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A Bibliometric and Content Analysis of Cryptocurrency

Adnan Ramzan[1], Hina Amir[2], Muhammad Atiq ur Rehman[3], Maida Ashraf[4]

[1] Ph.D. Scholar, Department of Economics and Commerce, Superior University Lahore, Pakistan. Email: principalleadsbp@gmail.com
[2] Assistant Professor, COMSATS University Lahore, Pakistan. Email: hinaamir@cuilahore.edu.pk
[3] Assistant Professor/Adjunct Faculty, Higher Education Department Punjab, Superior University, Lahore, Pakistan. Email: atiq164@live.com
[4] Research Scholar, COMSATS University Lahore, Pakistan. Email: maidaashraf430@gmail.com

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ABSTRACT

The findings of our extensive review of the cryptocurrency literature from 2010 to 2022 are presented in this report. We cover the definitions, history, uses, and distinctive activities of the cryptocurrency business in our overview. We initially conducted a bibliometric analysis on articles acquired from the Scopus database using the VOSviewer bibliometric and R package tool in order to identify the two main streams of cryptocurrency literature. Then, we conducted content analyses on pertinent publications from reputable sources. We also found gaps in the literature and suggested seven research areas that should be addressed in follow-up studies to improve understanding of the cryptocurrency sector. Researchers researching at the numerous sides of cryptocurrencies to increase our understanding of this industry may find the findings of this paper to be a helpful resource.

Corresponding Author's Email: principalleadsbp@gmail.com

1. Introduction

Cryptocurrencies have been a major and contentious topic in economics literature for more than 5 years. It is an interesting part to study for academics and industry experts due to its macroeconomic inferences and institutional-level rank. Virtual currency, such as cryptocurrency, has carved out a unique niche for itself in the international financial markets since its prompt rise and dissemination. The marketplace capitalization of cryptocurrencies extended to 798 billion U.S. dollars till December 2022 where it was only barred to 1 billion U.S. dollars in 2013. Due to this circumstance, the impact of crypto markets on practical finance has acknowledged a lot of consideration in current years from academics, the press, governmental agencies, and the financial industry etc. In spite of their significant explosive nature, cryptocurrencies are budding in approval on the universal financial markets (Colon et al., 2021). According to Katsiampa (2017) the price movement of cryptocurrencies is quite volatile because of the enormous incentives. You may safeguard yourself with Bitcoin against a diversity of hazards, including those linked with the market efficiency, foreign exchange, and things. Cryptocurrency can also have an important influence on market efficiency and monetary policy (Claeys, Demertzis, & Efstathiou, 2018; Corbet, McHugh, & Meegan, 2014; Kakinaka & Umeno, 2022; Noda, 2021). Cryptocurrencies' operation depends on a number of variables, such as market efficiency and monetary policy perspectives, before it can ever be said that they are secure (Nelson, 2018; Stevens, 2017; Wei, 2018; Y. Zhang et al., 2020). According to Sahoo and Sethi (2022), the inclusion of cryptocurrencies in an investor's portfolio will help it become more diversified.

Our goal was to document the variety of viewpoints and defenses presented in the literature on cryptocurrency. As a result, our main goals were to analysis the evolution and structure of cryptocurrency research, discover the key study areas, and compile the most pertinent information at this time. Inconsistencies in earlier investigations are also presented, along with potential causes. Finally, we point out gaps in the literature on cryptocurrencies and

discuss the necessity for additional research. On the bitcoin articles we gathered, bibliometric and content analysis were performed. The bibliometric analysis of cryptocurrency research reveals the most frequent keywords as well as the most significant studies, authors, and sources. We offer key points from each of the two distinct study streams that our content analysis of the cryptocurrency literature identified. That is, we showed a bibliometric analysis on the relevant literature we had received from the Scopus database first, and then we directed a content analysis on the most important and relevant articles that had been identified. Due to the dearth of review studies on the literature related to cryptocurrency, this study adds to it. Because it offers mutually bibliometric and content analyses of cryptocurrency examination from 2010 to 2022, this review is unique. It also adds to the ground by pointing out 7 research issues that need to be solved in next cryptocurrency studies. The left behind paragraphs of the article are planned as tracks: The unit under "An explanation of cryptocurrency" provides a general overview in addition to details on the terminology, history, and goals of the cryptocurrency sector. In the second half of the study, the "methodological approach" is explained, and in the third unit, the results of the "bibliometric analysis" are untaken. In the fifth unit, we introduce "Content analysis," review each research stream, and provide summaries of the key articles for that stream. Each of the extra seven research subjects is fully explained in the "Content analysis" section. In the "Conclusion" section, we offer our comments on the cryptocurrency market and potential directions for scholarly research.

1.1. An explanation of cryptocurency

1.1.1. The meanings of cryptocurency

The definition of cryptocurrency varies among scholars. Even if there is argument over the use of "virtual currency" as a alternative word for "cryptocurrency," several persons still practice terms similar "virtual money," "crypto-assets," "virtual assets," "virtual tokens," etc. as replacements (Стойка, 2021). A dispersed compassionate of money recognized as cryptocurrency usages cryptographic acts to bring out monetary dealings (Doran, 2014). Dibrova (2016), the only distinction between Virtual Currency and the value is that the latter is a digital version, while the former is not. This digital currency can be conveyed, saved, and castoff in automatic dealings; it is not connected to a particular general currency and is proposed to be acknowledged as payment by some people. Cryptography, not people or belief, is typically the foundation for cryptocurrencies' security (Narayanan et al., 2016). For example, "Elliptic Curve Cryptography" is a procedure that Bitcoin employs to protect the security of its dealings (Wang, He, & Ji, 2020).

