Content Analysis of Blockchain and Cryptocurrency Applications in the Metaverse: A Study on Users' Financial Behaviors

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ABSTRACT

This study conducts a content analysis of Blockchain and cryptocurrency applications within the metaverse, focusing specifically on how these technologies shape users' financial behaviors. With Blockchain facilitating decentralized finance and secure asset ownership, and cryptocurrencies enabling fluid transactions in virtual environments, these technologies are integral to developing metaverse economies. By applying bibliometric and content analysis methods to articles from 2021 to 2024 in the Scopus database, the study identifies key themes and emerging trends in digital asset utilization, user engagement, and financial decision-making. The findings reveal that Blockchain and cryptocurrency applications foster new and varied financial behaviors among metaverse participants, shaping an ecosystem that is progressively diverging from traditional financial models.

KEYWORDS

Blockchain, Cryptocurrency, Financial Behavior, Metaverse, Transparency.

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Introduction

The rapid advancement of digital technologies has led to the emergence of the metaverse, a virtual ecosystem where users interact, transact, and collaborate in immersive digital spaces. Huynh-The et al. (2023) argue that Blockchain technology plays a critical role in creating a secure and transparent environment for the metaverse, addressing challenges related to scalability and privacy within this emerging digital ecosystem. Recent studies on Blockchain applications in the metaverse indicate that this technology can play a key role in the growth of virtual ecosystems by enhancing data security, improving scalability and interoperability, and supporting decentralized applications. In particular, Blockchain has the potential to enhance user privacy and facilitate secure transactions, features that can help create new frameworks and increase engagement in virtual environments, thereby expanding the metaverse's capacity as a safe and flexible platform for users and developers (Gadekallu et al., 2022).

Integrating Blockchain technology and artificial intelligence (AI) in the metaverse has can enhance security, improve data management, and enrich user experiences. This research explores various applications of this convergence and addresses the associated challenges, offering insights into how these technologies can reshape the metaverse (Yang et al., 2022). Blockchain integration in the industrial metaverse enhances data transparency, security, and interoperability in industrial applications. The study discusses its implications for supply chain management, manufacturing processes, and collaborative environments, while highlighting the challenges and opportunities that arise from implementing Blockchain within this context (Mourtzis et al., 2023). An exploration of the metaverse reveals its significant role in the cryptocurrency ecosystem, particularly in facilitating transactions and enhancing user engagement within virtual environments. This research analyzes the potential for developing innovative economic models and ecosystems in the metaverse while addressing the challenges and opportunities associated with the integration of cryptocurrencies in these digital spaces (Osivand, 2021).

Financial behavior refers to how individuals manage and make decisions about their financial resources, including saving, spending, investing, and debt handling. These behaviors are influenced by various factors such as financial knowledge, self-esteem, personal values, and past financial experiences, playing a crucial role in achieving financial stability and economic goals. In the study conducted by Stolper and Walter (2017), the relationship between financial literacy, financial advice, and individuals' financial behaviors is closely examined. The research highlights that higher financial literacy is directly associated with more informed and deliberate financial decision-making, helping individuals avoid common financial errors. Furthermore, the study emphasizes that financial advice can play a key role in promoting optimal financial behaviors, especially for those with lower levels of financial knowledge, by guiding them in areas such as planning and saving.

Despite the promising potential of Blockchain and cryptocurrencies in the metaverse,

several challenges hinder their effective integration and adoption. Key questions arise regarding how users evaluate the security and functionality of these technologies in digital environments and what factors influence their willingness to adopt Blockchain and cryptocurrency solutions. While existing research highlights the benefits of Blockchain in enhancing data security and facilitating transactions, there is limited empirical evidence showing how these factors influence users' financial behaviors. Additionally, it is essential to determine the roles that Blockchain and cryptocurrencies play in users' financial behaviors within the metaverse and the key challenges that prevent the widespread adoption of these technologies. This study employs bibliometric methods and content analysis to explore these issues, aiming to identify barriers and provide solutions for improving user experience and increasing trust in digital environments. The research questions are as follows:

1. What patterns and trends exist in the research literature related to Blockchain, cryptocurrencies, and financial behaviors?
2. What insights does the content analysis of related articles provide about the role of these technologies in shaping economic and social structures in the metaverse?

