Cryptocurrency and Behavioral Finance: Co-Word Analysis and Research Evolution

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Article Info

ABSTRACT

This study explores the evolving intersection between cryptocurrency and behavioral finance through a scientometric approach using co-word analysis. By analyzing publications indexed in the Scopus database from 2010 to 2025, the study identifies dominant research themes, intellectual structures, and emerging trends within this interdisciplinary field. The analysis reveals that early research focused heavily on investor sentiment, market efficiency, and behavioral biases related to bitcoin and cryptocurrency trading. Over time, the literature has expanded to include advanced methodologies such as machine learning, sentiment analysis, and portfolio optimization, highlighting a growing convergence between behavioral theories and data-driven techniques. Furthermore, the study maps global collaboration patterns among authors, institutions, and countries, showing that knowledge production is increasingly international and interdisciplinary. The findings provide valuable insights for researchers, practitioners, and policymakers by highlighting key research clusters, practical implications, and future directions in the study of digital financial behavior. This work contributes to the theoretical integration of behavioral finance and crypto-asset studies and lays the groundwork for more nuanced, data-informed behavioral research in digital markets.
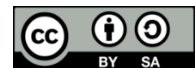
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1. INTRODUCTION

Over the past decade, cryptocurrencies have emerged as a revolutionary force in the global financial landscape, challenging conventional monetary systems and transforming the way individuals, institutions, and governments perceive value, investment, and economic governance. Born from the ideals of decentralization and cryptographic security, cryptocurrencies such as Bitcoin, Ethereum, and others have grown from niche technological curiosities into mainstream financial assets [1], [2]. This evolution has not only redefined transactions and capital flows but also introduced new dimensions to the study of finance, economics, and human behavior. The volatility, decentralization, and speculative characteristics of digital currencies have created fertile ground for behavioral finance scholars to explore how psychological biases, cognitive errors, and emotional factors drive investor decisions in crypto markets [3].

Behavioral finance, as an interdisciplinary field, examines how psychological influences affect market outcomes, often deviating from traditional assumptions of rationality. In the context of cryptocurrency, where prices are not solely determined by fundamentals but often driven by sentiment, social media hype, and herd behavior, behavioral finance provides a powerful analytical lens. Phenomena such as overconfidence, loss aversion, FOMO (fear of missing out), anchoring bias, and regret theory have become highly relevant in explaining trading behaviors in crypto markets. Unlike traditional assets, cryptocurrencies operate in a largely unregulated and highly speculative environment, amplifying the emotional and psychological responses of investors. This intersection between a technologically novel asset class and behavioral economics necessitates a deeper, structured investigation of how the academic field has evolved to capture such complexity [4], [5], [6].

The rapid increase in cryptocurrency-related research publications and the simultaneous rise in behavioral finance studies signal a growing scholarly interest in examining their convergence. Recent studies have explored topics such as investor sentiment analysis, speculative bubbles, behavioral patterns during crypto crashes, and the impact of digital platforms on investor decisions. However, despite this burgeoning interest, the evolution of the knowledge structure within this interdisciplinary area remains fragmented [7], [8]. Scholars are drawing from multiple theoretical frameworks, including prospect theory, bounded rationality, and heuristic-based decision-making, yet there is a lack of consensus on dominant research trends, thematic clusters, and intellectual foundations of the field. Given the novelty and dynamism of both cryptocurrency and behavioral finance, there is a pressing need to map the intellectual structure and evolutionary trajectory of this emerging body of knowledge.

To address this complexity, bibliometric and scientometric tools, particularly co-word analysis, have gained prominence [9]. Co-word analysis enables researchers to identify the frequency and co-occurrence of key terms in scholarly literature, thereby revealing underlying conceptual frameworks, thematic clusters, and evolving research directions. When applied to the domain of cryptocurrency and behavioral finance, co-word analysis can uncover how research interests have shifted over time—from early discussions on digital currency adoption and speculation to more nuanced inquiries into psychological determinants of crypto investment behavior. This method offers a systematic and data-driven approach to understand how the academic discourse is structured, which themes are dominant, and which emerging topics may define future inquiries.

Moreover, the COVID-19 pandemic, economic crises, and heightened media attention toward crypto assets have further fueled research on investor psychology and digital assets. These external shocks have not only influenced the financial behavior of retail investors but also shaped how scholars

conceptualize risk, uncertainty, and trust in decentralized systems. The question of how behavioral finance theories are being adapted, challenged, or expanded in the context of cryptocurrency remains central to advancing academic discourse. A scientometric investigation into the evolution of research themes, influential authors, and leading journals in this area is crucial to understand where the field stands and where it is heading. Such insights are valuable not only for academics but also for practitioners, regulators, and fintech developers seeking to design better policies, platforms, and investor education initiatives.

