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PREDICTING THE INFLUENCE OF DISRUPTIVE TECHNOLOGIES ON FINANCIAL PERFORMANCE - A BIBLIOMETRIC ANALYSIS

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Abstract
The rapid evolution of technology in recent times can be seen as both an opportunity and a threat. Although initially viewed with reluctance and distrust, artificial intelligence (AI) and blockchain technology (BCT), these technologies have now managed to capture the interest of entrepreneurs and managers, as they can help businesses grow faster, gain competitive advantage and thus increase financial performance. The paper analyzes current research trends on the influence of AI and BCT on financial performance, identifies relevant authors and countries that have shown increased interest in the influence of AI and BCT on financial performance (FP), and identifies the most researched topics and themes on this topic. Our results reveal an increased research interest in recent years on this topic, from 262 articles published in 2019 to 1,483 in 2024. Countries with the most cited articles were the US, China and the UK. In the period 2020-2024, the results of the bibiliometric analysis demonstrate a growing academic interest in research focused on the influence of AI in the spheres of risk management, business optimization and financial performance. The interest in researching the impact of blockchain technology, has increased in recent years, an aspect demonstrated by the growth of publications focused on this topic. We believe that the paper can be useful both for academia, by revealing the links between research topics and identifying new research niches, but also for management that can analyze the opportunity of adopting these technologies in business.

Keywords: *artificial intelligence, blockchain technology, financial performance, bibliometric analysis*

JEL Classification: M41

I. INTRODUCTION

In an increasingly globalized and dynamic world, disruptive technologies such as AI and BCT are gaining more and more ground in more and more domains of activity, including business. Under this latter aspect, we are interested in how these disruptive technologies impact business organizations.

Thus, this paper reviews the literature on the influence of emerging technologies (AI and BCT) on financial performance through a bibliometric analysis. Research advances, areas, gaps and future research directions are presented, the most important studies in the field, the most relevant authors, the most cited articles and the countries most involved in research on the influence of AI and BCT on financial performance are identified.

Thus, in order to identify trends in the use of AI and BCT in companies and their influence on financial performance, we set the following objectives: O1 - To identify current research trends in the use of BCT and AI with an emphasis on the influence on financial performance (FP); O2 - To identify relevant authors and countries with most publications focused on identifying the influence of AI and BCT on PF; O3 - Identify the predominant research themes and topics on the influence of AI and BCT on FP; O4 - Identify potential future research directions and topics that can lead to better preparation of companies in terms of the influence of BCT and IA on FP.

Starting from the overview of the existing academic output to date, taking into account the proposed theme, emerging trends in the influence of BCT and IA on FP are identified. This paper is based on bibliometric analysis. We made this choice because it provides the productivity and quality of research over time, the most relevant authors and the most cited articles, also offering the possibility to identify the evolving trends in research (Bornmann and Leydesdorff, 2014; Şenel and Demir, 2018). On the same thematic area as our study, Yang et al. (2024) conducted a bibliometric analysis to understand the impact of AI in the auditing field, its benefits and drawbacks, and the need to integrate AI in companies to inform decision making.

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Structurally, the paper continues with a section dedicated to literature review, followed by research methodology, results and discussion, and conclusions and limitations of the study, respectively.

II. LITERATURE REVIEW

If we start from the definition of AI as the ability of a system to make an accurate interpretation of incoming data, extract learnings from it and apply what it has learned to accomplish certain tasks and meet certain goals (Haenlein and Kaplan, 2019) we realize that, theoretically, it would be the ideal aid in companies.

