Volume **13** / **2025** ISSN 2344-102X
Issue **2** ISSN-L 2344-102X

CRYPTOCURRENCIES IN THE DIGITAL AGE: A BIBLIOMETRIC ANALYSIS

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Abstract
The digital age has changed the way we communicate, work, learn and even spend our free time. Devices such as smartphones, computers or tablets have become indispensable, and access to information is now faster and easier than ever. In the context of the digital age, the purpose of this research paper is to carry out a bibliometric analysis based on a number of 2,454 scientific papers identified in the Web of Science (WoS) database. The first objective is to identify the concept of cryptocurrencies in the specialized literature by carrying out a brief literature review, and the second objective is to carry out the actual bibliometric analysis on the same topic. The results obtained consist in developing a research agenda, which captures the stages of evolution and consolidation of the concept of cryptocurrencies in the specialized literature.

Keywords: *Bibliometric analysis; cryptocurrencies; digital age*

JEL Classification: *M10, M41*

INTRODUCTION

In the era in which technology leaves its mark on most sectors of activity, and in people's lives, this inevitably led to the emergence of a new monetary system, based on cryptographic technology, represented by the so-called cryptocurrencies or virtual currencies, which from the beginning of their appearance to the present have gained enormous notoriety among consumers, becoming a vast network in which, second by second, at a global level, numerous transactions take place with such instruments used as a means of payment and exchange (Mateș, 2022).

The cryptocurrency market has an essential characteristic that differentiates it from the rest of the financial markets, which is its very high volatility (Stuparu, 2021). In Stuparu's opinion (2021), the cryptocurrency market can grow significantly over a short period of time, but can also immediately suffer a substantial decline; therefore, not infrequently, we hear cryptocurrency investors saying "only invest the money you are prepared to lose"; However, cryptocurrencies have captured the intense attention of investors, eager to make quick profits through speculation, a process called "day trading".

In recent years, the accounting and financial reporting systems have also had to adapt to the rapid emergence of cryptocurrencies as alternative financial instruments. Traditional reporting frameworks often fail to capture the specific characteristics of digital assets such as volatility, decentralization, and lack of intrinsic value benchmarks. Sorici (Zlati) et al. (2021) highlight that the process of transferring financial transactions to the cryptocurrency market has required significant adjustments in financial reporting practices, particularly regarding the recognition, valuation, and disclosure of such assets. Their findings emphasize that accounting systems must evolve to integrate mechanisms for tracking blockchain-based transactions and ensure transparency in financial statements, as the integration of cryptocurrencies into mainstream finance continues to expand.

At the same time, researchers debate whether cryptocurrencies should be perceived primarily as speculative investment tools or as disruptive technologies capable of reshaping the financial landscape. Cosmulese (2021)

DOI: 10.4316/EJAFB.2025.13209

Volume **13** / **2025** ISSN 2344-102X
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argues that cryptocurrencies represent both an innovative investment alternative and a disruptive technological force, challenging the traditional paradigms of monetary policy and banking intermediation. From this perspective, the emergence of decentralized finance (DeFi) and blockchain-based ecosystems signals a structural transformation in global financial systems. This evolution calls for a better understanding of the risks and opportunities associated with the adoption of cryptocurrencies, particularly in the context of regulatory frameworks and financial stability concerns.

I. BACKGROUND AND RATIONALE

In recent years, virtual currencies, known as "cryptocurrencies", have experienced a significant increase in popularity globally. They are electronic payment systems that facilitate online transactions without the intervention of an intermediary financial institution, such as a bank (Ciobanu, 2020). Contemporary financial markets are characterized by an accelerated flow of information and a very high volume of transactions, carried out by participants with different perspectives and investment horizons (Wątorek et al., 2021).

Bitcoin, the first electronic currency, was created in 2009 by an individual or group of individuals under the pseudonym Satoshi Nakamoto (Belous, 2023). Bitcoin is a decentralized digital currency, meaning that it is not controlled by any central authority, such as a bank or government. Instead, Bitcoin uses blockchain technology to record transactions and validate money transfers.