Despite the growing interest in the intersection of cryptocurrency and behavioral finance, there is a lack of structured, systematic mapping of the intellectual landscape of this research area. Existing studies tend to focus on specific issues without providing a comprehensive overview of how the field has evolved, what core themes dominate, and which areas remain underexplored. As a result, scholars and practitioners face challenges in identifying research gaps, theoretical overlaps, and emerging trends. Without a clear synthesis of the knowledge structure and its evolution over time, the advancement of interdisciplinary understanding and theoretical integration in this field remains limited. The objective of this study is to conduct a scientometric review using co-word analysis to map the thematic evolution and intellectual structure of global publications at the intersection of cryptocurrency and behavioral finance.

2. METHODS

This study adopts a scientometric approach using co-word analysis to map and analyze the intellectual and thematic structure of academic publications at the intersection of cryptocurrency and behavioral finance. Scientometric methods are widely used in knowledge domain visualization to uncover the evolution of research fields through bibliographic metadata, particularly keywords, titles, and abstracts. Co-word analysis, in particular, allows for the detection of conceptual linkages by identifying patterns of keyword co-occurrence, revealing how frequently two or more terms appear together across a corpus of literature. By visualizing these relationships, we can detect core themes, peripheral topics, and emerging trends in the research landscape. The use of co-word analysis in this context offers a granular and data-driven method to understand the conceptual framework shaping this interdisciplinary domain.

The dataset for this study was extracted from the Scopus database, chosen for its comprehensive indexing of peer-reviewed journals, conference proceedings, and other scholarly outputs in the fields of finance, economics, and behavioral sciences. A search query was developed using Boolean logic to include terms such as "cryptocurrency", "Bitcoin", "Ethereum", "blockchain", in conjunction with "behavioral finance", "investor sentiment", "heuristics", "bias", and "decision making". The time frame was limited to publications between 2010 and 2025 to capture the significant rise of cryptocurrencies and the associated behavioral finance discourse. Only English-language publications were included to maintain consistency and ensure accurate keyword extraction. The metadata, including keywords, authors, titles, sources, and abstracts, were exported in CSV format and cleaned for duplications and inconsistencies before analysis.

The co-word analysis was conducted using VOSviewer, a widely used software tool for constructing and visualizing bibliometric maps. The software was employed to create keyword co-occurrence networks based on author-supplied keywords. A minimum threshold for keyword occurrence (e.g., at least five occurrences) was set to ensure the inclusion of significant and meaningful terms. VOSviewer was used to cluster keywords into thematic groups using its built-in clustering algorithm, allowing for the identification of major research themes and their interrelations. The visualization included density maps, network diagrams, and overlay

visualizations to reflect temporal changes in thematic emphasis.

