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ANALYSIS OF RESEARCH TRENDS IN THE FIELD OF DIGITAL FINANCE BASED ON BIBLIOMETRIC DATA

ABSTRACT

The spread of digitalisation has led to the global penetration of digital finance in all sectors of the economy. The high relevance of the problem of digital finance necessitates deepening research in this area, in particular by carrying out a comprehensive analysis of the accumulated knowledge in it. The aim of the present research is to reveal the main trends and determinants of the evolution of scientific investigations in the field of digital finance by means of a bibliometric analysis of publications in the journals indexed by the Scopus scientometric database. This study was carried out in accordance with the traditional approach to bibliometric analysis and is aimed at the following objectives: determining the features of the scientific landscape in the field of digital finance by carrying out an evolutionary analysis of publication activity; identification of the main determinants for the development of research by mapping and clustering the existing array of publications using VOSviewer software. The time frame of the study was set as 2008 – 1st quarter of 2024. The results showed that the term «digital finance» is of an interdisciplinary nature. It is found that China is leading in the number of publications in this area, followed by the United States, Great Britain, and India by a notable margin. 8 clusters have been selected that characterise the key research areas. The results of the bibliometric analysis showed that the most significant development of research in the field of digital finance was in 2021-2023, with an emphasis on the development of fintech, banking services and cryptocurrencies. In 2023, it was found that the number of studies on the following issues increased: the Green Deal, COVID-19, ecosystem formation, and green energy. They are considered to be research areas that require further development in the near future.

Keywords: digitalisation, digital finance, bibliometric analysis, evolutionary analysis, scientific research, publication activity, VOSviewer, clustering, mapping

JEL Classification: G17, G20, M21

INTRODUCTION

The financial sector is among those that are always actively developing since it must correspond with all relevant trends in industrial, technical, technological development, and information development in particular. Recently, the financial sector has made significant progress in the delivery of services due to the proliferation of digitization processes (Chang et al., 2023). Today, digital technologies are increasingly gaining influence on society and the economy, forming a new type of the latter, i. e. the digital economy (Kyzym et al., 2020). In particular, the UN Initiative for Sustainable Development until 2030 provides for the formation of new models of economic management based on digitalization, which extends to all its spheres (Khaustova et al., 2024).

The term «digital finance» is now widely used to describe the latest digital technologies in the financial services industry covering different products, processes and business models that transform the traditional ways of delivering banking and financial services. These technologies are aimed at improving the accessibility of financial services and increasing the efficiency of the overall financial system (European Commission). Digital finance involves providing financial services digitally using devices such as computers, tablets, and smartphones. In addition, digital finance includes a huge number of novel financial products, and financial applications, as well as new forms of communication

and interaction with customers (Gomber et al., 2017). Digital finance has a number of advantages over traditional technologies, e.g.: reducing information asymmetry and transaction costs and, further on, optimizing the distribution of resources, which opens up interesting new prospects for development (Zongsen Zou et al., 2023). Digital financial services are part of finance and a product of the fintech component of the financial sector, provided within various forms of e-commerce using modern information and digital technologies (Semenog, 2021).

At the same time, as is pointed out by Zongsen Zou et al., despite the fact that digital finance is becoming increasingly important in the economy and social life, research in this area stays at an early stage. Overall, academic studies on digital finance have intensified in recent years, so there is a need for a further step. According to Hamza et al., 2024, although financial digitalization is being studied by many scholars, the use of bibliometric analysis for research in this area is relatively new, albeit very promising.

The high significance of the digital finance problem in the modern economy allows us to determine the necessity of deepening research in this sphere, in particular by conducting a complex review and study of the accumulated knowledge in the mentioned subject area, its systematization along with identifying trends in the development of scientific research, taking into account existing challenges and prospects.

LITERATURE REVIEW

Reviews of publications play an important role in scientific research, as they allow you to study the general situation in a particular area, and identify gaps that require further research to be filled. Publications are one of the main signs of scientific and technological achievements (Qiang Wang et al., 2020).

Bibliometric analysis allows for a thorough comprehensive review of all the most influential publications in a particular subject area, which makes it increasingly popular among scholars. Due to the advantages, it provides, bibliometric analysis has recently become widespread in the fields of business and management (Adel et al., 2023). According to Qiang Wang et al., 2020, bibliometric analysis has advantages in predicting promising trends in the development of disciplines, it can be widely used to analyze the state of research, in particular, for interdisciplinary areas.

Bibliometric analysis allows researchers to study a particular scientific field by analysing citations and co-citations, geographical distribution, and keywords to identify the determinants of the development of a chosen direction of research. Bibliometric analysis helps to define the direction of research development in a particular area, new applications, and research priorities (Wang et al., 2014, Liao et al., 2018). The methods of bibliometric analysis can be used to assess the evolution of a particular research area using two main approaches: performance analysis and scientific mapping (Noyons et al., 1999, Gallego-Losada et al., 2023).

Bibliometric analysis is a quantitative research tool. In turn, it applies mathematical and statistical tools to evaluate the interconnections and contributions of publications, authors, institutions, and countries in a particular scientific field (Hubarieva et al., 2021). It allows you to form a comprehensive understanding of the state and tendencies in the development of any subject area of study, identify the main thematic clusters of research and investigate the interrelationships between them.

There are a number of works by scientists in which recommendations on the mechanisms of bibliometric research are suggested. They propose a generalized vision of the procedures and techniques of implementation, a description of the methods of analysis and the features of their application, taking into account the goals and information basis of the study. Among them are the works of Öztürk et al., 2024, Donthu, 2021, Sauer et al., 2023, Hubarieva et al., 2021 and others. To carry out bibliometric research, scientists mainly use four typical stages: determining the purpose of the study, collecting data, analyzing and visualizing, and interpreting conclusions and results (Öztürk et al., 2024, Khaustova et al., 2024).