1.1.2. Development of cryptocurrencies

David Chaum, a cryptographer, is the first person to mention virtual currency. He created the cryptography technology known as e - cash in 1983. He created another system, called Digi -Cash, twelve years later that used cryptography to protect the privacy of financial transactions. However, the idea or saying "cryptocurrency" was leading jumble-sale in 1998. Wei Dai ongoing bearing in mind forming a innovative disbursement scheme that operated a cryptographic technology and whose major article was decentralization that year. The leading cryptocurrency, Bitcoin, was established in 2009 by a person whose self is silent unidentified. His area was to develop a new method of payment that could be hand-me-down worldwide, was autonomous, and was not supported by any financial institutions. A general-purpose digital currency created to serve as a means of exchange? Twenty years ago, this was unheard of and considered to be practically impossible; but, now, 3 in 4 people use cryptocurrencies, and between 2.9 and 5.8 million Americans alone have invested with the hope of enhancing their financial status in the future. The creations of the digital currency, the first digital money in history, manifest the opening of cryptocurrencies. Since its initiation, cryptocurrency's value has flowed and it has been labeled "digital gold" by its operators. Its fundamental area was to provide a harmless and set apart method of exchanging money between individuals. In order to maintain the currency's secrecy, a software developer going under the nickname Satoshi Nakamoto originally created Blockchain, the electronic record of Bitcoin transactions. At this point, Satoshi Nakamoto had to invent something fresh. A little while later, a real-time gross settlement system called Ripple was unveiled. Money can be moved between two people almost rapidly and directly because to the currency's design. Any form of money, including approval money, gold, and even scheduled carrier miles, can be dealt. They claim they may transact in cryptocurrencies outside of exchanges without incurring fees or standing in queue. This digital asset is presently utilized by banks all over the world as a result of its growing prominence in the sector.

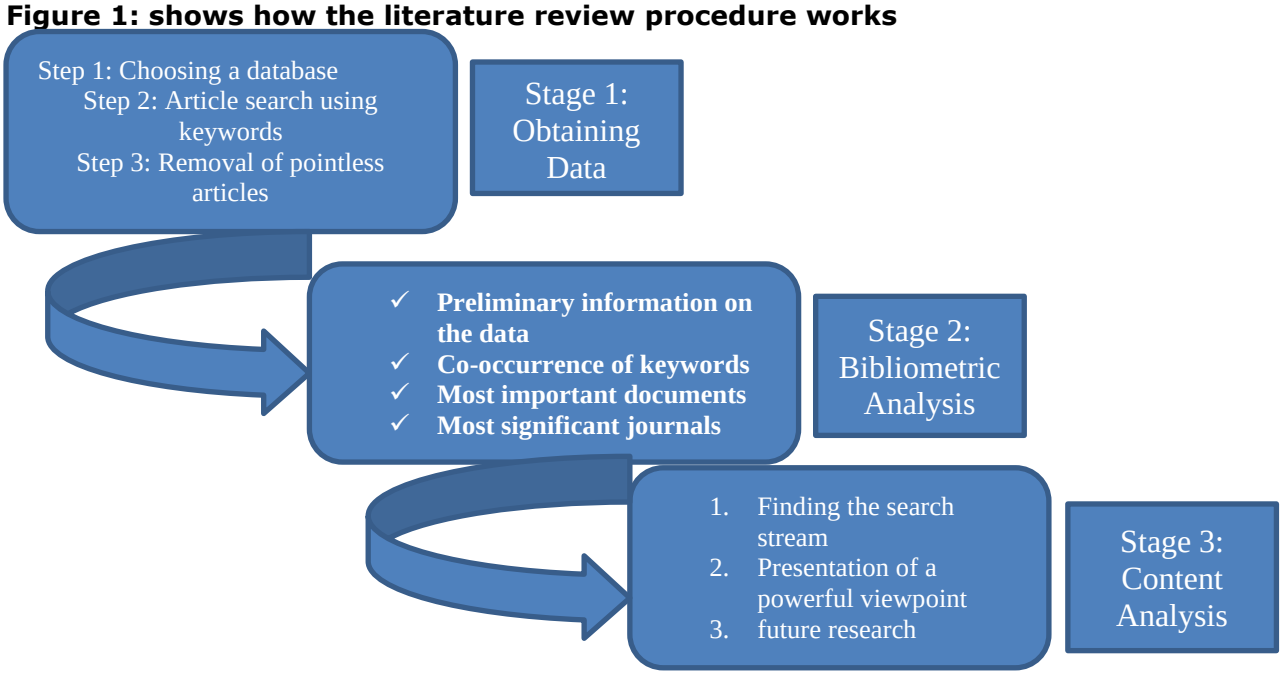
1.1.3. Activities and Functions of Cryptocurrency

There are two main purposes for crypto. Similar to traditional money, it can be used as a valid method of payment for products and services. It also serves as an investment as a secondary purpose. Both roles have advantages and disadvantages. In a transaction, money is moved between two digital wallets. These transactions are accepted by the public ledger, which is awaiting confirmation. The transactions are carried out with the aid of an encrypted electronic signature. The cryptographic signature, often known as an electronic signature, is a piece of encrypted data. It offers a mathematical justification for the transaction being processed from the owner's wallet. While the miners are engaged in their mining activity, the confirmation process takes about 10 minutes. The transaction is verified by the mining process, which also adds it to the public ledger (Soni, 2020).

2. Methodology

Our method of reviewing the literature on cryptocurrency includes bibliometric and content analysis. Numerous literature review studies have used the bibliometric analysis method (Alsmadi et al., 2022; García-Corral et al., 2022; Jalal, Alon, & Paltrinieri, 2021; Naatu & Alon, 2019). In business, economics, and finance literature, the content method of analysis is frequently used (Kumar et al., 2023; Lohmer, Ribeiro Da Silva, & Lasch, 2022; Sitthipon et al., 2023; Xie, Huo, & Zou, 2019). Jeris et al. (2022) earlier used the similar combined approaches strategy. In Figure1, the methodology for this study's literature review is shown. We divided the review into three phases. First, we gathered the 7473 papers that the SCOPUS database returned when we searched for "cryptocurrency" because it is a huge archive of published research with peer review (Burnham, 2006; Mongeon & Paul-Hus, 2016; D. Zhang et al., 2020). After filtering the papers according to title and importance and adapting the SCOPUS Excel document, we discovered 541 publications in the literature of the cryptocurrency area of economics. We manually searched the SCOPUS journals for economics to make sure no important papers were missed and to validate that articles that were vetted out were, in statement, unrelated to our study. Bibliometric examination of the 541 papers was the focus of stage two of our review procedure, which used the VOSviewer software. Van Eck and Waltman (2010) and R Package bibliomatric Aria and Cuccurullo (2017) created the bibliometric analysis tool VOSviewer and R Package bibliomatric that lets you generate and view bibliometric plots. It may present such records in a variety of methods, every one of which highlights various characteristics. This instrument has been formerly nearly new by Donthu et al. (2020), Geng, Feng and Zhu (2020), Passas (2024). We norm it look at 6th features of the literature on cryptocurrency. We did content analysis as part of the 3rd step of the analysis manner and by hand recognized two divergent study brooks based on pertinent keywords and a wary analysis of the summaries. The techniques, which are clearer covered concurrently with the results in the portions that follow, are covered in more detail.