3. RESULTS AND DISCUSSION
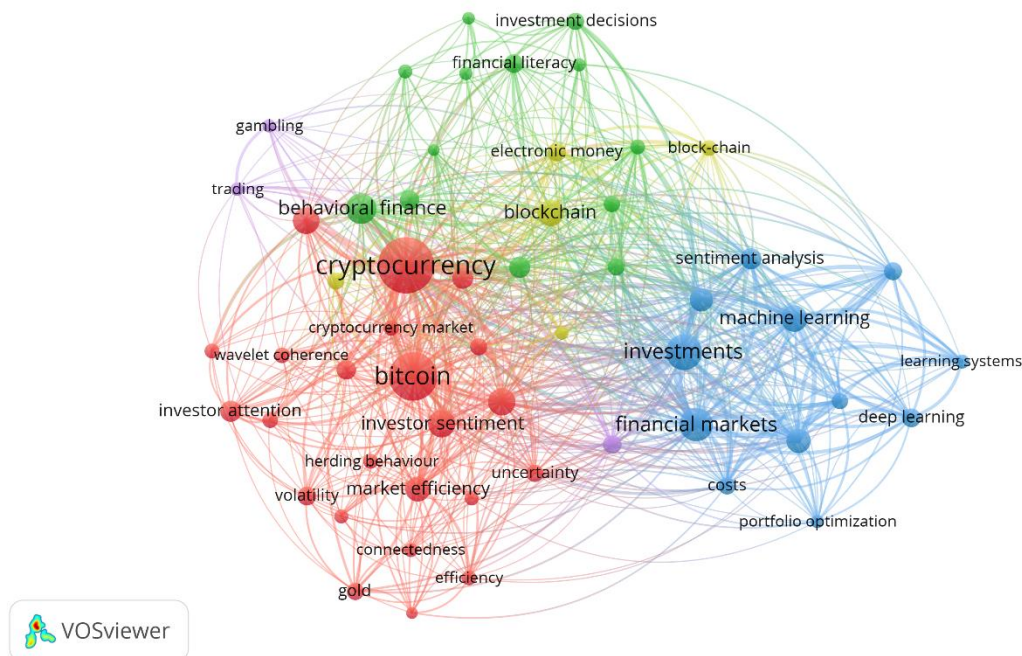
Keyword Co-Occurrence Analysis

Figure 1. Network Visualization
Source: Data Analysis

Figure 1 lists several thematic clusters that encapsulate the emerging literature in cryptocurrency and behavioral finance. Inside the red cluster, centrally located are the terms "cryptocurrency," "bitcoin," "investor sentiment," and "market efficiency." This reflects a high research focus on the behavioral dimensions of cryptocurrency trading, and more particularly how investor mood, bias, and psychological inclinations like herding behavior and uncertainty propel the crypto market dynamics. Their centrality and prevalence suggest that they are some of the most common and networked terms, and therefore their fundamental nature to the discipline.

Adjacent to the red cluster is a blue cluster surrounding "financial markets," "investments," "machine learning," and "sentiment analysis." It reflects a new trend in methodology: merging artificial intelligence techniques with behavioral finance to research crypto markets.

Machine learning, deep learning, and portfolio optimization models are increasingly applied by scholars to detect investor sentiment and predict market trends. The reference to "learning systems" and "costs" also suggests that researchers are thinking about predictive power and economic feasibility of such analysis tools in crypto finance. Moving up the map, we see a green cluster with terms like "investment decisions," "financial literacy," "blockchain," and "electronic money." This area speaks to a more traditional behavioral finance focus, one that examines how knowledge, belief, and learning about new technologies influence investor choice. The event of "financial literacy" points towards a pedagogical and policy research interest in the role that knowledge about blockchain technology and digital assets has on retail and institutional investors' decision-making mechanisms equally. The purple cluster, although smaller in size, presents distinctive but related themes

such as "behavioral finance," "gambling," "trading," and "investor attention." The cluster portrays crypto investment-related psychological and possibly regulatory concerns as speculative or seen as gambling conduct, especially among novice traders.

Research in this field is generally focused on risk-taking behavior, addictive trading patterns, and the thin line between sound investment and speculation. The inclusion of "trading" in this category also unites the behavioral and technical views of market participation.
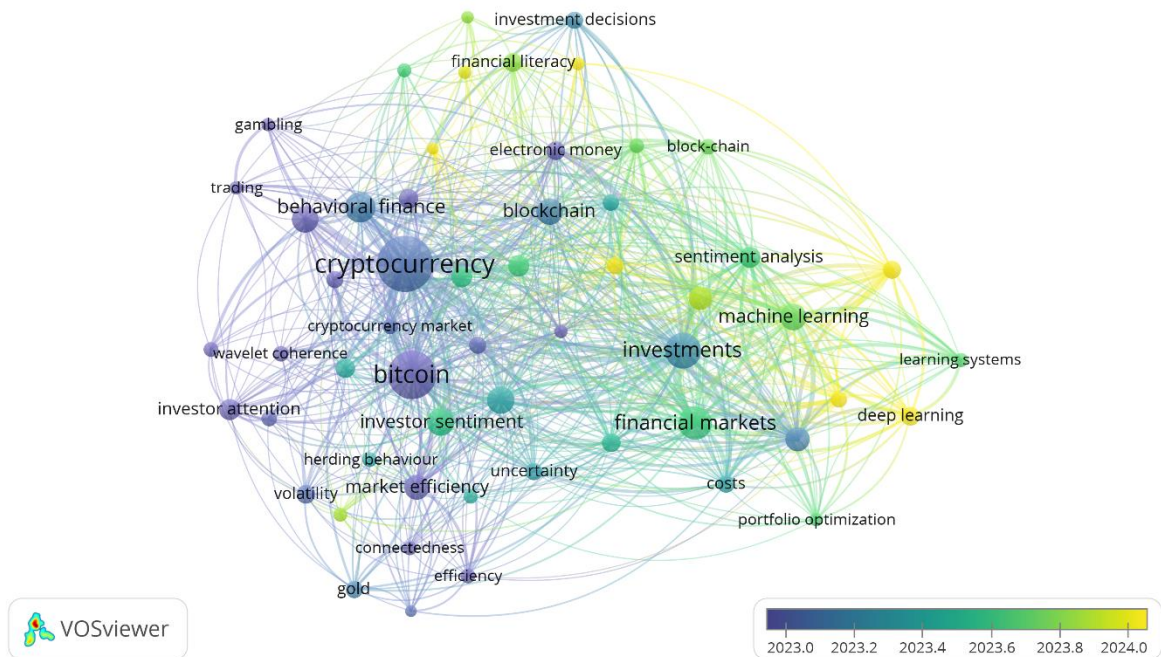