At present, research on digital finance is actively developing. Among the studies of digital finance using various methods of bibliometric analysis, it is advisable to highlight the following. Bollaert et al., 2021 researched access to finance through three main services: fintech lending, crowdfunding, and initial money offering. Brika (2022) analyzed the development of research on the relations between digital finance and fintech by conducting a bibliometric analysis of publications from the ScienceDirect database for the period 2003-2021. Gomber et al. reviewed the current state of research in the area of digital finance and potential future directions for research therein. Semenog (2021) carried out a bibliometric analysis of scientific publications focused on the category of 'digital financial services' using the Google Trends tools. The Digital Finance Cube is presented as a conceptual framework, covering the 3 key aspects of digital finance and fintech - relevant functions and technologies used, as well as relevant institutions. Garg et al. (2023) examined scientific research in the field of fintech using a bibliometric analysis of publications of the Scopus scientometric database and VOSviewer software

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for the period 2017-2022. Hamza et al. (2024) investigated the development of research in the field of financial digitalisation based on publications indexed by Scopus for the period 2003-2023, using VOSviewer tools. Adel et al. (2023) analyzed the impact of financial technology on the financial sector by carrying out a bibliometric analysis of scientific works in this sphere, published in 2015-2022 and indexed in Web of Science.

As shown by the authors' review of publications on bibliometric analysis in the field of digital finance, so far, the studies are somewhat limited in terms of coverage of key issues and the time frame of analysis. They are based on different arrays of initial information (carried out on the basis of information from scientometric databases Scopus, Web of Science, ScienceDirect, SpringerLink, Google Scholar, Microsoft Academic, Dimensions, Embase, etc., or using different combinations of databases, different sets of keywords and time dimensions), as well as applying appropriate tools (VOSviewer, Google Trends, Bibliometrics, SciVal, BibExcel, Histcite, SciMat, etc.). The formation of the primary array of information should best meet the goals of a study since these databases were developed for various purposes and have different features.

The most complete source of citation data in the world is considered to be the scientometric databases Web of Science [24] and Scopus. Google Scholar is usually not popular among researchers due to the limited ability to download data being used for bibliometric analysis.

As Glänzel (2003) points out, the Science Citation Index has decisively become the most universally recognized basic source for bibliometric analysis due to the following qualities:

- Multidisciplinarity (all directions of research in the area of life sciences, natural sciences, mathematics and engineering are represented);
- Selectivity (periodicals covered by SCI are selected based on quantitative criteria, and selection is usually supported by expert opinion);
- Full coverage (all articles published in SCI periodicals are registered);
- Completeness of affiliations (the addresses of all authors are indicated, which allows you to analyze scientific cooperation and apply full schemes for counting publications);
- Bibliographic references (together with each document, references to it are processed, which allows you to analyze the citation structure);
- Availability.

It should be noted that at the present time the Scopus database also fully meets these qualities, having even stronger positions in some of them than Web of Science.

As noted in the University of Eastern Finland's guidelines on Research Information Retrieval and Management [26], for a long time Web of Science has indeed been the main source for bibliometric analysis. However, in 2004, the Scopus citation index database was launched, which had become to some extent more complete than the Web of Science, covering a wider range of journals presently. Thus, Scopus offers approximately 20% more coverage for citation analysis than Web of Science, including publications since 1966 (while Web of Science covers publications since 1990). Further, Scopus has better representation in the area of engineering, but its coverage in the humanities is less. Moreover, Scopus' coverage in economics is outstanding. Thus, given the development of research in the area of digital finance, the bibliometric analysis of publications indexed by the Scopus database appears justified and appropriate.

AIMS AND OBJECTIVES

The article focuses on filling the existing research gaps in the field of digital finance through an in-depth study of research data available in this area.

Based on the review of publications on the problems of digitalization of finance, a number of issues require further research, including the following:

1. What is the genesis of the literature on digital finance and what are the latest trends in the development of investigations in the area of digital finance?
2. What journals are the most productive for digital finance issues?
3. Who are the most prolific authors in the field of digital finance?
4. What are the most impactful publications in the area of digital finance?

5. What are the main publications that have contributed to the development of digital finance?
6. What are the top journals that publish articles on digital finance?
7. What are the determinants of the development of digital finance in the world?

The aim of this research is to reveal the main trends and determinants of the evolution of scientific investigations in the field of digital finance by means of a bibliometric analysis of publications in the journals indexed by the Scopus scientometric database.

The objectives of the article are:

1. Determining the features of the scientific landscape and trends in the development of research in the field of digital finance by carrying out an evolutionary analysis of publication activity according to the Scopus database.
2. Identification of the main determinants and perspectives for the development of studies in the field of digital finance by mapping and clustering the existing array of publications in this area.

To obtain as recent data as possible, the time frame of the study was set as 2008 – 1st quarter of 2024.

METHODS

This study was conducted in accordance with the traditional approach to bibliometric analysis, which includes the following stages: determination of the aim and design of the study (formulation of research questions, determination of the tools and methods used), formation of a sample for the analysis (selection of a database and search criteria, collection and clarification of data), bibliometric and content analysis, visualization of results (citation analysis and analysis of common words, etc.), interpretation of results and formulation of research conclusions.

Table 1 shows the objectives, tools and methods used in the study.