Figure 1: shows how the literature review procedure works



3. Bibliometric Analysis

We looked at how often each keyword appeared in the literature on cryptocurrencies. We also looked at the sources, authors, and papers that received the most citations. Furthermore, in order to identify shared sources amongst publications, we used bibliographic coupling. The sections that follow include the findings of the bibliometric analysis.

3.1. Introductory statistics

The ultimate sample of 541 publications was shaped by 1117 writers in 193 journals, with an average of 25.79 citations per piece. Figure 2 displays the total number of publications and figure 3 citations affecting to the cryptocurrency over time. The most inventive year was 2022, but the number of articles written has been rising. Additionally, it should be mentioned that most article citations were acquired in 2016.

Figure 2: Annual Scientific Productions

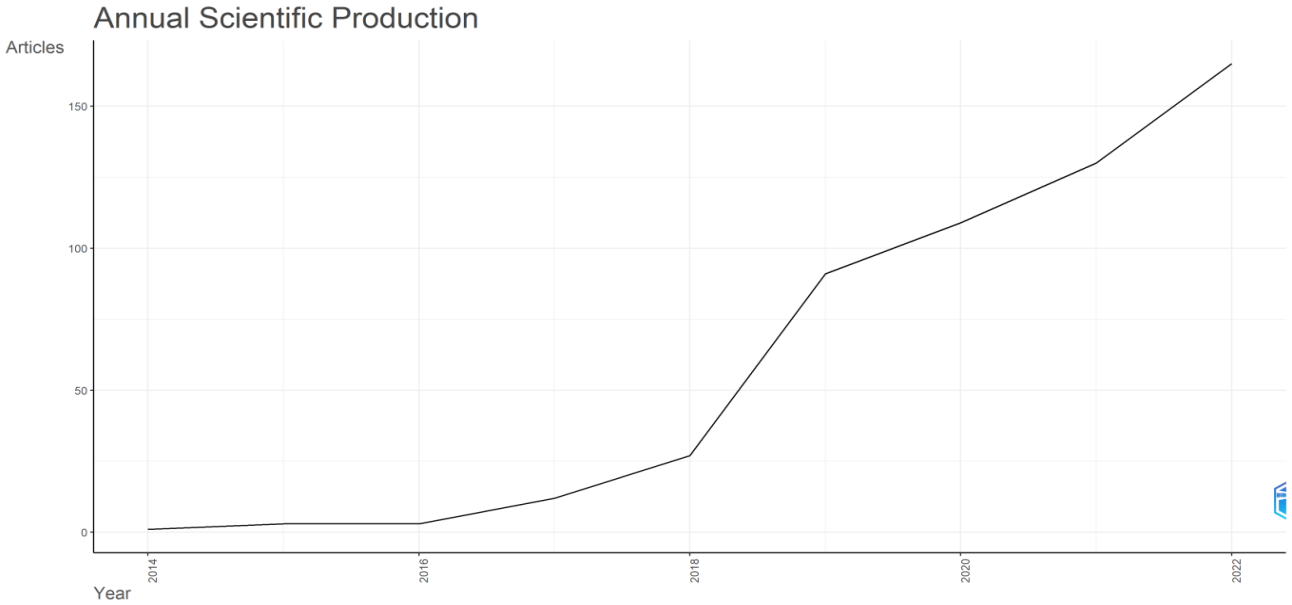
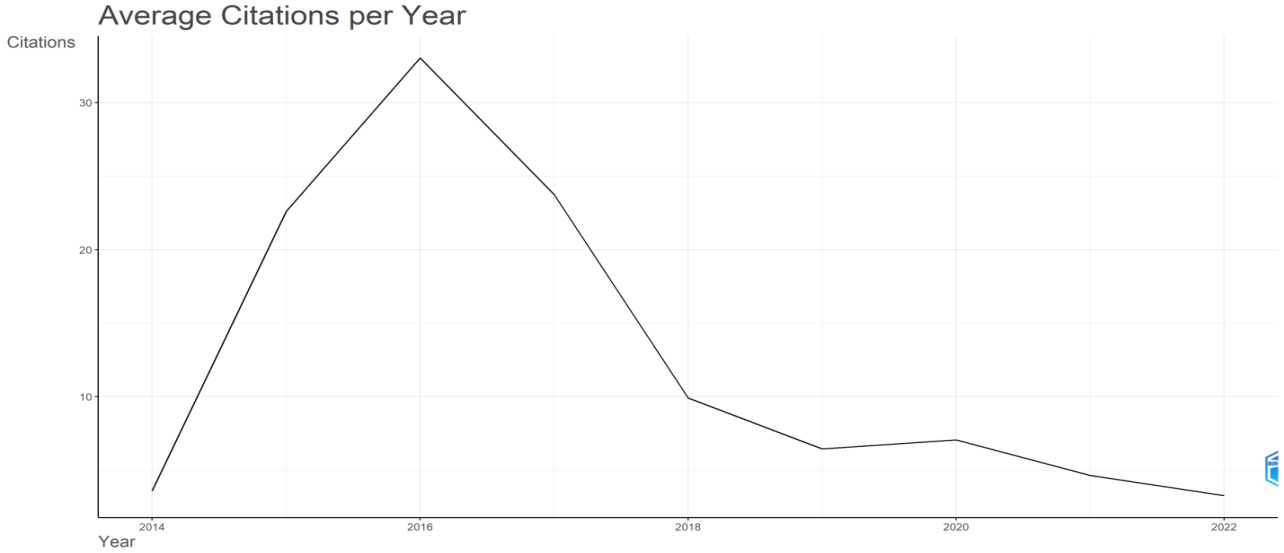