Sfetcu (2023) believes that innovation in the field of economic and social relations at the level of citizens regarding monetary evolution can have both a positive and a negative impact. Facilitating the execution of transactions presents an advantage in favor of citizens who use this type of operations in their daily lives, whether it is a purchase or making physical purchases. However, we can see the negative perspective in the increase in economic crime values, the legislations of the world's states being in certain situations surpassed by the growing criminological phenomenon. In Romania, the transition to cryptocurrencies is carried out starting with 2019 through Law 30/2019 regarding incomes earned in 2019.

Figure 1 illustrates the current value of the cryptocurrency on the market.

#	Name		Price	1h %	24h %	7d %	Market Cap	Volume(24h)	Circulating Supply	Last 7 Days
1	Bitcoin BTC	Buy	$94,359.43	0.16%	0.20%	0.48%	$1,874,078,045,986	$23,357,682,915 247.72K BTC	19.86M BTC	
2	Ethereum ETH	Buy	$1,766.61	0.00%	2.26%	2.46%	$213,287,416,821	$12,038,679,268 6.82M ETH	120.73M ETH	
3	Tether USDT	Buy	$1.00	0.01%	0.02%	0.04%	$149,448,537,245	$50,715,178,753 50.71B USDT	149.42B USDT	
4	XRP XRP	Buy	$2.12	0.56%	0.41%	7.22%	$124,118,071,411	$2,352,407,231 1.11B XRP	58.5B XRP	
5	BNB BNB	Buy	$597.53	0.16%	0.17%	0.66%	$84,185,981,380	$1,521,765,476 2.54M BNB	140.88M BNB	
6	Solana SOL	Buy	$142.85	0.05%	1.42%	3.46%	$74,027,164,377	$2,464,838,819 17.25M SOL	518.18M SOL	
7	USDC USDC	Buy	$1.00	0.01%	0.01%	0.00%	$61,565,746,432	$8,744,599,478 8.74B USDC	61.54B USDC	
8	Dogecoin DOGE	Buy	$0.1661	0.18%	2.10%	6.68%	$24,783,175,599	$767,677,818 4.62B DOGE	149.15B DOGE	

Figure 1. The current value of the cryptocurrency on the market
Source: https://coinmarketcap.com. - *screenshot* – [accessed 6 May 2025]

The rapid growth of the cryptocurrency market has drawn considerable academic and institutional interest, particularly due to its expanding market capitalization and increasing integration into global financial systems. According to Corbet et al. (2020), cryptocurrencies have evolved from niche digital assets into significant components of diversified investment portfolios, offering both opportunities and systemic risks. Their high volatility, illustrated by sharp price fluctuations in assets such as Bitcoin and Ethereum (see Figure 1), reflects the speculative behavior of investors and the sensitivity of this market to macroeconomic and regulatory developments. Furthermore, research by Kyriazis (2019) highlights that the interdependencies between major

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cryptocurrencies contribute to market contagion effects, meaning that the volatility of Bitcoin often propagates to other digital assets, amplifying systemic risk in the crypto ecosystem.

On the other hand, the institutionalization of cryptocurrencies has prompted governments, regulators, and financial institutions to explore frameworks for sustainable integration within traditional markets. As noted by Ante (2021), the increasing participation of institutional investors and the emergence of cryptocurrency derivatives signal a gradual maturation of this asset class. Nevertheless, regulatory uncertainty remains a central challenge in ensuring investor protection and market stability. In this context, Sorici et al. (2021) emphasize that the accounting and reporting of digital assets require updated methodologies aligned with international financial standards, as the transfer of financial transactions to blockchain-based platforms fundamentally transforms transparency and traceability in financial reporting. Therefore, the rationale for continued academic exploration lies in understanding how digital currencies can coexist with established monetary systems while addressing issues of governance, regulation, and technological trust.

"The analysis of the relationship between volatility and spillover effects among cryptocurrencies contributes to a better understanding of the information transmission mechanism in the crypto market, providing relevant data for market participants, such as investors" (Liu & Serletis, 2019). The advantages of cryptocurrencies are illustrated in Figure 2.