Table 1. Objectives, tools and methods.

Objectives: Tools	Purposes	Questions	Bibliometrics method	Areas of analysis
Evolutionary analysis of publication activity: ▪ Scopus database tools	▪ Identifying tendencies in the development of research in the field of digital finance	▪ Historical evolution of publications ▪ Most productive journals ▪ Most productive authors ▪ Most cited publications	▪ Measures of productivity ▪ Impact metrics	Historical evolution of publications; publication structure by authors, journals, and fields of knowledge; citation analysis
Clustering of publications, mapping: ▪ VOSviewer	▪ Identification of the main determinants and perspectives for the development of studies in the field of digital finance	▪ The main documents that had the strongest impact on the development of digital finance ▪ The top journals that publish articles on digital finance ▪ Clusters of publications and directions of research development	▪ Co-citation ▪ Co-occurrence	Citation analysis by publications and authors; keyword analysis

As can be seen from Table 1, the present study applied a bibliometric approach using VOSviewer software [27], developed at the Centre for Scientific and Technical Studies of Leiden University (Netherlands) by Nies Jan van Eck and Ludo Waltman. This software is one of the most commonly used in such studies due to its comprehensiveness, relative simplicity and ability to provide results available for good visualization, interpretation and subsequent analysis.

The information base of the study is articles published in journals indexed by the Scopus database. The selection of publications was carried out by searching for literature by keywords. This methodology is automated, which eliminates any potential bias on the part of researchers. The choice of search query is crucial in this kind of research. To avoid the

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potential exclusion of relevant works, the search was carried out for the term «digital finance», the initial selection comprised 5656 publications. The initial selection was clarified, the search chain was carried out by the subfield's «title», «abstract» and «keywords» (TITLE-ABS-KEY (digital AND finance)), the search period was 2008-2024, the type of publication was an article. The clarified sample included 2748 publications.

Both evolutionary and bibliometric analyses were applied to the formed sample of articles. To analyze the evolution of the number of publications, the structure of articles by countries, institutions, journals and individual authors, and to cite articles, the tools for analyzing the Scopus database were used.

RESULTS

According to the study, the first single publications in the field of digital finance appeared in the early 80s of the 20th century. For example, the article by Kanngisser (1981) is devoted to the analysis of costs and calculation of efficiency associated with the use of timeshare services. The article focuses on the problem of accounting and billing for external data processing services through online applications, such as a financial planning system.

After the initial period of 1980-2000, when some of the seminal works were published, there is a tendency for a gradual increase in the number of publications in this area of research (up to 10 publications per year). The peak of publication activity (892 articles) is observed in 2023.

Figure 1 shows the dynamics of publication activity in the field of digital finance for the period 2008 - 1st quarter of 2024.

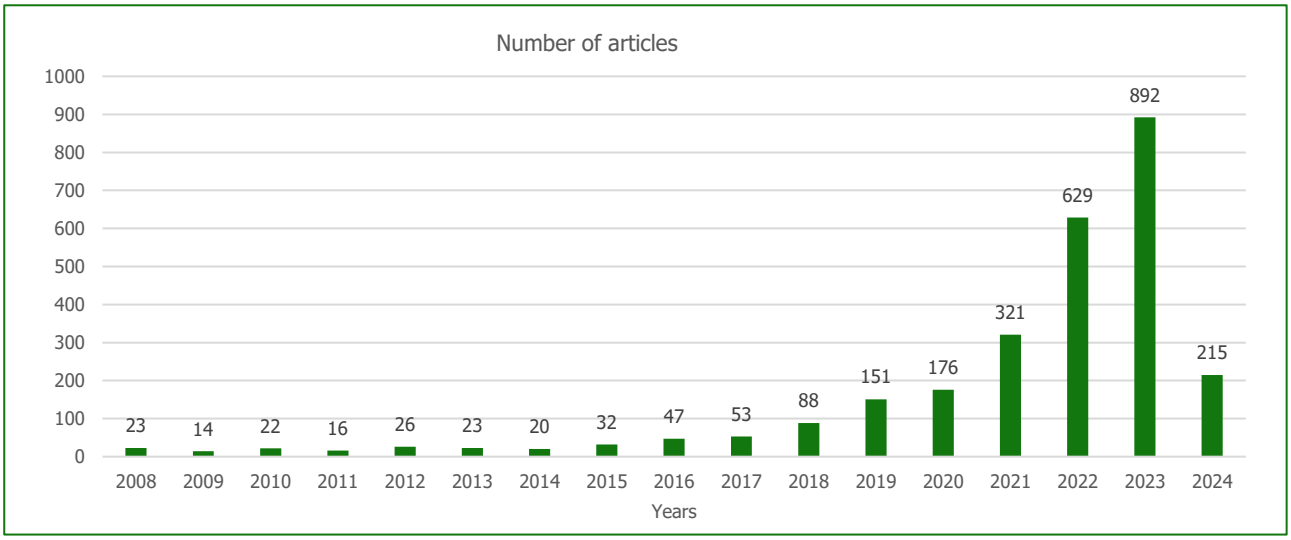

Figure 1. Dynamics of publication activity in the field of digital finance. *(Source: author's development based on the Scopus database)*

The reasons for the rapid increase in publications in the field of digital finance, in our opinion, include the development of ICT, the widespread use of smartphones, and the introduction of new technological solutions, which makes it possible to access a huge range of financial services online. It should be pointed out that the process of financial digitalization has accelerated significantly during the COVID-19 pandemic. The Scopus database indexes 262 publications on the impact of COVID-19 on digital payments, foreign exchange markets, the banking system, lending, financial inclusion, financial services development, digital transformation, etc.