Kanbach et al. (2023) have shown the implications of innovative business models assisted by generative artificial intelligence applications by discussing their applicability in the fields of software engineering, financial services and healthcare. Also in this segment, of generative artificial intelligence (ChatGPT, Bard, Sydney) Akter et al. (2023) found 3 usage orientations of generative artificial intelligence: towards the market, data and business models, and management. These are based on innovation potential, contributing to strategies oriented towards market adaptability and competitive advantage. Marketing and sales are among the areas pioneering the use and rapid deployment of AI technologies. Thus, AI has enabled analyzing and managing the content present on websites, identifying the right images, identifying trends, dynamically adapting prices leading to increasing customer portfolio, identifying new potential markets and increasing revenues (Jain, 2023; Kumar et al., 2019; Overgoor et al., 2019). Technology has also driven changes in buyer behavior. These changes determine the dynamics in the market. The business environment needs to be vigilant to the changes and adapt to market needs (Overgoor et al., 2019; Jain, 2023), optimize costs, identify new ways to supplement revenues and provide outstanding customer shopping experiences (Sharma et al., 2024). At the same time the development of emerging technologies offers unique business opportunities and is also capturing the attention of researchers. Thus Sharma et al. (2022) analyzed the ability and readiness of 292 SMEs to deploy AI-based chatbots at the enterprise level. Studies conducted by Mitić (2019), Jumani et al. (2021), Coombs et al. (2020) showed that AI provides customer support and optimizes customer management, builds consumer profiles, helps improve conversion rate, refine dynamic pricing and improve sales strategy. It can also identify cyber-attacks and vulnerabilities in the system by providing ways to be resilient in case of any such events (Bytniewski et al., 2020; Bharadiya et al., 2023). All of these can lead to competitive advantages in the market, contribute to increased financial performance, and create comfort and resilience in case of unexpected shocks or crises (Zamani et al., 2023). Emerging technologies have enabled a huge leap from traditional financial statement-based analytics to forecasting future business through the ability to archive and analyze large volumes of data (Big Data). Thus, complex analysis can be performed based on existing data, trends can be identified allowing predictions with a high degree of accuracy (Afiouni, 2019; Kolbjørnsrud et al., 2016; Neiger, 2019), it becomes possible to analyze the circumstances that led to certain actions and behaviors (Haenlein and Kaplan, 2019; Bharadiya et al., 2023). Bharadiya et al. (2023) and Jain (2023) have shown through their studies that AI contributes to operational efficiencies by optimizing production processes and thus, superior performance. In recent years in addition to artificial intelligence, BCT has also made its place in the business environment. Pundir and Jagannath (2019) consider BCT as a technology that is based on blocks of data, which can be identified through mining operations using computers around the world and encrypted in a decentralized ledger and enables global transaction management (Arabioun and Moghaddasi, 2024). BCTs are present in a wide range of applications: supply chain traceability, agriculture, online payments, healthcare systems, and voting-based elections (Vadgama and Tasca, 2021; Marin, 2021; Laroiya et al., 2020). The integration of AI and BCT can provide opportunities to take companies to the next level and transform them (Haenlein and Kaplan, 2019). In the accounting environment, on a sample of 317 professionals, Afifa et al. (2023) studied the influence of using blockchain technology. The results showed that performance perspective, information quality, computerized effectiveness and job ease positively influence the implementation decision, while job relevance has negative effect. The studies conducted by Bharadiya et al. (2023), Jumani et al. (2021), Soni (2020) and Jain (2023) also highlight the disadvantages of emerging technologies and which refer to low creativity, high implementation and maintenance costs, high staff training costs, and high vulnerability and insecurity of data to cyber attacks, and lack of standardization or regulation of BCT transactions. From the studies previously cited, we observe that disruptive technologies present both advantages and disadvantages for companies and therefore, we believe that studies and research are needed to identify how they can impact, positively or negatively, the activity of business organizations and implicitly their performance and financial resilience. In this sense, the study conducted by Hanganu and Socoliuc (2023) highlight the need for a proactive attitude of business organizations to the external environment and to the changes imposed in business practices. These aspects are also the intrinsic motivation of the present study, whose methodology we present in the following.