Figure 2. Overlay Visualization
Source: Data Analysis

Figure 2 above shows a timeline of the development of research in the field of cryptocurrency and behavioral finance, with colors used to identify the typical publication year of keywords. Dark colors (teal to blue) representing earlier research topics well-established by 2023, and light colors (yellow to green) indicating newer and developing topics trending towards 2024. Central vocabulary such as "cryptocurrency," "bitcoin," "behavioral finance," and "investor sentiment" are marked darker, suggesting they were the central themes of study in the initial years of the research field. These topics likely set the foundation theories and empirical bases, especially on how the psychology of investors affects speculative virtual assets. On the other hand, "machine learning," "deep learning," "sentiment analysis," and "learning systems" are presented in lighter hues (green to yellow),

symbolizing the recent increased emphasis on research.

This shift signifies a shift in the topic to the use of computational and AI-based techniques for the explanation of crypto investor behavior and market movements away from traditional behavioral finance approaches. The prevalence of terms like "portfolio optimization" and "costs" within these emerging clusters suggests that researchers are increasingly moving away from descriptive research towards more applied and performance-oriented research, examining how behavioral insights can be integrated into algorithmic trading, investment decision support, and risk management systems. Additionally, words such as "financial literacy," "investment choices," and "electronic money" appear in greenish tones, indicating a continued but modestly recent concern with exploring how cognitive factors and financial education

influence investment behaviors in digital asset environments. This transition indicates that while the underlying psychological principles of behavioral finance remain, the field is advancing rapidly to tap interdisciplinary methods and now-time data analysis
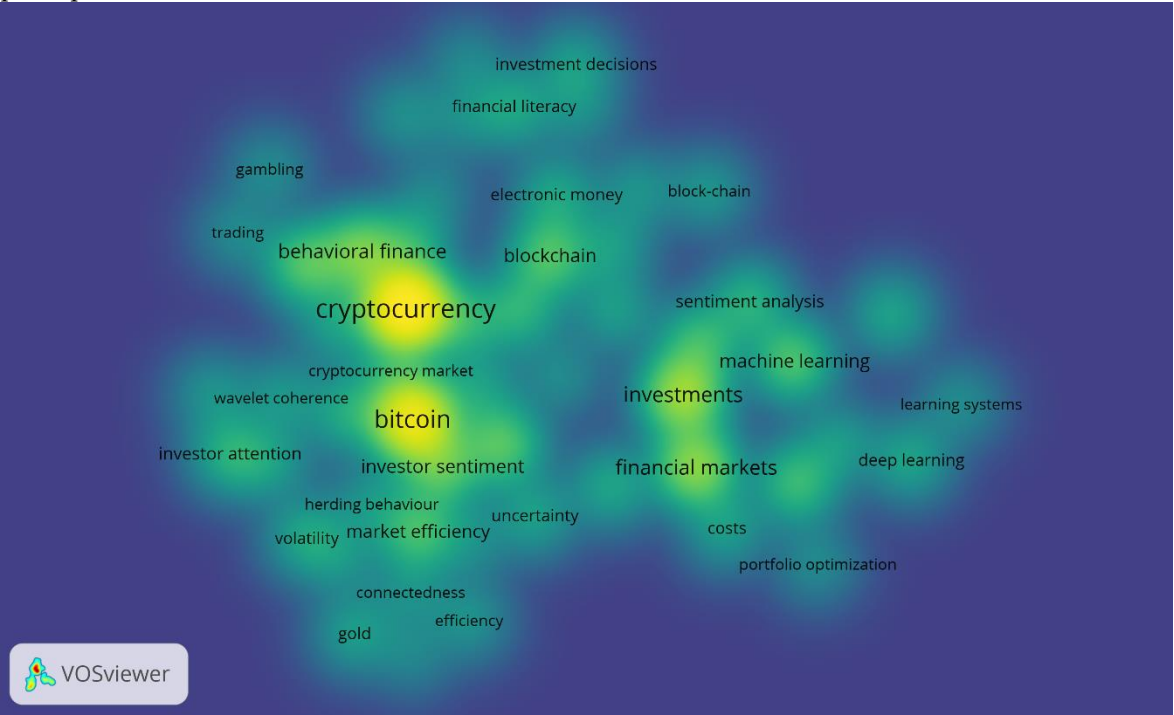