Figure 3: Average Citation per year

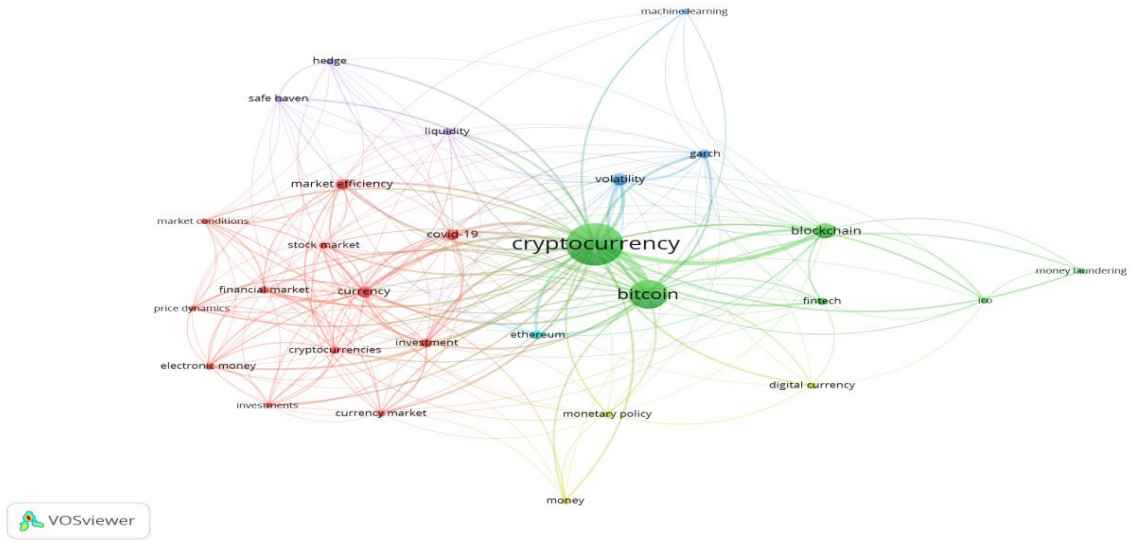


3.2. Co-occurrence of keywords

The standard, which we set at 10 as the least number of techniques a term can seem, was met by 28 of the 1456 keywords. There are many diverse themes covered in the literature on cryptocurrencies, and over time, 1456 keywords have become often employed in this sports ground. In Figure. 4, the number of nodes resembles to the rate of recurrence of the keyword (Van Eck & Waltman, 2010; Van Eck & Waltman, 2014). The numeral hence shows that the word "Cryptocurrency" was the most commonly used of the 28 keywords recognized. Other commonly used terms include "monetary policy," "market efficiency," "investment," "fintech," "stock

market," "blockchain," "financial market," "COVID – 19," "currency market," "garch," "electronic market," "digital currency," "liquidity, "and "money laundering." It became clear from the results that the terms "cryptocurrency" and "bitcoin" had the strongest relationship. Additionally, it was discovered that "cryptocurrency" was strongly associated with "blockchain," "currency," "volatility," "investment," "COVID-19," and "market efficiency." According to these findings, the most prevalent worries about cryptocurrencies are the blockchain, bitcoin, and market efficiency.

Figure 4: shows a network map of all the keywords' co-occurrences. Source: Authors' best judgment



3.3. Most important documents

In order to discover the most frequently mentioned publications in the cryptocurrency literature, we restricted the exploration to bringing back booklets that were cited at least 15 intervals. 10 of the 218 articles meet the criteria. Table 1 displays these 10 articles from the literature on cryptocurrencies. The diagram of networks generated from the most frequently referenced articles is shown in Figure 5. We discovered that Urquhart (2016) publication had the highest citations; yet, it is not linked to the group of 218 related papers depicted in Figure 5. Also, Bouri et al. (2017) Acharya et al. (2013), Katsiampa (2017), Dwyer (2015), and Conlon, Corbet and McGee (2020) are not included in the related collection either, despite being one of the top 10 most mentioned documents.

Table 1: highest-cited cryptocurrency documents

References	Number of citations	References	Number of citations
Urquhart (2016)	702	Yi, Xu and Wang (2018)	222
Bouri et al. (2017)	651	Urquhart (2017)	218
Katsiampa (2017)	527	Polasik et al. (2015)	208
Dwyer (2015)	402	Wei (2018)	198
Conlon, Corbet and McGee (2020)	274	Phillip, Chan and Peiris (2018)	196

Figure. 5: A network map of the cryptocurrency documents with the highest citation counts. Source: Authors' best judgment

3.4. Most significant journals

The most dominant journals were acknowledged via the R Package software. We categorized the topmost 5 journals into two sets: those that printed the most articles on the topic (Table 2) and those that usual the most citations (Table 3). In the case of the maximum number of articles printed, the most leading journal was Finance Research Letters with 75 articles wrapper 13.86% of the whole publications, subsequently economics letters (26, 4.81%), research in international business and finance (23, 4.245%) and international review of financial analysis (19, 3.51%). In terms of top citations received, Finance Research Letters and economics letters again endured highest two most effective journals with 3374 and 2534 citations correspondingly.

Table 2: most published Journals

Rank	Source	Publication
1	FINANCE RESEARCH LETTERS	75
2	ECONOMICS LETTERS	26
3	RESEARCH IN INTERNATIONAL BUSINESS AND FINANCE	23
4	INTERNATIONAL REVIEW OF FINANCIAL ANALYSIS	19
5	APPLIED ECONOMICS	14

Table 3: most published Journals

Rank	Source	Citation
1	FINANCE RESEARCH LETTERS	3374
2	ECONOMICS LETTERS	2534
3	RESEARCH IN INTERNATIONAL BUSINESS AND FINANCE	813
4	INTERNATIONAL REVIEW OF FINANCIAL ANALYSIS	666
5	JOURNAL OF FINANCIAL STABILITY	487

3.5. Most powerful authors

The supreme powerful authors of the study are accessible in Table 4. Corbet s was the best creative author, published 16 articles and Articles Fractionalized 4.52. Followed by, Grobys K published 9 documents with Articles Fractionalized 4.42. Bouri E,Lucey B,Roubaud D and Urquhart A had 8 documents each although Urquhart A had the Articles Fractionalized 3.75 among them.