III. RESEARCH METHODOLOGY

To achieve our objectives we used bibliometric analysis. The ability of bibliometrics to identify literature characteristics on a logical basis in an objective manner (Donthu et al., 2020), to provide an overview analysis on

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the connections between keywords and citations (Feng et al., 2017) has made it a widely used research tool in recent times. Among the various software available, among the most widely used by researchers is Biblioshiny, which we have also used for the present research. This software is preferred due to the valuable information provided on descriptive statistics and research trends. Our research was also based on the scientific literature review procedure presented by Kitchenham (2004). Thus the bibliometric interography was carried out on the papers available in the Web of Science (WoS) database, covering the period from the earliest publications to the present. The bibliometric query was performed using the inclusion and exclusion criteria which are centralized in Table 1.

Table 1. Description of the database construction process

	Description
Keywords and Boolean Operators	(Financial performance or corporate performance or financial metrics or financial outcomes or Corporate financial analysis or Business performance or Performance evaluation or Financial analysisor smart programs) and (Blockchain technology or Blockchain adoption or Blockchain in finance or Blockchain applications or Blockchain impact or Decentralized finance or Blockchain integration)
	(Financial performance or corporate performance or financial metrics or financial outcomes or Corporate financial analysis or Business performance or Performance evaluation or financial analysis) and (Artificial intelligence or AI in finance or AI adoption or Machine learning or AI applications or AI impact)
Inclusion Criteria	1. Documents from WoS
	2. Documents classified as articles
	3. Documents that include specific keywords
	4. Articles classified as: *Management, Business, Economics and Business Finance*
	5. Articles written in English
Inclusion Criteria	1. Articles not written in English
	2. Documents not classified as Articles

Source: Authors' elaboration

The collected articles are grouped under the key terms Artificial Intelligence (AI) and Financial Performance (FP) and Blockchain Technology (BCT) and Financial Performance (FP), aiming to identify how financial performance is influenced by AI and BCT. The inclusion criteria are based on the same objective. Thus, the articles must be present in WoS, contain keywords related to our study, which is why we restricted the search only to the fields of Business, Economics, Management and Business Finance, written in English.