Figure 3. Density Visualization
Source: Data Analysis

The third graph indicates the most studied subject matters at the nexus of cryptocurrency and behavioral finance, with color gradient from yellow to green for keyword frequency and magnitude of co-occurrence.

The terms "cryptocurrency" and "bitcoin" co-occur with saturated yellow at the center, which means they are most prominent and core in the literature. Surrounding these are typically associated topics such as "investor sentiment," "market efficiency," "behavioral finance," and "financial markets," which suggest the concentration of research that investigates the influence of psychological factors and cognitive heuristics on trading activity and market outcomes in the crypto market. This group includes the foundational debates within the field, which

are volatility, uncertainty, attention, and efficiency across crypto domains. In the direction of the periphery, green-highlighted terms like "machine learning," "deep learning," "portfolio optimization," "financial literacy," and "investment decisions" represent new but immature areas of research. These are keywords of an evolving multidisciplinary extension in which researchers are beginning to intertwine computer-based approaches with behavioral research for the purpose of developing improvement models of decision-making as well as investor profile. The appearance of "sentiment analysis" in the fairly dense area points toward an increase in data-oriented techniques in the analysis of psychological trends.

Citation Analysis

Table 1. Top Cited Literature

Citations	Author	Title
154	[10]	Herding behavior and contagion in the cryptocurrency market
138	[11]	Herding and anchoring in cryptocurrency markets: Investor reaction to fear and uncertainty

98	[12]	Testing for herding in the cryptocurrency market
62	[13]	Herding intensity and volatility in cryptocurrency markets during the COVID-19
52	[14]	Uncertainty and herding behavior: evidence from cryptocurrencies
50	[15]	Investor attention and cryptocurrency: Evidence from the Bitcoin market
43	[16]	Predictive power of investor sentiment for Bitcoin returns: Evidence from COVID-19 pandemic
37	[17]	Behavioural finance and cryptocurrencies
36	[1]	Cryptocurrency Market: Behavioral Finance Perspective*
26	[18]	"All are investing in Crypto, I fear of being missed out": examining the influence of herding, loss aversion, and overconfidence in the cryptocurrency market with the mediating effect of FOMO

Source: Scopus Database
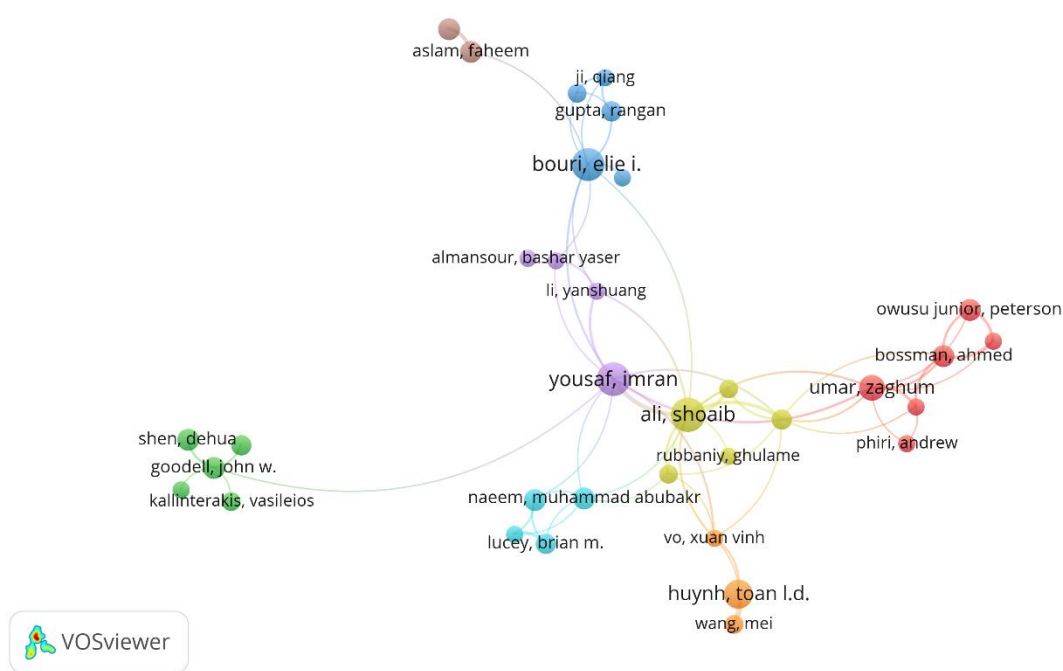
Co Authorship Analysis