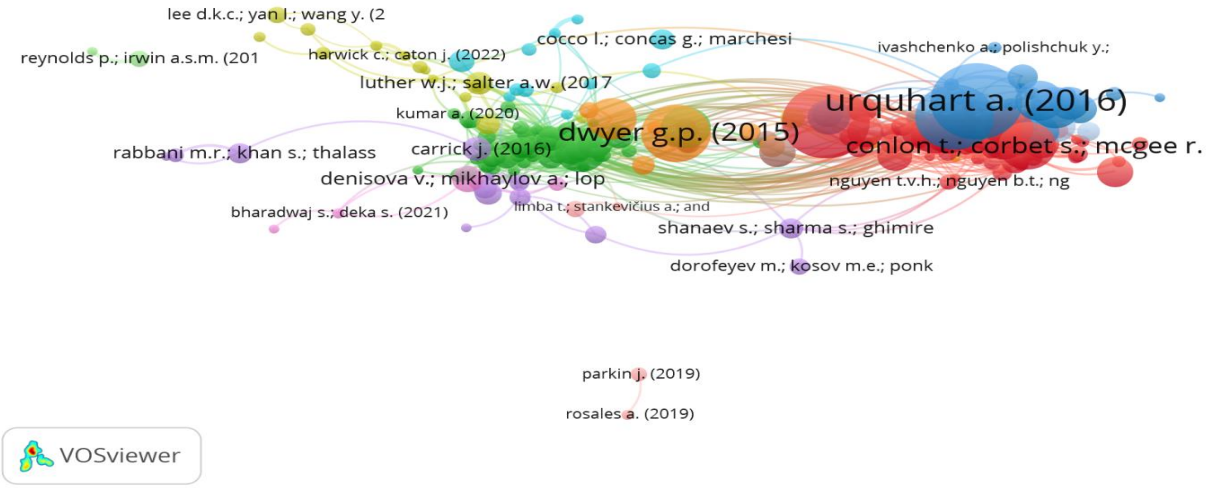
Table 4: most influential authors

Rank	Author	Publication	Articles Fractionalized
1	CORBET S	16	4.52
2	GROBYS K	9	4.42
3	BOURI E	8	2.20
4	LUCEY B	8	2.37
5	ROUBAUD D	8	2.20
6	URQUHART A	8	3.75
7	KATSIAMPA P	7	4.67
8	ZHANG S	7	2.33
9	SAPKOTA N	6	2.42
10	LARKIN C	5	1.15

3.6. Bibliographic document coupling

The makers of VOSviewer recommend that bibliographic coupling results represent the overlap of references between publications. The strength of the link between two papers increases with the number of shared references between them. We limited this study to only include publications with at least 10 citations, which produced 277 articles. Only 260 articles were discovered in the related collection, though. The figure 6 displays a imagining of the bibliographic coupling of papers in the cryptocurrency network. Flori (2019a) was identified as having the highest total bibliographic coupling connection power (516 with 11 citations). The following are the highest 5 additional articles. The first value is the total link strength for each article, while the second number represents the total number of citations. Flori (2019b) [382,14], Panagiotidis, Stengos and Vravosinos (2019) [278,68], Katsiampa (2019) [269,66], Huynh, Burggraf and Wang (2020) [256,27], Eross et al. (2019) [236,53].

Figure 7: shows the network visualization of the linking of papers' bibliographies



Source: Authors' best judgment

4. Content Analysis

4.1.1. Main study streams

We ensured that no significant document was omitted from the conversation by ranking the documents according to their applicability to our problem during the content analysis phase. By scanning the subject study abstracts for the thematic keywords mentioned in the previous studies, we were able to pinpoint three key research areas in the cryptocurrency literature. It helps to visualize the aspects of cryptocurrency that have been investigated during the course of its development to group the study streams. However, given the interdisciplinary nature of cryptocurrency research, we agree that certain works belong to numerous streams. Tables 4, 5, and 6 provide summaries of the key arguments in each stream. The next three parts include descriptions of the articles and their findings.

4.1.2. Determinants of cryptocurrency

The first empirical investigation on the factors that influence cryptocurrency was carried out by Teichmann and Falker (2020). The outcomes were then put to a quantitative test. The unique Liechtenstein blockchain statute is then addressed in depth, along with how the legislation can help create a global standard for blockchain regulation. In that study, a qualitative research involving ten suspected money launderers and 18 deterrence specialists was done to look into the specific techniques that money launderers employ. Fasanya, Oyewole and Odudu (2020) identified linear correlations between several macroeconomic indices and cryptocurrencies. The authors show that there is a sizable difference between the volatility spillover indexes and return indices for bitcoin portfolios in excess of period. The authors discover indication of reliance among cryptocurrency holdings using the overflow catalogs. While the reoccurrence surplus catalog demonstrates improved incorporation among currency sets, the explosiveness spillover index displays enormous bursts during significant market disasters. Return spillovers and volatility spillovers, in particular, show some interesting trends and bursts. Ahmed, Grobys and Sapkota (2020) discussed the effect of applied tradeoff profitability and other issues on the function of cryptocurrencies in funding the short-term and long-term crypto markets. The "privacy function" is displayed by the top ten cryptocurrencies. Simple moving average trading strategies are examined. These five coins' daily price data are used. Our examination of the 2016–2018 time frames demonstrates that a variable moving average strategy works well in specific circumstances. Sukumaran, Bee and Wasiuzzaman (2022) performed another study on cryptocurrencies in Malaysia, this time using the decision of adopting cryptocurrencies as the dependent variable. There were two independent variables: perceived value and perceived risk. Dupuis and Gleason (2020) also debated that the technique for analyzing noteworthy topical trials, the accessibility of "fintech" crime-fighting utensils, and the analysis of recent significant events is a literature review concentrating on the solicitation of the controlling conflict to advancements in current crypto-asset markets that make them alluring to money launderers. Corbet et al. (2020) Furthermore, it was found that trade volumes and returns had significantly

increased, indicating that major cryptocurrencies have performed the function of a store of value throughout this extremely stressful period for the financial markets. Hou et al. (2020) discovered that a sizable part of price spikes is contemporaneously and highly anticorrelated with volatility jumps. Sabah (2020) investigated that a key factor in the volatility of cryptocurrencies is the number of emerging markets. Additionally, sites in Europe, North America, and Oceania as well as those that don't reveal the nature of their operation raise the volatility of cryptocurrencies. The essential points in the literature on the determinants of cryptocurrency are presented in Table 5.