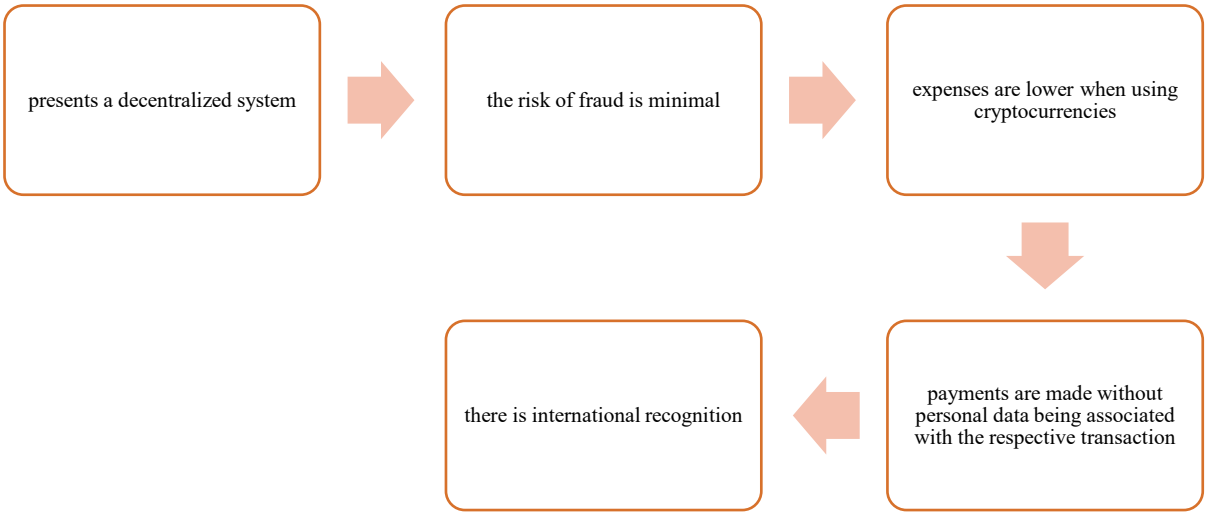

Figure 2. Advantages of cryptocurrencies

Source: own adaptation after Parasciuc (2019)

Since the launch of Bitcoin in 2009, the cryptocurrency market has expanded far beyond initial expectations, as evidenced by the existence of thousands of tokenized assets and daily trading volumes exceeding tens of billions of dollars. The popularity of cryptocurrencies is explained by their functionality as efficient payment systems, based on a decentralized distributed ledger, independent of both political processes and government regulations (Corbet et al., 2020).

"In recent years, the tendency of the number of financial institutions to include cryptocurrencies in their portfolios has accelerated; cryptocurrencies are the first pure digital assets to be included by asset managers. Although they have some commonalities with more traditional assets, they have their own separate nature and their behaviour as an asset is still in the process of being understood. It is therefore important to summarise existing research papers and results on cryptocurrency trading, including available trading platforms, trading signals, trading strategy research and risk management" (Fang et al., 2022).

From a macroeconomic perspective, cryptocurrencies can pose a risk to monetary and financial stability. However, from a microeconomic perspective, they involve a fairly high risk for investors, who could significantly reduce or even lose all of their invested money, based solely on volatility. However, the small size of digital currency schemes today does not pose any real risks to financial stability. Monetary stability risks could arise if a digital currency were to be widely adopted in its current form, but this is extremely unlikely (Anghelache et al., 2023).

II. RESEARCH METHODOLOGY

The research aims at bibliometric analysis of scientific papers on the topic of cryptocurrencies taken from the WoS database between 2014 and April 2025. The research strategy was grounded in accordance with the strategy approached by Chelba & Svetlana (2025) in their paper.