Figure 4. Author Visualization

Source: Data Analysis

Figure 4 visualization reveals distinct clusters of scholarly collaboration in the field of cryptocurrency and behavioral finance research. At the center of the map, Yousaf, Imran and Ali, Shoaib emerge as key bridging authors, connecting multiple clusters and serving as central figures in the academic collaboration landscape. The blue cluster led by Bouri, Elie I. and collaborators such as Gupta, Rangan and Ji, Qiang reflects a concentrated research group focused on financial volatility and investor sentiment. Meanwhile, the red cluster involving Umar, Zaghum, Bossman, Ahmed, and Phiri, Andrew suggests a regional or thematic collaboration, possibly focusing on macroeconomic and behavioral aspects of crypto markets. Other notable groups include the green cluster with Goodell, John W. and Shen, Dehua, and the orange cluster featuring Huynh, Toan L.D., which likely explores AI and econometric modeling.
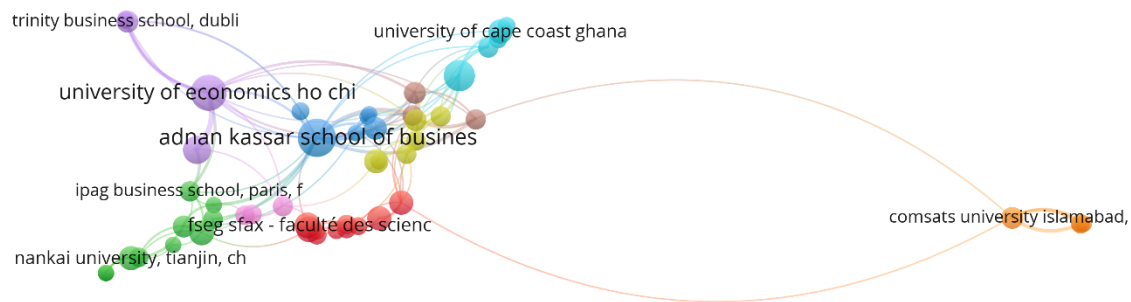
Figure 5. Institution Analysis

Source: Data Analysis

The central and most interconnected institutions include Adnan Kassar School of Business, University of Economics Ho Chi Minh, and FSEG Sfax - Faculté des Sciences Économiques, which act as pivotal hubs linking diverse global research communities. These institutions are closely connected to others such as IPAG Business School, Paris, Nankai University, Tianjin, and University of Cape Coast, Ghana, reflecting strong international collaboration within the core clusters. In contrast, COMSATS University Islamabad appears more isolated, forming a distinct orange cluster with minimal links to the central academic network, indicating regional or institution-specific research efforts
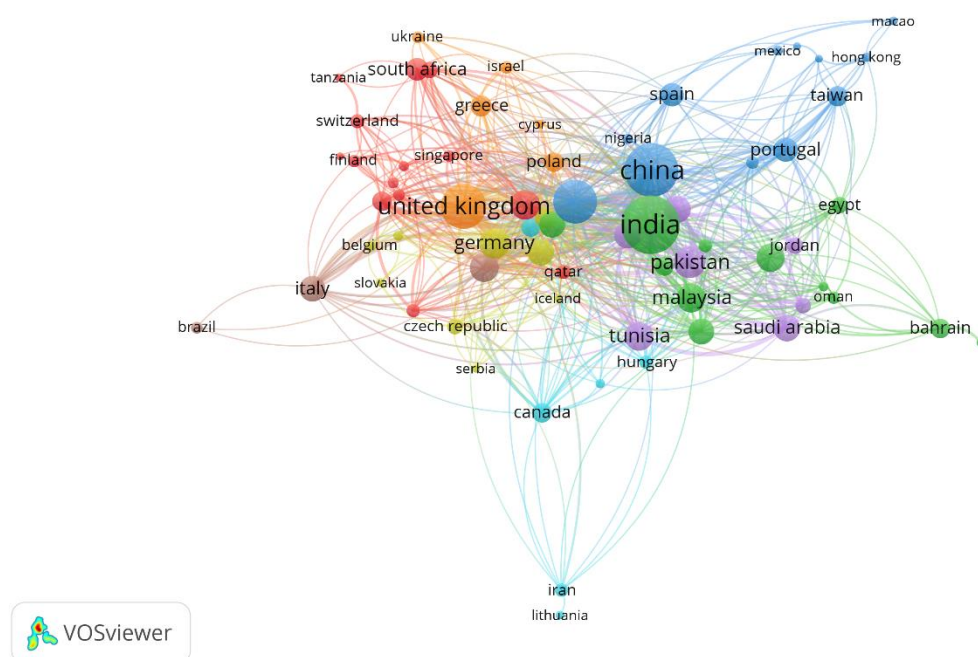