The most recent article on digital finance at the end of the period under study was the paper by Han et al. (2024), which assessed the impact of social inclusion and green finance on sustainable growth in OECD countries. The authors conclude that the growth of green finance markets and the attraction of environmentally friendly foreign direct investment contribute to green development in OECD countries.

The most used keywords in digital finance publications are Finance (838 articles), Digital Finance (397 articles), China (365 articles), Blockchain (213 articles), and Digital Storage (204 articles).

The largest number of articles on the analyzed issues for the entire period was published by Chinese scholars: 1060. Other countries of the world lag far behind China in terms of the number of papers: the United States (384 articles), the United Kingdom (267 articles), India (172 articles), Germany (110 articles), Australia (108 articles). The Scopus database also

indexes 23 articles by Ukrainian scholars with the term «digital finance» present in the title, abstract and keywords. As can be seen from Table 2, leading in the number of publications are the advanced Chinese universities.

Table 2. Distribution of publications by affiliation of scientists, the TOP-5 of universities. *(Source: author's development based on the Scopus database)*

Institution	Country	Number of publications	Proportion, %
Renmin University of China	China	33	1.16
Wuhan University	China	32	1.12
Southwestern University of Finance and Economics	China	29	1.02
Zhongnan University of Economics and Law	China	25	0.88
Nanjing University of Finance and Economics	China	21	0.74

Articles in the field of digital finance have been published in a number of highly rated-journals (Table 3).

Table 3. Top journals with the highest number of articles on digital finance. *(Source: author's development based on the Scopus database)*

Journal	Number of articles	Areas of expertise	CiteScore 2024, quarter (Q)	Publishing house
Sustainability	107	Social Sciences, Computer Science, Ecology, etc.	5.8 / Q1	Multidisciplinary Digital Publishing Institute (MDPI), Switzerland
Environmental Science and Pollution Research	57	Ecology	7.9 / Q1	Springer Nature, Germany, United Kingdom
Finance Research Letters	47	Economics, Econometrics and Finance	10.8 / Q1	Elsevier Ltd, United Kingdom
Resources Policy	34	Social Sciences, Economics, Econometrics and Finance, Ecology	11.3 / Q1	Elsevier Ltd, United Kingdom
Journal Of Cleaner Production	28	Business, Management and Accounting, Ecology, Engineering, Energy	18.5 / Q1	Elsevier Ltd, United Kingdom

Articles on digital finance were published in 163 journals indexed in Scopus, the largest number of articles were published by the following journals: Sustainability – 107 articles; Environmental Science and Pollution Research – 57 articles; Finance Research Letters – 47 articles; Resources Policy – 34 articles; Journal of Cleaner Production – 28 articles. These journals are high-quality ones included in the Q1 ranking by the Journal of Citation Report. They are related to various research fields such as social sciences, computer science (Sustainability Switzerland), ecology (Environmental Science and Pollution Research), business, management, and accounting (Journal of Cleaner Production), economics, econometrics, and finance (Finance Research Letters).

The distribution of articles in the field of digital finance by fields of knowledge in the Scopus database was as follows: social sciences – 16.6%, computer sciences – 14.5%, economics, econometrics and finance – 13.6%, business, management and accounting – 12.6%, engineering – 8.8%, ecology – 8.1%, energy – 4.3%, mathematics – 3.5%, decision sciences – 3.5%, medicine – 2.6%, others – 11.9%, which indicates the interdisciplinary nature of research.

The most fruitful authors who contributed to 4 or more articles on the analysed issues are the following: Vismara (9 articles, Università degli Studi di Bergamo, Bergamo, Italy); Lee C.C. (8 articles, Adnan Kassar School of Business, Beirut, Lebanon); Li W. (8 articles, Henan University of Technology, Zhengzhou, China); Li G. (7 articles, Nanjing Normal University, Nanjing, China); Ozili (7 articles, Central Bank of Nigeria, Abuja, Nigeria).

The number of citations, which can be determined by means of bibliometric analysis, shows which articles and documents are key to a particular topic (Tahamtan, 2016). Table 4 presents the TOP-10 of the most cited publications on digital finance.

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Table 4. The top 10 of the most cited publications on digital finance. *(Source: author's development based on the Scopus database)*

The source	Authors	Country of the 1st author	Journal	Number of citations
[31]	Gomber P. et al.	Germany	Journal of Management Information Systems, 2018, 35(1), 220–265	690
[32]	Ozili P.K.	United Kingdom	Borsa Istanbul Review, 2018, 18(4), 329–340	605
[6]	Gomber P. et al.	Germany	Journal of Business Economics, 2017, 87(5), 537–580	568
[33]	Klein T. et al.	Germany	International Review of Financial Analysis, 2018, 59, 105–116	460
[34]	Zhong R.Y. et al.	Hongkong	Computers and Industrial Engineering, 2016, 101, 572–591	428
[35]	Li J. et al.	China	Economic Modelling, 2020, 86, 317–326	220
[36]	Cao S. et al.	China	Journal of Cleaner Production, 2021, 327, 129458	277
[37]	Upadhyay A. et al.	United Kingdom	Journal of Cleaner Production, 2021, 293, 126130	269
[38]	George G. et al.	Singapore	Entrepreneurship: Theory and Practice, 2021, 45(5), 99–1027	250
[39]	de Luna I.R. et al.	Spain	Technological Forecasting and Social Change, 2019, 146, 931–944	243

As can be seen from Table 2, the most cited (690 references) from the studied sample was the article by Gomber et al. (2018), on the transformation of financial services through the introduction of new technological innovations. In second place is an article by Ozili (2018) (605 references), which evaluates the impact of digital finance on financial stability. It is determined that digital finance and financial inclusion have a number of benefits for financial service users, digital finance providers, governments and the world economy. In third place is the article by Gomber et al. (2017) (568 references), which is devoted to identifying future areas of digital finance and fintech research.