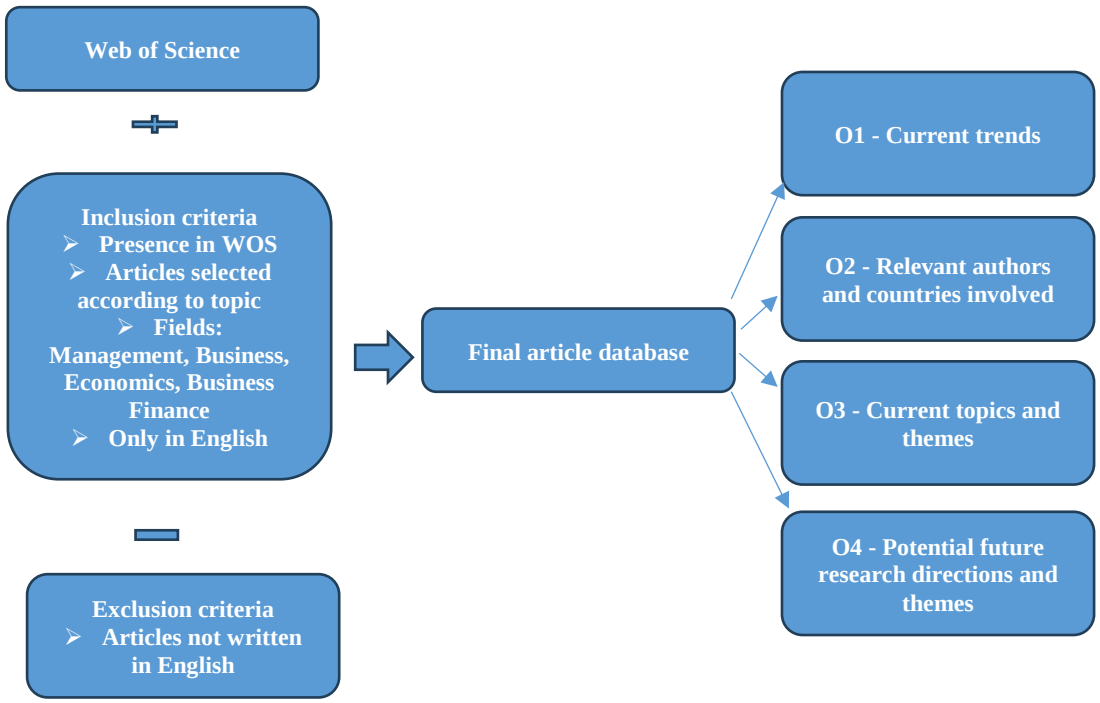

Figure 1. Schematic representation of the methodology
Source: Authors' elaboration

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IV. RESEARCH RESULTS

After selection of these articles they were exported in BibTex format and later uploaded into Bibliometrix software in order to fulfill the research aim and objectives stated in the Introduction section.

Thus, in the following we have structured the research results according to the set objectives.

1. Identification of current research trends in the use of BCT and AI, with a focus on the influence on financial performance

To achieve the first objective, we initially took over the description of the main data.

Table 2. Summary descriptive analysis

Main information about data	
Timespan	1989-2025
Sources	1221
Documents	5711
Annual Growth Rate %	5,34
Average citation per doc	15,52

Source: Data processed using Biblioshiny

Table 3. Most relevant authors

Author	h_index	g_index	m_index	TC	TC/Y	NP	PY_start
KUMAR A	15	29	3	884	177	33	2020
HUNJRA AI	14	21	1	511	39	35	2011
WANG Y	12	23	0,706	571	36	46	2008
BAG S	11	17	2,75	979	326	17	2021
CHEN Y	11	20	0,478	415	19	22	2002
GUPTA S	11	27	2,2	1114	279	27	2020
KUMAR S	11	23	1,375	3744	535	23	2017
LIU Y	11	26	0,55	701	37	36	2005
LI J	10	23	0,556	574	34	31	2007
LI X	10	20	0,909	416	42	31	2014

Source: Data processed using Biblioshiny

As can be seen in table no. 2, the database includes 5,711 articles, published in the period 1989-2025. The average annual growth rate was 5.34% and the average citation rate was 15.52%. If we follow the dynamics of article production for the period 1989-2024 (and those that were already published in 2024 related to 2025) in the figure below (Figure 2) we can see that in the period 1989-2013, interest was very low. With the beginning of the pandemic, a period that can also be associated with a strong development of information and communication technologies, a significant increase in the number of articles is observed.

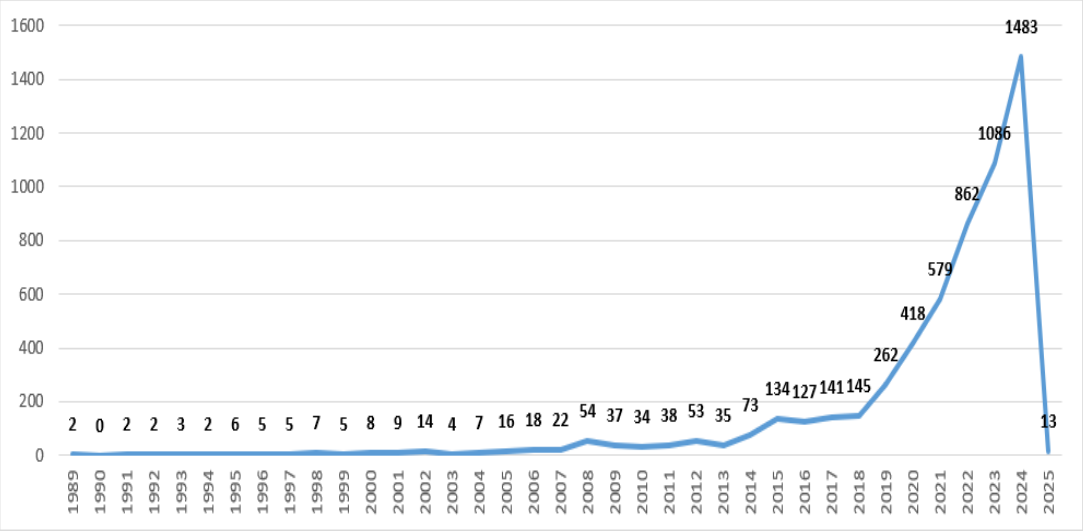

Figure 2. Production of articles on the selected topic between 1989 and 2025
Source: Data processed using Biblioshiny

If we take a foray into the past, along the thread of historical events, and try to correlate them with the scientific output on the map, we can identify several important moments.