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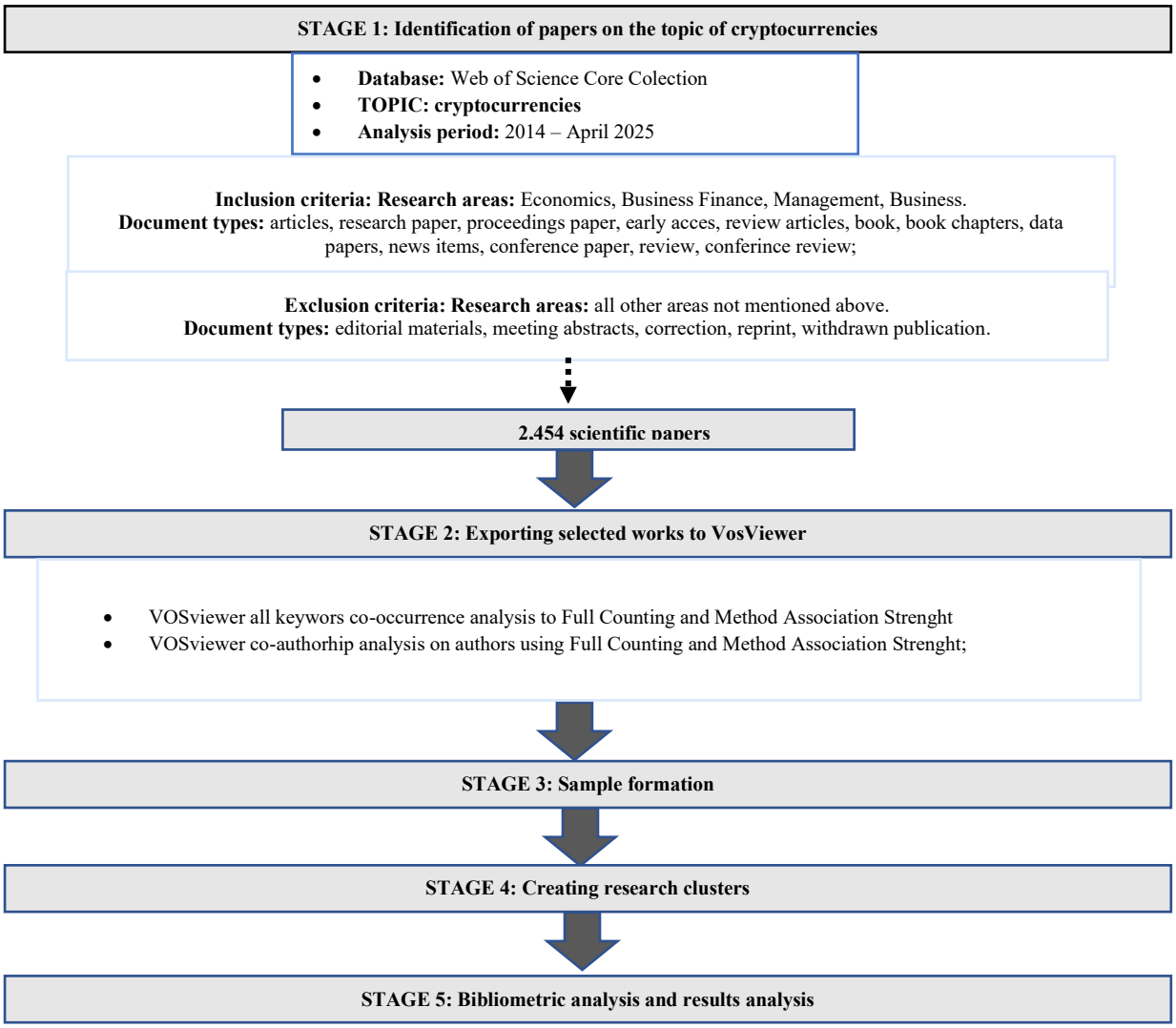

Figure 3. Stages of the research methodology
Source: authors' own elaboration

Bibliometric analysis is of essential significance in contemporary scientific research, as it provides an objective and systematic framework for evaluating and understanding academic production. Through it, both the volume and impact of publications can be measured, as well as collaborative relationships between authors, institutions or countries. This method goes beyond the simple quantification of publications, as it allows capturing networks of influence, dominant directions and emerging themes in a field of study. Bibliometric analysis of specialized literature allows for a rigorous systematization of all existing studies, thus generating research of considerable complexity and scope. The stages of the research methodology can be analyzed in Figure 3, there being five of them.

III. RESULTS AND DISCUSSION

3.1. Exploratory Bibliographic Study

The review of the specialized literature was carried out with the aim of highlighting the main bibliometric features emerging from the research conducted on the existence and functionality of cryptocurrencies in the context of the digital age, on an international scale. The study was carried out using a database established in the academic environment (Web of Science), following an investigation protocol that began with the formulation of the central research question: What is the current level of international literature on cryptocurrencies?