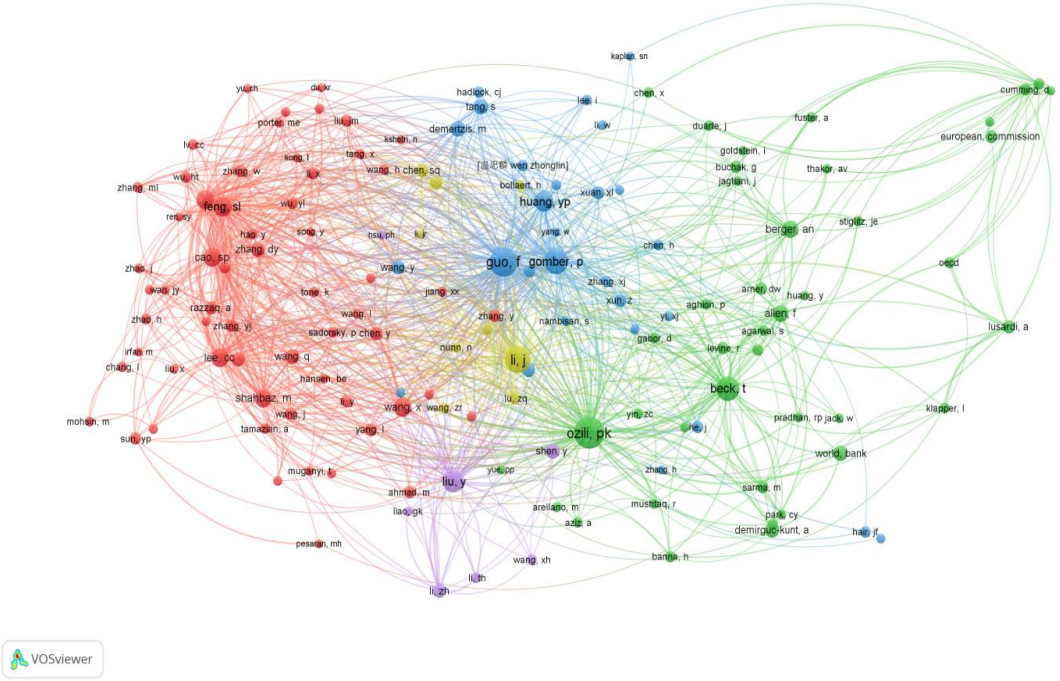
The articles included in the TOP-10 of the articles with the most citations in the field of digital finance are devoted to the following issues: comparison of volatility, correlation and efficiency of the bitcoin and gold portfolio (Klein et al. (2018)); the challenges and opportunities of using big data in areas such as finance and economics, healthcare, supply chain management, and the manufacturing sector (Zhong et al. (2016)); evaluating the influence of digital inclusive financing on consumption by households (Li et al. (2020)); the impact of digital finance on China's energy and environmental indicators, the introduction of green technological innovations and energy efficiency (Cao et al. (2021)); both the current and potential contribution of blockchain technology to the circular economy through the prism of sustainable development and social responsibility (Upadhyay et al. (2021)); digital sustainability, using digital technologies to address global challenges in countering climate change and promoting sustainable development (George et al. (2021)); developing a behavioral model that explains the intention to use mobile payments, comparison of the factors that determine the consumers' perception of SMS (Short Message Service) mobile payment systems, NFC (Near Field Communication) and QR (Quick Response), also finding out the main factors that determine the decision to use these mobile payment systems as a means of payment (de Luna et al. et al. (2019)).

With the help of VOSviewer tools, a citation network is also constructed on the basis of identifying the most influential works in the analyzed field and the relationships between them. Co-citation occurs when two different documents are cited simultaneously in the same article, suggesting some similarities between the 39 cited papers. Co-citation can be studied by various primary units of analysis: journals and documents (Small (1973)), as well as authors (McCain (1990)).

In total, 24787 cited references were identified in the analyzed documents, of which 146 met the criterion of at least 20 citations per article. The network of citations of documents in the field of digital finance is shown in Figure 2. Each node of the presented network represents one reference, and its size reflects the number of citations of the document. The connection between the two nodes indicates the relations of a citation. The thicker the arc indicating the connection between two nodes, the stronger the connection is considered to be. Nodes are assigned to different clusters based on the degree of similarity between them.

The map showed the presence of 3 groups of published works. The green cluster includes publications related to cryptocurrency, the introduction of financial technologies, and the development of the banking sector (the most cited author is

Ozil P.K.), the blue cluster includes works on digital financial supervision, the impact of digitalization on the shadow economy (the most cited author is Guo F.), and the red cluster includes articles on digital finance, green technological innovations and energy efficiency (the most cited author is Cao S.).