Table 5: Important literature on determinants of Cryptocurrency

References	Journal	Country	Key opinions/outcomes
(Teichmann & Falker, 2020)	Journal of Money Laundering Control	Switzerland	Money launderers continue to often employ cryptocurrencies like Bitcoin as tools for monetary offense. The Blockchain Act of Liechtenstein could oblige as a template for policymakers working to address the issue globally.
(Fasanya, Oyewole, & Odudu, 2020)	International Journal of Managerial Finance	South Africa	The authors designate that the volatility and return overflow metrics for bitcoin portfolios fluctuate meaningfully over time. Based on the spill indicators, the authors notice suggestions of necessity among cryptocurrency holdings. The volatility spillover index demonstrations enormous spikes during major market crises, whereas the return spillover index shows better integration across currency portfolios. The return and impact of volatility exhibit both trends and bursts, which is interesting to note.
(Ahmed, Grobys, & Sapkota, 2020)	Finance Research Letters	Finland	Our technical trading rules show that, overall, basic technical trading rules do not provide gains above a buy-and-hold strategy when all 10 privacy coins are used combined.
(Sukumaran, Bee, & Wasiuzzaman, 2022)	*Risks*	Malaysia	According to the results, adoption of cryptocurrencies was found to be significantly influenced by perceived value. Nevertheless, perceived danger had little bearing on Malaysian investors' acceptance of cryptocurrencies.
(Dupuis & Gleason, 2020)	Journal of Financial Crime	Sharjah	The authors look at recent "closed doors," evaluate how cryptocurrencies are being used illegally using Kane's rules logic paradigm, name several crypto-to-fiat exchange options that are still open to those looking to use digital coins as tools for money laundering, and offer suggestions for how to regulate the crypto-related markets to help make them less appealing to potential criminals.
(Corbet et al., 2020)	Economics Letters	Ireland	We discover indication of a substantial rise in yields and exchange bulks, signifying that key cryptocurrencies assisted as a store of value during this period of extreme financial market stress. Furthermore, it is discovered that the negative temper surrounding COVID-19 has a substantial influence on cryptocurrency returns. Results indicate that these digital assets served as a safe haven during historical crises, comparable to how precious metals served as a safe haven, in addition to offering investors benefits from diversification.
(Hou et al., 2020)	*Journal of Financial Econometrics*	Sweden	We demonstrate that a considerable share of rate fences are contemporaneously and negatively linked with volatility jumps. Our paper includes innovative examination of BTC alternative valuing. We validate how the valuing system suggested emphasizes the significance of spikes in CC markets.

(Sabah, 2020)	Finance Research Letters	United States	We discover that a key factor in the volatility of cryptocurrencies is the number of new sites. Additionally, venues in Europe, North America, and Oceania as well as those that don't reveal the nature of their operation raise the volatility of cryptocurrencies. Our deductions are reinforced by Granger-causality, VAR estimation, and a nearly natural trial.

4.1.3. Cryptocurrency and monetary policy

Corbet, McHugh and Meegan (2014) investigate how modifications in global monetary policy impact bitcoin returns, a GARCH (1.1) estimate ideal was used. The outcomes demonstrate that interest rate-based monetary policy choices made by the Federal Open Market Group have a important influence on bitcoin returns. After correcting for global conditions, we find compelling evidence that the announcements of quantitative easing from the US, EU, UK, and Japan had an impact on volatility. Sauer (2016) suggested that the popularity of virtual currencies is primarily driven by two causes. Major, as a gripe against monetary policy choices made by authorities, and second, as a remedy for shortfalls in some monetary structures brought on by political unrest or other factors. Krivoruchko, Ponamorenko and Nebera (2018) empirically examined financial regulators should be aware of the potential for cryptocurrency contagion in order to protect public confidence and promote the creation of public goods. Central bankers generally have not come to a consensus over how to handle cryptocurrencies, despite the fact that this is their primary role. Fama, Fumagalli and Lucarelli (2019) studied the point that the public and private segments are paying more and more courtesy to cryptocurrencies and the underlying skills behind them suggests that they may have the authority to basically vary the way we contemplate about currency. Nguyen et al. (2019) analyses the uneven effects of monetary policies on cryptocurrency returns under regimes of monetary constriction v/s easing. Interestingly, we discovery that four main cryptocurrencies, including Bitcoin, significantly respond to Chinese monetary policy tightening; nevertheless, U.S. monetary policy has little effect on cryptocurrency returns. Table 6 presents the main points made in important works on cryptocurrencies and monetary policy.

Table 6: Key literature on Cryptocurrency and monetary policy

References	Journal	State	Key opinions/outcomes
(Krivoruchko, Ponamorenko, & Nebera, 2018)	Journal of Reviews on Global Economics	Russia	Private cryptocurrencies have grown to be an essential component of the financial industry. With respect to cryptocurrencies, fundamental banks acquired a variety of arrogances, from absolute denial to non-intervention. We discovered a common and predominating pattern in the central bank's strategy to steer the advancement of cryptocurrency through limitations, stringent monitoring, and licensing.
(Corbet, McHugh, & Meegan, 2014)	Investment Management and Financial Innovations	Ireland	According to the findings, the Federal Open Market Committee's monetary policy decisions in the US have a big impact on bitcoin yields. These results are founded on interest rates. After adjusting for global factors, we realize stout indication of impulsiveness sound effects triggered by quantitative easing statements from the US, EU, UK, and Japan. These results prove that, in malice of its nature and goals, bitcoin seems to be vulnerable to the same economic dynamics as conventional approval currencies and is not finally resistant to the effects of constitutional policy.
(Nguyen et al., 2019)	Research in International Business and Finance	Viet Nam	We observe strong responses of four main cryptocurrencies, including Bitcoin, to China's narrowing monetary strategies; though, U.S. monetary strategies do not meaningfully mark cryptocurrency yields.