Thus, in the 2017-2018 period, the above graph shows an increase in researcher interest. This can be associated with the development of cloud computing platforms, the development of technologies for processing Big Data and the growing interest in the cryptocurrency market. After the official launch of generative AI technologies (ChatGPT, Gemini) in 2022, an explosion of researchers' interest on this topic is also observed.

Another indicator of interest in emerging technologies can be the average number of citations which peaked during the pandemic period (8.1). The average number of citations was lower in the post-pandemic period and in terms of the calculation formula, the number of articles published was very high in this period.

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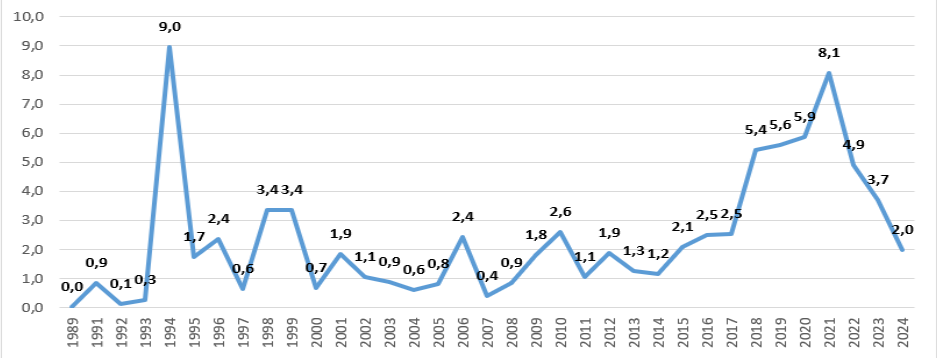

Figure 3. Average annual citations
Source: Data processed using Biblioshiny

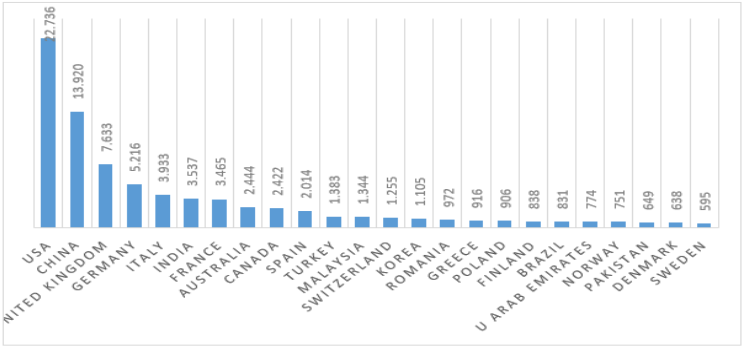

Figure 4. Total number of citations by country
Source: Data processed using Biblioshiny

However, the use of technologies (AI, Big Data, BCT) has been of growing interest since 2018, which is also confirmed by the high average citation values, given the very high number of articles published.

2. Identification of relevant authors and countries with the most publications focused on identifying the influence of AI and BCT on PF

Figure 4 shows the ranking of countries with the most cited papers. The top positions in the ranking of the most cited countries on the influence of AI and BTC on business performance are occupied by the USA, China and the UK. This also reflects the level of interest and implementation of these technologies in the entrepreneurial reality of the USA and the UK. As for China's positioning, it is justified in the light of the economic boom in recent decades and the explosive development in IT&C.