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ISSN 2344-102X
ISSN-L 2344-102X

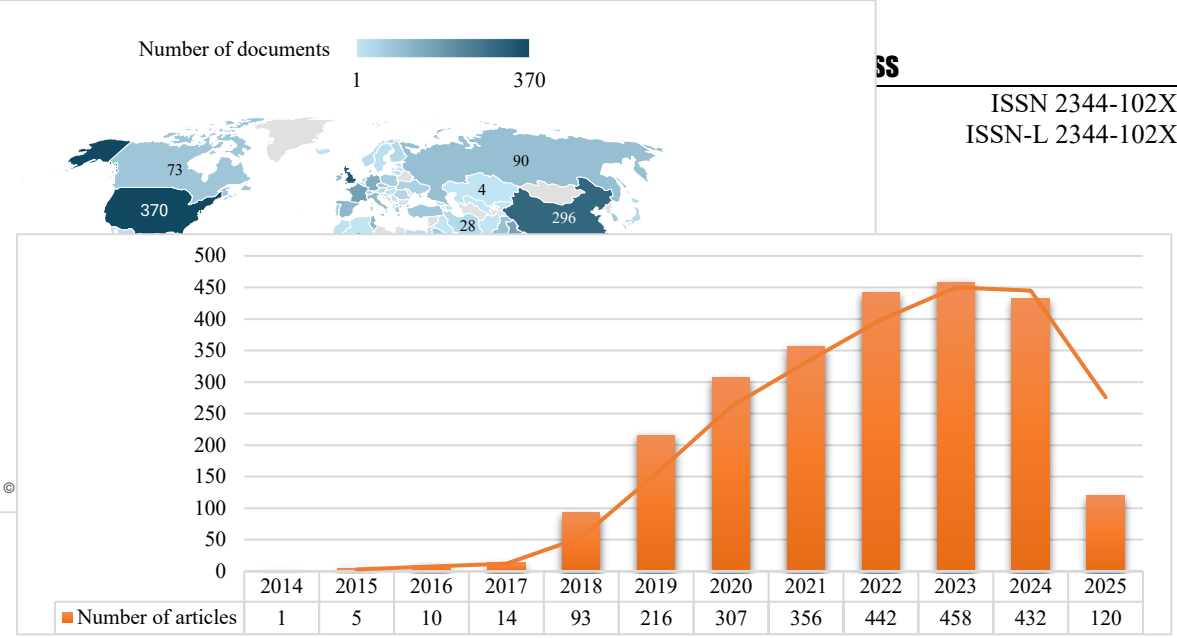

Figure 4. Temporal distribution of papers on cryptocurrencies indexed in WoS
Source: own research based on the WoS database

Figure 4 illustrates the temporal distribution of papers on the topic of cryptocurrencies during the analysis period 2014-April 2025. The peak of publications was in 2023, generally observing an increasing evolution, which makes us think that authors and researchers are increasingly interested in this topic.

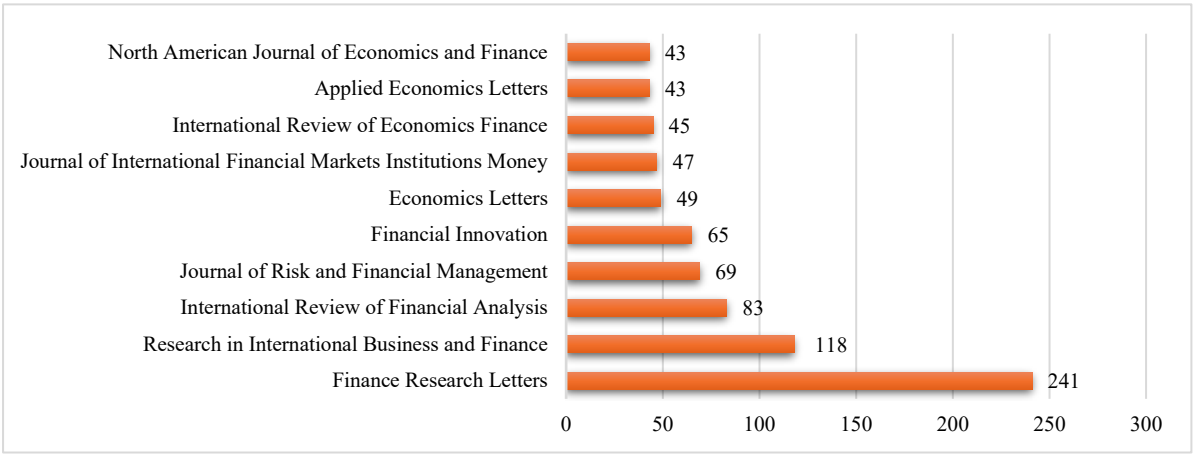

Figure 5. Top 10 publishing sources with the highest productivity on the topic of cryptocurrencies in WoS
Source: own research based on the WoS database

Figure 5 illustrates the top 10 publishing sources with the highest productivity on the topic of cryptocurrencies in the WoS database. It can be seen that the 1st place is occupied by Finance Research Letters with the most scientific papers in number of 241.