Theoretical literature

Metaverse

Recent research on the metaverse focuses on fundamental principles, security, and privacy, emphasizing their importance in creating safe virtual environments. It analyzes the challenges and opportunities related to security and privacy while proposing strategies to enhance user data protection and build trust in digital interactions (Wang et al., 2022). Recent research in the field of the metaverse examines the latest status, technologies, applications, and challenges within this domain. The authors analyze current trends while identifying key opportunities and barriers for metaverse development, emphasizing the need for innovative approaches to overcome these challenges (Wang et al., 2022). The content analysis of metaverse articles identifies key patterns and research topics within this field. The findings provide insights into current trends and future directions in metaverse research, emphasizing the importance of further investigation to advance scientific knowledge in this area. This article serves as a valuable resource for better understanding the developments and challenges within the metaverse in the research literature (Narin, 2021).

Blockchain and Cryptocurrency

Recent research shows that Blockchain technology and cryptocurrency applications significantly influence economic patterns and users' financial behaviors in the metaverse. These technologies enhance transparency, security, and decentralized ownership, particularly through digital assets, smart contracts, and NFTs, fostering independent virtual economies and facilitating economic participation. Overall, Blockchain plays a crucial role in building trust and promoting sustainable economic interactions within the digital economy of the future (Zhang, 2023). The analysis of Blockchain role in the

metaverse emphasizes its significance for secure digital asset management, ownership transparency, and interoperability among virtual worlds. The research highlights how Blockchain facilitates decentralized financial systems (DeFi) and examines its current applications and challenges, underscoring its transformative impact on the sustainability of digital assets within metaverse ecosystems (Truong & Niyato, 2023).

Cryptocurrencies and Blockchain have the potential to revolutionize virtual economies through offering secure transactions, enhancing asset ownership, and enabling decentralized governance. However, research also addresses the associated risks, such as financial volatility, regulatory challenges, and ethical concerns, underscoring the need for balanced policies to foster innovation and safety in metaverse environments (Radanliev, 2024). Blockchain technology is increasingly viewed as a foundational element for managing virtual assets in the metaverse, providing essential transparency and verifiability for digital economies. While it enhances tracking and ownership validation, it also raises regulatory challenges and requires standardized accounting practices, highlighting its potential to influence future metaverse economic policies (AL-Hawamleh et al., 2024).

Literature Review

With the emergence of the metaverse and rapid advancements in Blockchain and cryptocurrencies, numerous studies have explored integrating these technologies within financial markets, their effect on consumer behavior, and their security and social challenges. For example, in a notable study, Özkaynar (2022) investigates banks' marketing strategies in the metaverse, Blockchain, and cryptocurrencies through the lens of consumer behavior theories and illustrates that these technologies have significantly transformed consumer preferences and behaviors.

In addition, several review studies have examined the role of Blockchain in the metaverse, highlighting its opportunities and security and technical challenges (Gadekallu et al., 2022). Research has also focused on integrating Blockchain with digital asset management, exploring how data and assets are managed within the metaverse. These studies analyze the economic and social opportunities presented by Blockchain, alongside the security challenges inherent in the metaverse environment (Truong, et al., 2023; Radanliev, 2024). Furthermore, Blockchain-based asset storage mechanisms have been proposed as innovative solutions for managing digital assets and enhancing accessibility and security within the metaverse (Ersoy & Gürfidan, 2023).