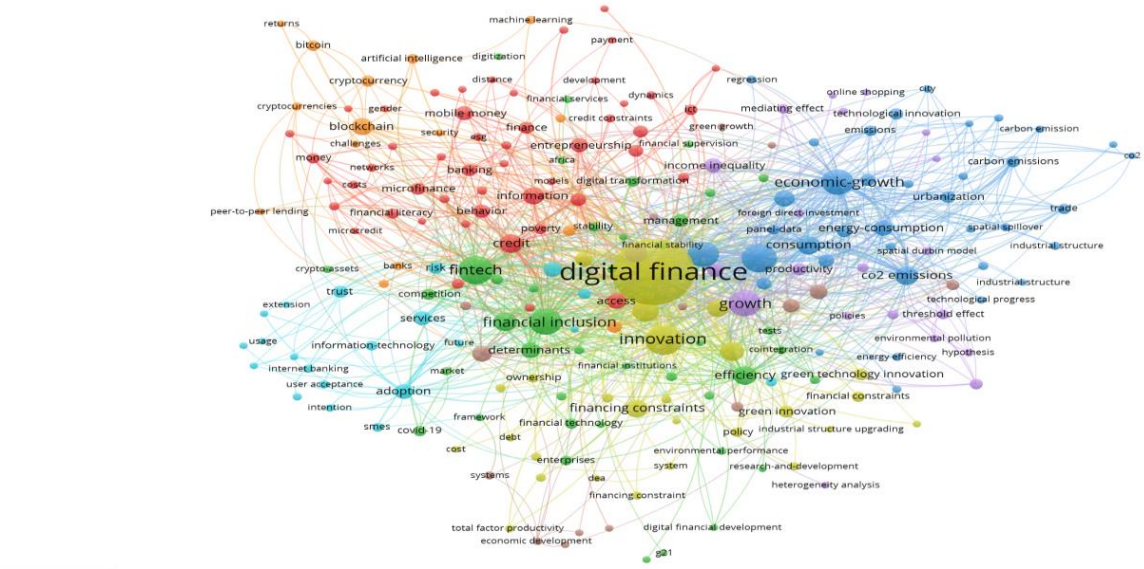


VOSviewer

Figure 2. Document citation network in the field of digital finance, implemented by means of VOSviewer tools. *(Source: author's development based on the Scopus database)*

All search results in the Scopus scientometric database were exported in a tabbed format, which included main bibliographic information (journals, titles, authors, abstracts, institutions, keywords, years of publication). This information formed the basis for further analysis and visualisation using the appropriate software.

The map of the bibliometric network in the field of digital finance is shown in Figure 3.



VOSviewer

Figure 3. Network visualization of citation of articles on digital finance, implemented by means of VOSviewer tools. *(Source: author's development based on the Scopus database)*

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According to the results of the mapping, the most used keywords related to digital finance were the following: impact, innovation, financial inclusion, economic growth, and fintech.

Thus, the bibliometric analysis carried out in accordance with the central category of «digital finance» made it possible to identify 8 clusters, each of which is highlighted in a certain colour:

Red cluster. The most used keywords are credit, banking, microfinance, and mobile money. This cluster includes publications that explore the issues of digitalization of the banking sector.

Green cluster. The most used keywords are fintech, digitalization, and technology. The cluster includes publications on the digital transformation of financial services, the identification of factors influencing the efficiency of financial services, and financial services management.

Blue cluster. The most used keywords are economic development, impact, energy, CO2 emissions, and green finance. The cluster includes publications that focus on determining the impact of digital finance on sustainable development, the introduction of green innovations, the energy sector, and the structure of industry.

The yellow cluster includes publications that focus on innovation and investment. This cluster combines publications on corporate governance, implementation of green innovations, science and education, the impact of finance on the growth of innovation and investment activities and investment efficiency.

The purple cluster combines publications on determining the ways of economic growth, the developing state policy in the field of finance, ecology, and innovative development.

Blue cluster. The most used keywords are information technology, risk, and modelling. Includes articles that focus on substantiating the latest trends in the development of digital finance, and improving information technology, and services.

The orange cluster presents «blockchain» as the most commonly used term. The cluster includes publications that explore cryptocurrencies, security, and market volatility.

The brown cluster focuses on inclusion and its impact on economic development.

Figure 4 presents a map of the relationship between concepts and the term «digital finance».

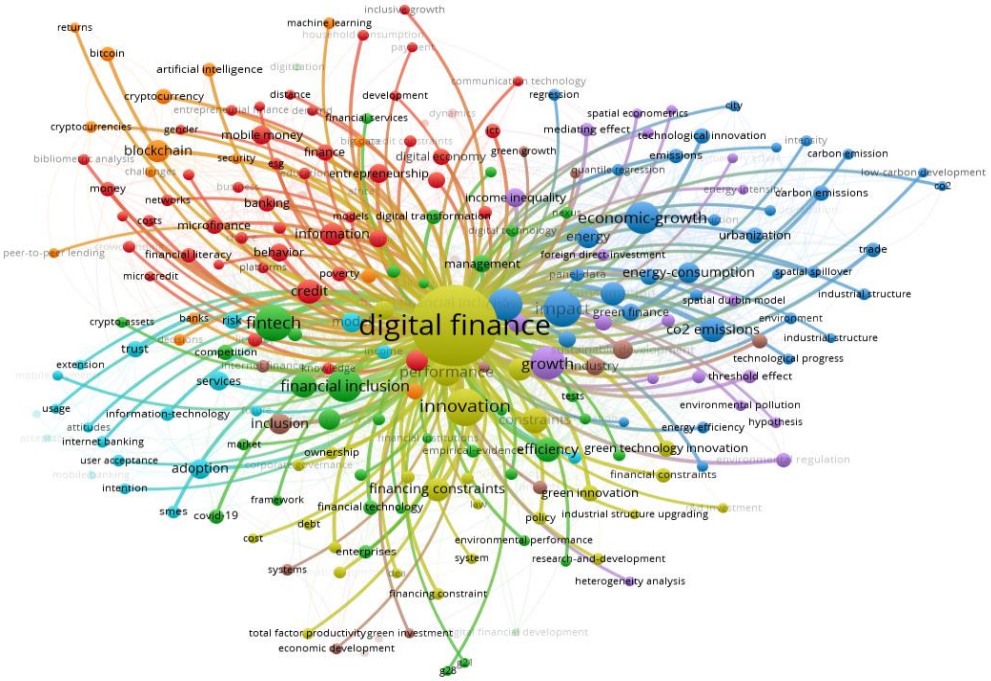

Figure 4. Map of the relationship between keywords and the term «digital finance», built by means of VOSviewer tools. *(Source: author's development based on the Scopus database)*