Figure 6. Total number of scientific studies published worldwide about cryptocurrencies, based on data

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from WoS

Source: authors' own elaboration in Microsoft Excel; icons taken from flaticon.com (see flaticon)

Figure 6 illustrates the total number of scientific studies published worldwide on cryptocurrencies, based on data from WoS. Places 1, 2 and 3 are marked with cryptocurrency-specific icons and are occupied by the USA, China and the United Kingdom. Next, the author citation network is analyzed.

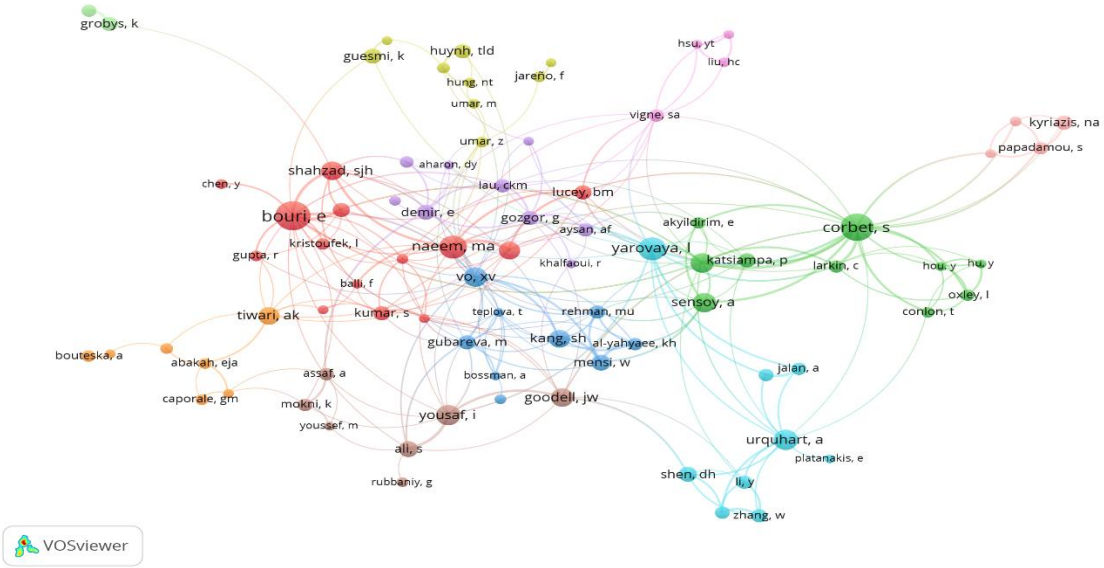

Figure 7. Map of authors addressing the topic of cryptocurrencies in WoS

Source: own elaboration using VOSviewer software

The analysis based on the 2,454 scientific articles indexed in the WoS database highlights a total of 4,664 unique authors; however, the network is restricted to 125 authors, namely those who met the minimum threshold of five publications. The network projected in Figure 7 represents the interconnection of researchers and collaborative efforts.

"VOSviewer is an appropriate tool for examining various types of data from bibliometric networks, such as citation relationships between publications or journals, collaboration relationships between researchers, or co-occurrence of scientific terms" (Van Eck & Waltman, 2011).

