagement with the digital banking system. By tracing trends in the literature over time, this analysis highlights the clear impact of the COVID-19 pandemic on the proposed research topic. To effectively assess this impact, the timeframe of January 1, 2016, to December 31, 2021, was established, capturing the rapid digital transformation that has affected the financial and banking sectors during the pandemic period. Consequently, the primary hypothesis assumed that the COVID-19 crisis directly stimulated a rise in publications on digital banking systems topics.

In adherence to a structured bibliometric workflow, the study began with the research design and the formulation of guiding questions, followed by data collection, methodological choices, and software selection. In the final analytical stage, the study sought to answer to all the research questions. In the final phase, the study synthesized its findings, formulating conclusions and proposing avenues for further investigation.

However, the majority of publications were written in English (4,461 papers), the second most frequent publication language was Ukrainian (33 papers, 0.729% of the total), reflecting significant local research activity intended primarily for Ukrainian-speaking researchers. The temporal analysis reveals a steady rise in publication volumes, from 419 papers in 2016, to 950 in 2021. Although the COVID-19 pandemic appears to have amplified publication rates, the trend of increasing interest was already evident beforehand. These observations underscore the growing prominence of digital banking as a research topic, mirroring the rapid evolution of technological innovations.

In examining published keywords, *risk* emerges as the most relevant, highlighting a widespread concern with potential vulnerabilities arising from digital banking innovations. Researchers also concentrate on banking performance, growth, liquidity, corporate governance, competition, stability, and monetary policy. Among contributors, Viral V. Acharya (an economist from India) stands out for accruing the highest citation (820 citations).

In conclusion, the growing academic focus on digital banking indicates ample opportunities for future research endeavors. A promising direction involves complementing quantitative bibliometric analysis with qualitative methods, thereby enhancing the depth and breadth of insight into this evolving field.

## References

- Bloomberg, J. (2018). *Digitization, digitalization, and digital transformation: confuse them at your peril*. Forbes 28.

- Iansiti, M. L. (2014). Digital ubiquity: how connections, sensors, and data are revolutionizing business. *Harvard Business Review* 92(11), 19.
- Jan van Eck, N. W. (2022). *VOSviewer Manual. Manual for VOSviewer version 1.6.18*. Universiteit Leiden, CWTS Meaningful Metrics.
- Legner, C. E. (2017). *Digitalization: opportunity and challenge for the business and information system engineers community*. Business & Information Systems Engineering 59.
- McAfee, A. (2009). *Enterprise 2.0: New collaborative tools for your organization's toughest challenges*. Harvard Business Press.
- Paavola, R. H. (2017). Role of middle managers in modular digital transformation: the case of Servu. *25th European Conference on Information Systems, ECIS 2017*.
- WoS. (2022). *Analyze Results*. Retrieved August 2022, from <https://www-webofscience-com.am.e-nformation.ro/wos/woscc/analyze-results/91d415c5-7ea8-410e-a977-e82a1e851145-4b9924f3>