As can be seen in Figure 4, the term «digital finance» is the basis of the yellow cluster, it is closely related to all other clusters. The strongest connection is with such keywords as economic development, innovation, fintech, and financial inclusion.

Based on the information from the Scopus database, a network map was created using the VOSviewer software. It illustrates the chronology of the distribution of keywords in publications on digital finance (Figure 5), which allows to reveal trends in the publication activity of researchers over a certain period.

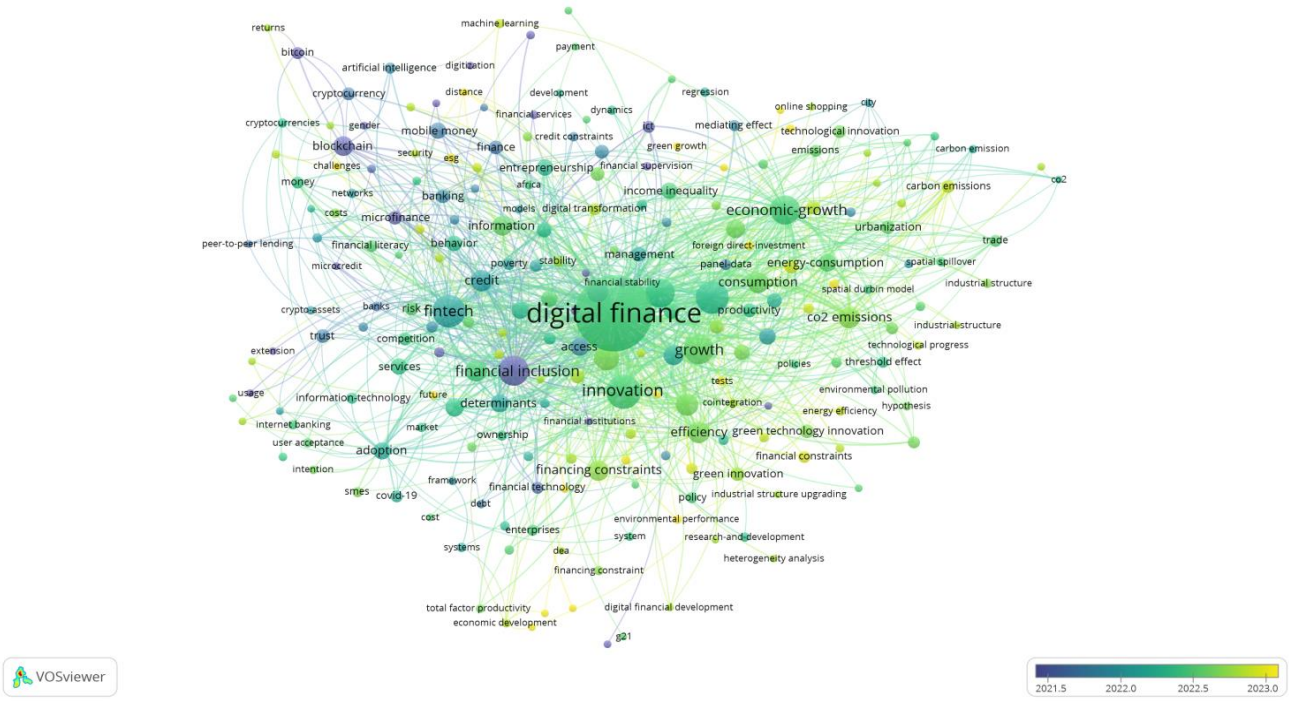

Figure 5. A network map of the relations between keywords in the field of digital finance in chronological order. *(Source: author's development based on the Scopus database)*

The results show that the intensive development of scientific research in the field of digital finance occurred in 2021-2023. During this period, most of the publications were focused on the development of fintech and banking services, and the study of cryptocurrencies. In 2023 (yellow keywords) one can observe active studies on the issue of digital finance in such areas as green course, COVID-19, ecosystem formation, and green energy. These areas can be considered the most relevant today.

DISCUSSION

The findings have allowed to form a fairly clear and complete picture of the development of research in the field of digital finance, as well as to identify the most perspective areas for today, which will obviously receive a more in-depth study in 2024. In general, the results obtained do not contradict the results of existing studies of publication activity in the field of digital finance but complement and develop them due to the expansion of the research time period and the use of powerful analytical tools of VOSviewer software and a relevant sample of publications in the Scopus database.

The limitations of the results obtained in the study arise from the general limitations inherent in bibliometric analysis and the analytical capabilities of its tools. To date, a number of works can be distinguished to the critical analysis of this approach. In particular, the articles by Romanelli et al. (2021), Breslin et al. (2020), Lim et al. (2024), and others. One of the problems highlighted by scholars is that many systematic literature reviews that rely on bibliometric analysis tend to describe results rather than interpret them (Lim et al. (2024)). Also, among the problematic issues are: the ambiguity of bibliometric data and the variety of their formats, which requires close attention when choosing a research base, forming a sample of publications, etc.