Table 1. Global ranking of the 10 most cited authors

First author	Paper	Journal	Year	Total citations
Corbet S	"Exploring the dynamic relationships between cryptocurrencies and other financial assets"	*"Economics Letters"*	2018	822
Gomber P	"On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services"	*"Journal of Management Information Systems"*	2018	762
Cheah ET	"Speculative bubbles in Bitcoin markets? An empirical investigation into the fundamental value of Bitcoin"	*"Economics Letters"*	2015	760
Corbet S	"Cryptocurrencies as a financial asset: A systematic analysis"	*"International Review of Financial Analysis"*	2019	613
Corbet S	"The contagion effects of the COVID-19 pandemic: Evidence from gold and cryptocurrencies"	*"Finance Research Letters"*	2020	545

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First author	Paper	Journal	Year	Total citations
Klein T	"Bitcoin is not the New Gold - A comparison of volatility, correlation, and portfolio performance"	*"International Review of Financial Analysis"*	2018	478
Thakor AV	"Fintech and banking: What do we know?"	*"Journal of Financial Intermediation"*	2020	445
Demir E	"Does economic policy uncertainty predict the Bitcoin returns? An empirical investigation"	*"Finance Research Letters"*	2018	442
Foley S	"Sex, Drugs, and Bitcoin: How Much Illegal Activity Is Financed through Cryptocurrencies?"	*"Review of Financial Studies"*	2019	401
Corbet S	"Datestamping the Bitcoin and Ethereum bubbles"	*"Finance Research Letters"*	2018	399

Source: own research based on the WoS database

Table 1 lists the names of the authors with the highest citation visibility, along with the journals where they published their articles.

3.2. Bibliometric Analysis of the Researched Subject

To further explore the topic of cryptocurrencies, the keyword co-occurrence visualization, Figure 7, shows a network of interconnected terms. Each node represents a keyword, and the lines connecting them indicate the frequency with which these keywords co-occur in the analyzed documents. The size of the nodes corresponds to the frequency of the keywords, while the thickness of the lines represents the strength of the association between them.

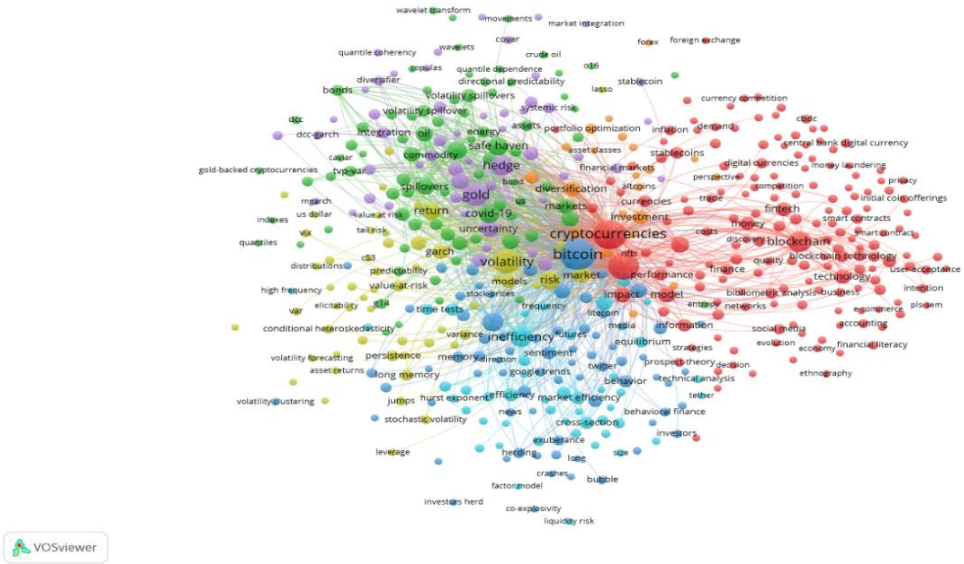

Figure 8. Cryptocurrency keyword map on WoS (2014–April 2025)
Source: own research based on using VOSviewer software

The 509 most relevant terms were selected from a total of 5,009. This threshold was chosen to best include terms with high significance in the context of the research. Thus, the keywords "cryptocurrency", "bitcoin", "volatility" and "blockchain" are at the center of the network, indicating strong connections with other associated terms.