Moreover, it is not at all negligible that these countries are characterized by a level of advanced research and innovation, with renowned universities, technology companies and research institutions that encourage the applicability of new technologies in the business environment.

Table no. 3 presents the 10 most cited authors. This was done based on total citations and taking into account metrics related to articles (h-index, number of articles, total citations, year in which they started publishing, total number of citations).

Thus, the top position is held by Kumar A., who has published 33 articles from 2020 to the present. Productivity and impact measured by h-index is 15, which shows that he has a significant influence in his field of research. The total number of citations was 884, which means an average of 177 per year, which demonstrates significant recognition in the research environment.

The second position in the ranking is held by Hunjra A.I. who has published 35 articles since 2011. His productivity and impact has a value of 14, one unit lower than the top position. The total number of citations was 511 for the period 2011-2024, which means an annual average of citations of 39, much lower than the top position (177). The third position in the ranking is occupied by Wang Y., who has published since 2008 and has an h-index value of 12, a total of citations of 571 with an annual average of citations of 36.

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3. Identifying the predominant research themes and topics regarding the influence of AI and BCT on PF

To identify the most popular research topics, over time, regarding the influence of AI and BCT present in the specialized literature, we conducted the analysis in Biblioshiny, and the results can be seen in the figure below.

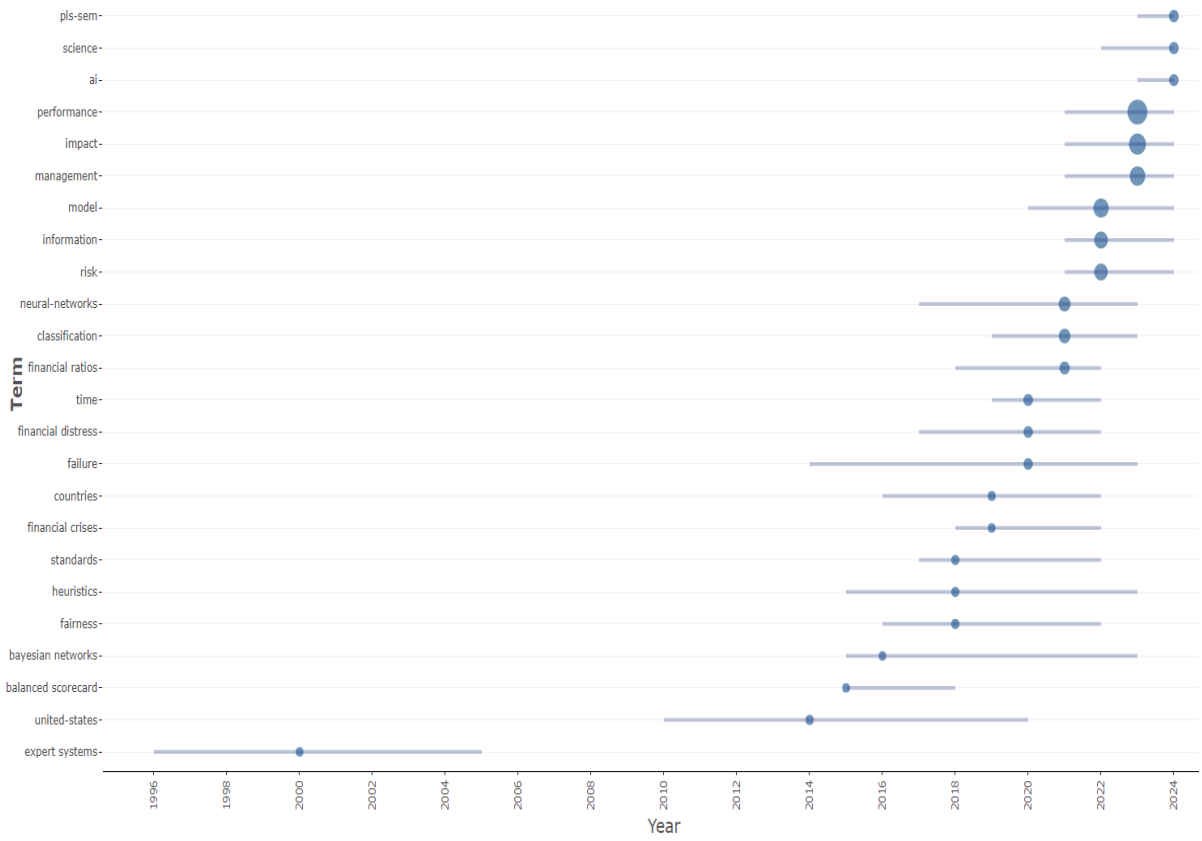

Figure 5. Analysis of the most popular topics regarding the influence of AI and BCT on financial performance and the business environment over time
Source: Data processed using Biblioshiny