Figure 6. Country Visualization

Source: Data Analysis

Figure 6 visualizes the global research network in the field of cryptocurrency and behavioral finance, highlighting prominent contributors and their international linkages. China, India, United Kingdom, and Pakistan appear as dominant nodes with large circles, indicating high publication output and extensive collaborative ties. These countries serve as central hubs, linking with a wide array of partners across Asia, Europe, and the Middle East. European countries such as Germany, Spain, Greece, and Poland form dense clusters, particularly around the UK, showcasing strong intra-regional collaboration. Meanwhile, Malaysia, Saudi Arabia, Tunisia, and Egypt form a vibrant Middle Eastern and North African (MENA) cluster with growing ties to Asian and

European research communities. The network also shows emerging participation from countries like Iran, Canada, and South Africa, suggesting increasing diversification in global academic engagement.

Practical Implication

This study offers several practical insights for investors, policymakers, financial advisors, and fintech developers operating in the cryptocurrency ecosystem. By mapping the thematic evolution of research in cryptocurrency and behavioral finance, this study highlights critical behavioral factors—such as investor sentiment, attention, and financial literacy—that influence crypto investment decisions. Financial advisors and platforms can use these insights to design more psychologically informed investment tools, improve user experience, and reduce decision-making biases. Moreover, the identification of recent trends such as the use of machine learning and sentiment analysis enables fintech developers to adopt cutting-edge methodologies for predicting market behavior and managing risk more effectively. Policymakers can also benefit from this study by recognizing the role of financial literacy and behavioral regulation in minimizing speculative excesses and promoting responsible participation in crypto markets.

Theoretical Contribution

Theoretically, this study advances the interdisciplinary integration of behavioral finance and cryptocurrency research by offering a structured synthesis of prevailing themes and emerging directions. Through co-word analysis, the study reveals the intellectual structure of this hybrid field and identifies conceptual linkages between traditional behavioral theories—such as loss aversion, herding behavior, and overconfidence—and their applications in digital asset markets. It also contributes to the literature by demonstrating how contemporary tools like machine learning and deep learning are expanding the methodological boundaries of behavioral finance. By mapping the knowledge evolution over time, this study helps bridge fragmented research and provides a theoretical

foundation for future empirical investigations that aim to explore the psychological dimensions of decentralized finance (DeFi), digital asset valuation, and algorithmic trading behavior.

Limitation

While this study provides a comprehensive overview of the research landscape using co-word analysis, it is not without limitations. First, the analysis is restricted to the Scopus database, which, although extensive, may exclude relevant publications from other sources such as Web of Science, SSRN, or regional journals. Second, the reliance on author-supplied keywords may lead to the omission of nuanced topics not explicitly labeled by researchers, potentially affecting the depth of thematic detection. Third, co-word analysis identifies patterns of frequency and co-occurrence but does not capture the depth of theoretical argumentation or methodological rigor within individual studies. Therefore, while the findings offer a macroscopic view of the research domain, they should be complemented with qualitative reviews or meta-analyses for more in-depth insights. Future research could address these limitations by incorporating multi-database coverage, full-text content analysis, and triangulation with expert interviews or citation analysis.

4. CONCLUSION

This study provides a comprehensive scientometric overview of the intersection between cryptocurrency and behavioral finance by employing co-word analysis to map the thematic evolution, research trends, and intellectual structure of the field. The findings reveal that scholarly interest has evolved from foundational topics such as investor sentiment, behavioral biases, and market efficiency toward more technologically integrated approaches involving machine learning, sentiment analysis, and portfolio optimization. Central themes such as bitcoin, cryptocurrency markets, and financial decision-making remain dominant, while emerging clusters

indicate growing interdisciplinary convergence. The study not only uncovers key research areas and collaboration patterns but also offers valuable guidance for future inquiries and practical applications in fintech, investment strategy, and policy design. By bridging gaps between behavioral theory and data-driven methods, this study contributes to a deeper understanding of how cognitive and emotional factors continue to shape the dynamics of the digital financial era.