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Table 2. The 7 clusters included in the cryptocurrency analysis

Clusters	The most relevant key terms	Occurrences	Total Link Strength	Main Topic
Cluster 1 red (171 items)	banking	12	84	Cryptocurrencies
	banks	5	26	
	blockchain	252	1185	
	Central Bank	10	34	
	cryptocurrencies	823	5084	
	digital currencies	22	132	
	economics	97	783	
	finance	26	152	
	Fintech	65	417	
	monetary policy	12	63	
Cluster 2 green (81 items)	Covid-19 pandemic	145	1066	Connection
	connectedness	131	1086	
	crisis	19	150	
	financial market	7	53	
	geopolitical risk	8	49	
	predictability	17	143	
Cluster 3 dark blue (74 items)	Bitcoin	1070	7143	Bitcoin
	cryptocurrency market	34	233	
	investors	11	82	
	price	58		
Cluster 4 yellow (55 items)	currency	33	239	Volatility
	return	106	945	
	risk	160	1261	
	volatility	419	3244	
Cluster 5 purple (53 items)	BRICS	5	44	Gold
	gold	299	2615	
	precious metals	12	120	
	uncertainty	98	858	
Cluster 6 light blue (47 items)	efficiency	49	382	Inefficiency
	inefficiency	192	1548	
	liquidity	78	576	
	market efficiency	42	287	
Cluster 7 orange (21 items)	diversification	74	607	Diversification
	investment	65	569	
	portfolio diversification	38	303	

Source: own research

Table 2 includes the 7 clusters present in the cryptocurrency analysis.

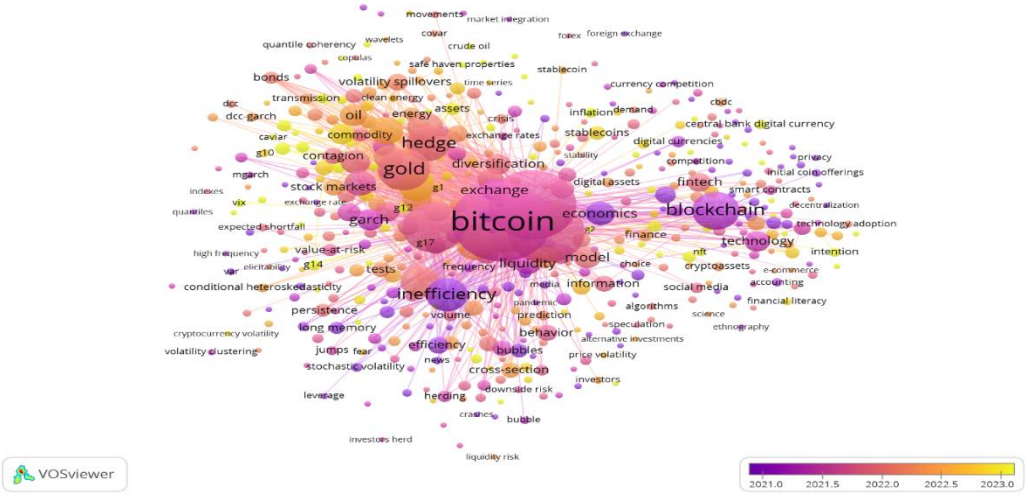

Figure 9. Cryptocurrency keyword co-occurrence map
Source: own research based on using VOSviewer software

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In Figure 9 the colors of the nodes and lines mark the temporal dimension: purple for older occurrences, from 2021 (e.g. blockchain, inefficiency, efficiency, economics); pink for terms encountered between early and mid-2021 (Bitcoin, cryptocurrencies, volatility, Fintech); orange for more recent occurrences, from 2022 and the first half of 2022 (connectedness, Covid-19, stocks, stock markets); and yellow for the most recent terms, used in 2023 (bibliometric analysis, financial stability, inflation, gold price).

IV. CONCLUSION

Peculiarity of cryptocurrencies lies in the fact that, as a rule, they are not issued by a centralized authority, which is why many investors consider them resistant to manipulation attempts or government interventions. Their creation and security are based on blockchain technology, a state-of-the-art digital solution. Thus, cryptocurrencies represent specific financial instruments that operate on the basis of blockchain technology and are currently used by an increasing number of people as a means of payment and investment.

In terms of bibliometric analysis, this research surprises that the number of publications on the topic of cryptocurrencies is increasing between 2014 and April 2025. The countries most interested in this topic were the USA, China and the United Kingdom. We can say that the expansion and evolution of cryptocurrencies-related technologies generate certain effects on the macroeconomics, money supply and financial aggregate. Blockchain-based solutions reduce transaction costs, and this can increase the level of prosperity.

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ACKNOWLEDGMENT

The paper was presented at the first edition of NEO Entrepreneurship International Conference, held online on 5 June 2025, Romania.