In Figure 5, presented above, we can observe a notable increase, after 2016, in the interest through the presence of the terms AI, neural networks, management, performance. As we mentioned above, this period corresponds to the adoption of AI and blockchain technologies in different industries. If we analyze the size of the points in the graph, we can deduce that the terms performance, impact, management, model, information and risk have more prominent representations and suggest an intensification of interest in the influence of these factors on financial performance. The absence of the term blockchain in the figure above can be substantiated by the fact that the subject is relatively new and that there are still not enough studies that correlate it with financial performance in top positions and that it is possible that this technology is represented in studies with different keywords. A dominance of AI and associated terms is also observed, which may indicate an interest in using artificial intelligence to optimize financial processes, assess risks and make financial predictions. To complete our research, a Co-occurrence network analysis was performed, which allows the study of the relationships between the main concepts present in the selected articles. Taking into account the fact that emerging technologies (Big Data, AI, BCT) constitute impact factors for the business environment and beyond, the analysis of their influences on the performance of companies is an essential theme for research. Thus, in the figure below we can follow the co-occurrence of key concepts and visualize the relationships between them.

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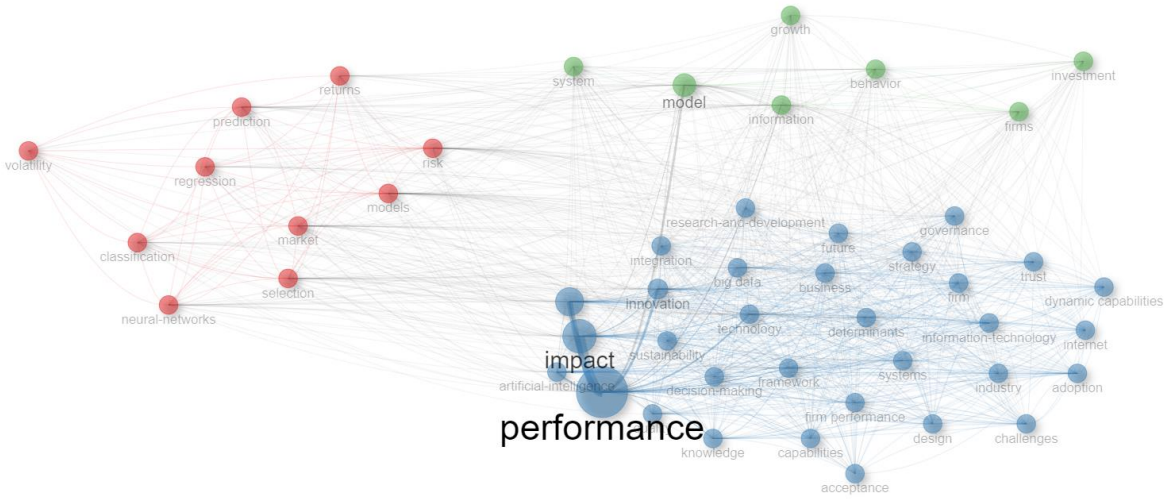

Figure 6. Co-occurence network analysis
Source: Data processed using Biblioshiny

In Figure 6, three thematic clusters can be observed that have been created which may indicate research sub-domains, but which have performance as a point of convergence. The red cluster comprising the key terms: volatility, classification, neural-networks, prediction, returns may indicate a convergence towards financial and technological areas with impact in risk modeling and the application of artificial intelligence methods to make predictions. It can be indirectly associated with blockchain, pointing to research directions oriented towards the volatility and risk of financial markets, the impact on security and transparency of transactions. To these can be added the use of Deep Learning technologies based on neural networks for risk prediction in environments using BCT. We can conclude that this cluster suggests that the mix of BCT and AI can provide innovative solutions for risk and prediction.