(Fama, Fumagalli, & Lucarelli, 2019)	International Journal of Political Economy	Italy	The ability of the cryptocurrency to function as a reliable payment method is now badly impacted by a number of problems. It raises questions about a wide range of political, technical, and social factors as to whether this knowledge can overlay the technique for the creation of new and more self-ruled monetary tools, as the essay deliberates.
(Sauer, 2016)	International Advances in Economic Research, 2016	Germany	There are primarily two reasons why virtual currencies are popular. In the first place, as a protest against monetary policy decisions made by authority figures, and in the second place as solutions to shortfalls in certain monetary systems that result from political instability or other factors. In this article, we try to include the supply and demand of virtual currencies into the Keynesian money market agenda, assuming that they do, in fact, (moderately) swap countrywide currencies as recompense automobiles. This article addresses potential issues with monetary policy development and gives some findings for central banks. Some oversimplified assumptions have been made because this is the first effort to simulate a countrywide money market as a mixture of nationwide delivered currency and internationally issued virtual currency. However, the model provides guidance on the impact

4.1.4. Cryptocurrency and market efficiency

Hu, Valera and Oxley (2019) discussed that lack of empirical support for the hypothesis in the panel evidence points to market inefficiencies in cryptocurrency. Shynkevich (2020) suggested that Trading of the inadequately valued fund's shares looks to be even more emotionally charged than the by this time turbulent and intense swap of bitcoin, and it also shows a significant tendency towards round up. Yaya et al. (2021) discover that flea market for Bitcoin and the bulk of the altcoins we studied are both highly efficient and volatile, particularly during the current post-crash era. Capriciousness is more likely to last for a shorter time than they did before the catastrophe. As a result, our work provides crucial information to portfolio managers and cryptocurrency market players. López-Martín, Benito Muela and Arguedas (2021) we employ a fixed of 5 five tests that are applied in both a inert setting and a dynamic context to examine the efficiency of these markets. Le Tran and Leirvik (2020) that conflicts with other, more recent findings on the subject, as suggested. We apply a larger sample size than in other studies, which is one factor. Another vital aspect is that we use a consistent efficacy metric that lets us to know whether or not competence is considerable. Ripple is typically the least efficient cryptocurrency, with Litecoin being the most efficient. Table seven boons the main points made in important works on cryptocurrencies and market efficiency.

Table 7: Key works on Cryptocurrency and market efficiency

References	Journal	State	Key opinions/outcomes
(López-Martín, Benito Muela, & Arguedas, 2021)	1. Eurasian Economic Review	Spain	The results are influenced by the duration of the study retro and the methods rummage-sale to evaluate the likelihood of the yield. Nonetheless, certain inferences might be made. First, it is evident that efficiency levels tend to rise over period. Second, although the productivity market seems to be changing over time, the prices of Ethereum, Litecoin, and Bitcoin indicate that efficiency has changed from lower to higher. The adaptive market hypothesis is supported by the fact that period of inadequacy alternative with

				periods of competence in Ripple, Stellar, and Monero.
(Shynkevich, 2020)	Applied Letters	Economics	United States	The resolution of this research is to fix whether pricing inefficiency, or inaccurate tracking of a bitcoin fund's net asset value (NAV), has a substantial effect on the fund's market efficiency in comparison to the selling bitcoin market. We take into account 2 bitcoin funds whose parts are dealt on markets with stricter transparency requirements than cryptocurrency markets. The fund is determined to be weak-form efficient if its shares have not been trading at a considerable premium or discount compared to its NAV. The fund is deemed inefficient since its returns exhibit a consistent, large positive autocorrelation and have been trading at a major premium to NAV.
(Yaya et al., 2021)	International Journal of finance and economics		Nigeria	In this study, we examine the market effectiveness and volatility persistence of 12 cryptocurrencies before and after crashes. By seeing dependable slight mixing strategies in both linear and nonlinear circumstances, the work contributes to the conversation of how well cryptocurrencies trade in the face of volatility. We find that, particularly in the present post-crash period, the markets for Bitcoin and the bulk of the altcoins we investigated are both extremely efficient and volatile. Volatilities are probably going to last less time now than they did before the disaster. Therefore, our research offers essential data to bitcoin traders and portfolio managers.
(Hu, Valera, & Oxley, 2019)	Finance Letters,	Research	New Zealand	The Efficient Market Hypothesis is revisited for 31 of the largest cryptocurrencies by market capitalization in this study using a variety of panel tests. In order to guide the use of tests for non-stationarity later on, we main study cross-sectional requirement in panels for these cryptocurrencies. The efficiency of cryptocurrencies is then simultaneously evaluated using panel unit root/stationarity tests that account for panel structural flaws and accommodate cross-sectional dependence. The panel evidence's lack of empirical backing for the hypothesis suggests that the bitcoin market is inefficient.
(Le Tran & Leirvik, 2020)	Finance Letters	Research	Norway	This turns pledge to other, more topical results in the area. We employ a bigger sample size than in previous studies, which is one of the factors. Another crucial element is the use of a consistent efficiency metre that enables us to judge whether or not an efficiency is substantial. Overall, Litecoin is the most effective cryptocurrency, and Ripple is the least effective.

5. Discussion and future research questions

The constantly expanding cryptocurrency literature shelters a varied variety of study parts. There are still some cryptocurrency themes that are open-ended and highly explorable, though. As a result, we here support cryptocurrency research. Future study should address seven research themes that we identified from our review of the cryptocurrency literature in order to improve understanding and awareness of cryptocurrency.