It is also reasonable to consider the fact that most bibliometric investigations are based on data covering only international journals indexed in Web of Science and Scopus. These databases may somewhat limit the overall picture of publication

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activity in academic disciplines because they do not take into account a number of national sources: monographs and journals not included in the databases, collections of works of specialized conferences, as well as non-scientific publications (which may be important, especially for social and humanitarian sciences). Therefore, for a deeper consideration of the subject area under study, it is advisable to conduct an additional in-depth analysis of such publications using other databases and tools.

CONCLUSIONS

The results of the presented study allowed us to determine the trends and key areas of digital finance research using the analysis tools provided by the Scopus database and conducting bibliometric analysis with VOSviewer software.

The results obtained in this study allowed us to make the following conclusions.

According to the Scopus database, the number of publications on digital finance has been growing rapidly over the past 5 years. This is due to the rapid development of ICT, as well as accelerated financial digitalisation, which was triggered by the COVID-19 pandemic. The term «digital finance» is interdisciplinary, used in research in economics, econometrics and finance, as well as in social sciences, ecology, computer science, energy, and engineering. The leading position in terms of the number of publications on digital finance is occupied by China. It is followed by the United States, the United Kingdom, India, and Germany by a notable margin. Ukrainian scientists are represented in the Scopus database by a small number of publications in this field.

The map of the keyword network allowed to identify 8 clusters that characterise the key areas of research in the field of digital finance: the first is focused on digitalization in the banking sector; the second is on digital transformation, identifying factors influencing the effectiveness of financial services; the third to determine the impact of digital finance on sustainable development; the fourth on investment and green innovation; the fifth on the development of public policy in the field of finance, ecology, innovative development; the sixth on the substantiation of the directions of development of digital finance, improvement of information technologies and services; the seventh on blockchain and cryptocurrency research; the eighth on inclusion and its impact on economic development. The results of the bibliometric analysis by chronological measurement demonstrated that the active development of scientific research on digital finance occurred in 2021-2023, during this period most publications were focused on the development of fintech and banking services, the study of cryptocurrencies. In 2023 there was an increase in research on the problem of digital finance in such areas as Green Deal, COVID-19, ecosystem formation, and green energy, which are considered areas of research to be further developed in the near future.

Thus, the result of the study is to identify the determinants of the development of digital finance by analysing the status and identifying the main tendencies of publication activity in this area. The contribution of this research to the development of scientific knowledge consists, first, in the systematization and critical analysis of the content, features and areas of application of bibliometric analysis, the development of the methodology of its implementation; secondly, in the practical implementation of the methodology of bibliometric analysis to determine the state and current trends of scientific research in the field of digital finance. The presented research generally deepens the understanding of bibliometric methodology and allows to form a comprehensive well-grounded view of the development of research in the field of digital finance based on the analysis of bibliographic data.

Directions for further research by the authors are an analysis of national publications in the field of digital finance and a comparison of its results with the main trends in the development of research in the leading countries of the world, as an in-depth study of the analytical capabilities of the tools of bibliometric analysis and identifying ways to improve the mechanisms for its application and interpretation of results.

ADDITIONAL INFORMATION

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CONFLICT OF INTEREST

The Authors declare that there is no conflict of interest.

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АНАЛІЗ ТЕНДЕНЦІЙ РОЗВИТКУ НАУКОВИХ ДОСЛІДЖЕНЬ У ЦАРИНІ ЦИФРОВИХ ФІНАНСІВ НА ОСНОВІ БІБЛІОМЕТРИЧНИХ ДАНИХ

Поширення цифровізації призвело до глобального проникнення цифрових фінансів в усі сектори економіки. Висока актуальність проблеми цифрових фінансів зумовлює необхідність поглиблення досліджень у цій царині, зокрема шляхом проведення комплексного аналізу накопичених у ній знань. Метою дослідження є виявлення основних тенденцій і детермінант розвитку наукових досліджень у царині цифрових фінансів за допомогою бібліометричного аналізу публікацій у журналах, які індексує наукометрична база даних Scopus. Це дослідження виконане відповідно до традиційного підходу до бібліометричного аналізу та спрямоване на виконання таких завдань: визначення особливостей наукового ландшафту в царині цифрових фінансів шляхом проведення еволюційного аналізу публікаційної активності; виявлення основних детермінант розвитку досліджень шляхом картування та кластеризації наявного масиву публікацій за допомогою програмного забезпечення VOSviewer. Часові рамки дослідження охоплюють 2008 – 1-й квартал 2024 року. Результати показали, що термін «цифрові фінанси» має міждисциплінарний характер. З'ясовано, що лідером за кількістю публікацій у цій царині є Китай, за яким із помітним відривом ідуть США, Великобританія та Індія. Визначено наявність 8 кластерів, які характеризують ключові напрями досліджень. Результати бібліометричного аналізу за хронологічним виміром свідчать, що найбільш інтенсивний розвиток наукових досліджень у царині цифрових фінансів відбувався у 2021-2023 рр. з акцентом на розвиток фінтеху, банківських послуг і криптовалют. 2023 року спостерігалося збільшення кількості досліджень із таких питань, як Green Deal, COVID-19, формування екосистем, зелена енергетика, які розглядають як напрями досліджень, що потребують подальшого розвитку в найближчому майбутньому.

Ключові слова: цифровізація, цифрові фінанси, бібліометричний аналіз, еволюційний аналіз, наукові дослідження, публікаційна активність, VOSviewer, кластеризація, картування

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