The second cluster, which has included the terms: system, growth, model, behavior, investments, firmss, information, shows a research orientation towards company dynamics, economic growth and the impact of technologies on investments and organizational behavior. We can consider that this cluster includes studies that analyze the impact of BCT and AI on firm dynamics and investment management.

It may suggest research directions including organizational behavior, financial management and investment strategies under the impact of AI and BCT.

The blue cluster particularly emphasizes the term performance. The term impact also has an obvious positioning. In correlation with these terms, terms such as innovation, artificial intelligence, knowledge, firm performance, sustainability, big data, technology, determinants, capabilities, design, challenges are also present in the cluster. As a result, the cluster may indicate a research direction focused on firm performance, innovation and the impact of technologies on them. Figure 6 shows that the main research theme is Performance.

The networks in this analysis show how frequently two concepts occur together, this also indicates the existence of important thematic correlations. The concepts that have high importance in studies analyzing the influence of financial performance are: impact, artificial intelligence, decision making, sustainability, impact, innovation. Thus, they can be considered current research issues and areas of interest. Thus, the presence of artificial intelligence and impact in correlation with the concept of performance, may indicate an interest in analyzing how artificial intelligence is studied to improve strategies and decision making. We can thus deduce that this cluster indicates research directions that refer to the challenges of emerging technologies and the impact of innovations on the growth and competitiveness of companies.

The absence of the term blockchain in this figure may signify that it is analyzed through the context of different keywords and that the topic of artificial intelligence dominates the research in this area.

4. Determining potential future research directions and topics that can lead to better preparing companies for the influence of BCT and AI on financial performance

Emerging technologies are a reality with different facets that require complex analysis to determine the benefits but also potential risks. Through the bibliometric analysis carried out in this study, further research topics have been identified that can determine the influence of AI and BCT on financial performance in business environment.

As mentioned above, the absence of the term Blockchain points to opportunities for further research, particularly in terms of the impact on financial performance.

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Several research directions can also be pursued, among which we can mention: The impact of emerging technologies on company performance (assessing the effectiveness of AI in decision making, security and efficiency of transactions under the BCT umbrella), innovation and knowledge transfer through emerging technologies (investigating the influence of innovation in inter-company collaboration), financial performance, resilience and sustainability through the lens of innovations (assessing the impact of innovative technologies on long-term performance), challenges and opportunities in the era of emerging technologies (resistance to change in the context of implementing emerging technologies, opportunities for growth through emerging innovations), behavioral mutations generated by emerging technologies (organizational adaptability to change).

We believe that these emerging themes can constitute in-depth and relevant studies that can contribute to the development of knowledge in the field of emerging technologies and their impact on organizational performance.

V. CONCLUSIONS

The bibliometric research conducted essentially identifies the research niches most explored by researchers focused on the impact of AI and BCT on FP and identifies future research directions.

Thus, the proposed research directions can contribute to building a solid knowledge base on the impact of emerging technologies on company performance. Emerging technologies will certainly transform business and society, not only economically but also in terms of sustainability. Along with the benefits always come challenges that require a strategic approach in order to minimize the negative impact on business and society. We believe that the research results on the influence of AI, BCT on business performance are important for managers and entrepreneurs, but also for regulators who can make public policy.

Our results may also be useful to academics, who can continue their research in less explored research niches. The research directions and suggested topics for further studies may contribute to a deeper understanding of the dynamics between innovation, technology and organizational performance.

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