5.1. Why does cryptocurrency prevail in economies?

The popularity of cryptocurrencies is rising quickly in both developed and developing countries. According to the coin market cap, it recovered fast from its 2019-2020 slumps and surpassed its size (general measure) in terms of its part of the worldwide GDP in 2021. However, the factors influencing economies to engage in cryptocurrency activities have not yet been adequately defined in the research. Given the dearth of studies on the subject, there may be need for additional investigation of the variables influencing the creation of cryptocurrencies. As recommended by Wei (2018) that the market effectiveness and return certainty of new cryptocurrencies are significantly influenced by liquidity. In keeping with Claeys, Demertzis and Efstathiou (2018), Our research implies that an effective replacement to the government's official currency could put pressure on them to adopt better policies. However, the widespread use of cryptocurrencies in place of fiat money might inadvertently produce parallel currencies.

5.2. What aspects of cryptocurrencies pose the greatest threat to market efficiency?

Regulatory bodies are quite concerned about the impact cryptocurrency has on market efficiency. The literature, however, does not go into great detail on the issue of which crypto sector components will have the most market efficiency for the economy. Studies examining the effects on market efficiency of particular crypto components could improve our knowledge of cryptocurrencies and the market efficiency connected to them. Future unpredictability with bitcoin is by far its biggest drawback. Extreme volatility, cyberattacks during digital transactions, and other dangers are always a possibility. It is only one of the explanations you should stay away from cryptocurrency investments in 2023. Fischer, Krauss and Deinert (2019) results from a study market microstructure is the most notable factor that could adversely affect returns. Transaction the bid-ask recoil unintentionally in a backtest results in substantial and statistically important yields that might not yet reflect reality. Arsi et al. (2022) addressed the key decisions establish that any failure of technology tends to rise people's indecision and distrust about cryptocurrency technology. This practicality may be additional discolored by fraud systems and untrue trading size.

5.3. How ought cryptocurrency to be regulated?

A system of regulation for cryptocurrencies is another subject that hasn't received enough attention in literature. The findings of the debate between regulators and academics about the reality and rule of the digital currency business are unclear. Many researchers support the banning of cryptocurrency users who do not fall under the supervisory safeguards and protection nets provided by central banks. Others contend that the cryptocurrency market has to be more efficiently controlled in light of its exclusive features so that the assistances can be realized without raising a general threat in the economy (Feinstein & Werbach, 2021; Hughes, 2017). The ties between the cryptocurrency business and the central bank also need to be more effectively regulated in order to avert universal fiscal stacking and ensure the satisfaction of liquidity needs. A macro prudential basis intended to evade spillover and contagion in both regular and emergency scenarios should also constantly monitor the connections between the various cryptocurrency sector participants. Scholarly and regulatory institutions will be extremely appreciative of studies on regulatory reforms and proposals as the need for them is growing.

5.4. What are the consequences of cryptocurrency on monetary policy?

Cryptocurrency usage is expanding quickly all across the world, despite repeated allegations that it violates government regulations. Cryptocurrency literature has not yet reached a clear conclusion regarding how cryptocurrencies will affect global monetary policy. There is evidence supporting and opposing this sector, provided by conflicting hypotheses and mixed findings. All of these might be regarded as important pioneers in the field of study on the effects of cryptocurrencies on monetary policy. Due to the fact that they provide an alternate payment method and a store of value, cryptocurrencies may surpass traditional fiat currencies in terms of competitiveness. This might put pressure on central banks to keep their currencies stable and valuable in order to stay competitive (Bech & Garratt, 2017).

5.5. How does cryptocurrency progress influence traditional banks?

In the financial system, traditional banks and cryptocurrencies are closely linked. Academics continue to question the validity of empirical research and theoretical talks on the influence of cryptocurrencies on traditional banks due to their conflicting findings. With the use of cryptocurrencies, a business may be able to boost financial liquidity and obtain fresh capital. A company may be loaned cryptocurrency without being subject to the exact same constraints

that could be associated with getting a loan of actual cash from a traditional bank (Othman et al., 2020).

5.6. What dangers and weaknesses does a cryptocurrency investor face?

The hazards and weaknesses that cryptocurrency investors confront may have an impact on other economic sectors as a result of their large role in the global economy. Additionally, the economy as a whole may suffer if cryptocurrency investors were to recognize the perils and flaws they face. Trading cryptocurrencies can occasionally be risky because they are frequently thought of being volatile. Despite how certain things may seem, there is always a danger that your investment could lose value because the cryptocurrency market has a history of experiencing price volatility (Bunjaku, Gjorgieva-Trajkovska, & Miteva-Kacarski, 2017). Khan and Hakami (2022) discussed the characteristics of cryptocurrencies, such as their price turbulence, significant energy consumption during mining, and use in illegal activities.

6. Conclusion

Our present project used a bibliometric method to track the growth and progress of the works on cryptocurrency. It acknowledged the most well-known facts in the field of cryptocurrencies, presented it, and made an effort to combine the most important theoretical and empirical discoveries. The bibliometric tool used, VOSviewer and R Packages, is trustworthy, scientific, and has already been used in practice by a number of authors, including Ejaz et al. (2022), Radha and Arumugam (2021), Derviş (2019) and Jalal (2019) to name a few. As a result, our methodologies reflect the current direction of cryptocurrency research, and the conclusions we reach are therefore verifiable. Content analysis was used to divide the information into three diverse brooks, each of which is investigated in framework and provides synopses of the important points. The information was first divided into the significant publications, sources, and authors in the literature on cryptocurrencies. The fact that the Scopus database was the single basis of data for the bibliometric analysis, however, places limitations on this study. More databases (such Dimensions and Web of Science) can be used to map the virtual currency research network in greater detail. By conducting more detailed research of individual cryptocurrency mechanisms and talking inter connectedness across cryptocurrency beings in different geographic areas, we will also advance towards more precise findings. Further, we realize that as numerous articles discuss the industry without using the term "cryptocurrency," restricting the data collected to the outcomes of a single search query "cryptocurrency" may have made it more difficult to give an in-depth view of the industry. Future research can be expanded by including new search terms like "market efficiency," "stock market," and "fin tech." In order to keep up with the rapid proliferation of cryptocurrency literature and the cryptocurrency sector itself, similar study should also be conducted on a regular basis to update the findings and keep increasing our understanding. We propose that solving the seven research questions raised in this study will help us develop a more profound with greater precision understanding of the cryptocurrency industry and come to more educated decisions about how to manage this financial innovation for the benefit of national and worldwide good.

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