REFERENCES

[1]   B. Y. Al-Mansour, "Cryptocurrency market: Behavioral finance perspective," *J. Asian Financ. Econ. Bus.*, vol. 7, no. 12, pp. 159–168, 2020.

[2]   B. Y. Almansour, S. Elkrghli, and A. Y. Almansour, "Unravelling the complexities of cryptocurrency investment decisions: A behavioral finance perspective from Gulf investors," *Int. J. Prof. Bus. Rev. Int. J. Prof. Bus. Rev.*, vol. 8, no. 7, p. 124, 2023.

[3]   S. Gautam and P. Kumar, "Behavioral biases of investors in the cryptocurrency market," *Recent Adv. Sci. Eng. Inf. Technol. Manag.*, vol. 2782, no. 1, p. 20105, 2023.

[4]   A. B. Sarin, "Behavioral Finance and Cryptocurrency Market," in *Revolutionizing Financial Services and Markets Through FinTech and Blockchain*, IGI Global, 2023, pp. 217–236.

[5]   M. Yadav, "Behavioral biases of cryptocurrency investors: a prospect theory model to explain cryptocurrency returns," *Rev. Behav. Financ.*, vol. 16, no. 4, pp. 643–667, 2024.

[6]   M. Abdeldayem and S. Aldulaimi, "Investment decisions determinants in the GCC cryptocurrency market: a behavioural finance perspective," *Int. J. Organ. Anal.*, vol. 32, no. 6, pp. 1073–1087, 2024.

[7]   B. Almisshal, "The Dynamics of Cryptocurrency Market from Behavioral Finance Perspective".

[8]   H. Huang, "An investigation of cryptocurrencies: Behavior finance perspective," in *2022 7th International Conference on Social Sciences and Economic Development (ICSSED 2022)*, Atlantis Press, 2022, pp. 484–489.

[9]   N. Donthu, S. Kumar, D. Mukherjee, N. Pandey, and W. M. Lim, "How to conduct a bibliometric analysis: An overview and guidelines," *J. Bus. Res.*, vol. 133, pp. 285–296, 2021.

[10]   P. V. J. da Gama Silva, M. C. Klotzle, A. C. F. Pinto, and L. L. Gomes, "Herding behavior and contagion in the cryptocurrency market," *J. Behav. Exp. Financ.*, vol. 22, pp. 41–50, 2019.

[11]   C. Gurdgiev and D. O'Loughlin, "Herding and anchoring in cryptocurrency markets: Investor reaction to fear and uncertainty," *J. Behav. Exp. Financ.*, vol. 25, p. 100271, 2020.

[12]   A. Ballis and K. Drakos, "Testing for herding in the cryptocurrency market," *Financ. Res. Lett.*, vol. 33, p. 101210, 2020.

[13]   P. E. Mandaci and E. C. Cagli, "Herding intensity and volatility in cryptocurrency markets during the COVID-19," *Financ. Res. Lett.*, vol. 46, p. 102382, 2022.

[14]   E. A. Coskun, C. K. M. Lau, and H. Kahyaoglu, "Uncertainty and herding behavior: evidence from cryptocurrencies," *Res. Int. Bus. Financ.*, vol. 54, p. 101284, 2020.

[15]   P. Zhu, X. Zhang, Y. Wu, H. Zheng, and Y. Zhang, "Investor attention and cryptocurrency: Evidence from the Bitcoin market," *PLoS One*, vol. 16, no. 2, p. e0246331, 2021.

[16]   A. Bouteska, S. Mefteh-Wali, and T. Dang, "Predictive power of investor sentiment for Bitcoin returns: Evidence from COVID-19 pandemic," *Technol. Forecast. Soc. Change*, vol. 184, p. 121999, 2022.

[17]   A. Ballis and T. Verousis, "Behavioural finance and cryptocurrencies," *Rev. Behav. Financ.*, vol. 14, no. 4, pp. 545–562, 2022.

[18]   M. Kaur, J. Jain, and K. Sood, "'All are investing in Crypto, I fear of being missed out': examining the influence of herding, loss aversion, and overconfidence in the cryptocurrency market with the mediating effect of FOMO," *Qual. Quant.*, vol. 58, no. 3, pp. 2237–2263, 2024.