Conversely, other studies have examined financial market behavior about Blockchain and the metaverse, discussing topics such as digital payment innovations and consumer behavior in this new era (Kara, 2023; Shaikh, Mutanov, & Karjaluoto, 2024). Additionally, Polas et al. (2022) focused on risk behavior among small and medium-sized enterprises in Bangladesh and examined the influence of artificial intelligence and Blockchain technology within the context of the Fourth Industrial Revolution .

Further investigations have concentrated on the role of Blockchain in the industrial

metaverse and the challenges associated with financial security and financial crimes in this domain. These studies categorize and propose solutions for addressing financial crimes within the metaverse (Mourtzis et al., 2023). Moreover, some research has explored the use of digital assets, such as NFTs and cryptocurrencies, within the metaverse, examining their financial and social implications (Belk et al., 2022).

Overall, this body of research indicates that studies on integrating Blockchain, the metaverse, and cryptocurrencies encompass a diverse range of topics from marketing strategies to security challenges and economic opportunities. This field of study continues to expand, underscoring the need for further investigations to gain a deeper understanding of how these technologies influence various economic and social sectors.

Methodology

This study aims to systematically examine how Blockchain and cryptocurrency technologies relate to financial behaviors in the metaverse through a bibliometric analysis. Bibliometric analysis, as a quantitative approach, evaluates scientific publications by measuring various aspects of scientific production, including collaboration networks, citations, and publication patterns across diverse fields (Amin et al., 2019; Caya & Neto, 2018). The research uses reliable scientific tools and databases to collect and analyze relevant data.

In this research, a bibliometric analysis of the application of cryptocurrencies and Blockchain in the metaverse is conducted to address the research questions. Accordingly, an initial search was performed in the Scopus database using the keywords in Table 1. The output of these searches was imported into VOSviewer for analysis. Subsequently, content analysis was conducted by accessing the Web of Science and Scopus databases, again using the keywords from Table 1. The resulting outputs were examined, and after excluding books and conference papers, only research articles were analyzed, resulting in a total of 24 articles. Keywords related to the research topic, such as *Blockchain*, *Cryptocurrency*, *Metaverse*, *Financial Behavior*, *Decentralized Finance (DeFi)*, and *Virtual Economies*, were used individually and in combination to retrieve relevant articles. To refine the search results to recent, relevant studies, filters were applied for publication date (focusing on the last five years) and article type (including research and review articles). Only English-language articles with full-text access were selected for the in-depth analysis.

For the bibliometric analysis, the study utilized VOSviewer, a powerful and widely-used tool for creating and analyzing networks of citations, co-authorship, and keyword co-occurrence. VOSviewer enables creating science maps that help identify various research clusters and emerging trends within the field. Through this tool, the study could effectively visualize patterns in collaboration and key thematic areas, contributing to a better understanding of current research directions and knowledge gaps in Blockchain and financial behaviors in the metaverse.

Bibliometric analysis is particularly valuable in rapidly evolving and innovative fields

like Blockchain, cryptocurrency, and the metaverse,. This approach allows researchers to explore financial behaviors comprehensively, identify emerging research avenues, and offer valuable recommendations for future studies.

Table 1 presents key data such as keywords, website addresses, and the publication year of each article. The selected keywords reflect the primary research topics—Blockchain technology, cryptocurrencies, and the metaverse—used to search scientific databases, specifically Scopus. Due to the recent emergence of these research variables, no restrictions were placed on the publication year of articles, allowing for an inclusive analysis of available literature. This foundational data aids in locating and analyzing scientific articles related to the influence of novel technologies on financial behaviors within the metaverse.

Table 1.
Data Collection Protocol

	First Search	Second Search	Third Search
Data Source	**Scopus**		
Key Words	(Virtual Economies AND Blockchain AND Decentralized Finance)	(Metaverse AND Cryptocurrency AND Digital Assets)	(Blockchain AND Metaverse AND Financial Behavior)
Search Fields	Titles, Keywords, Abstracts		
Publication Year	2021-2024		
Number of Results	27		

(Source: Researcher's Findings)

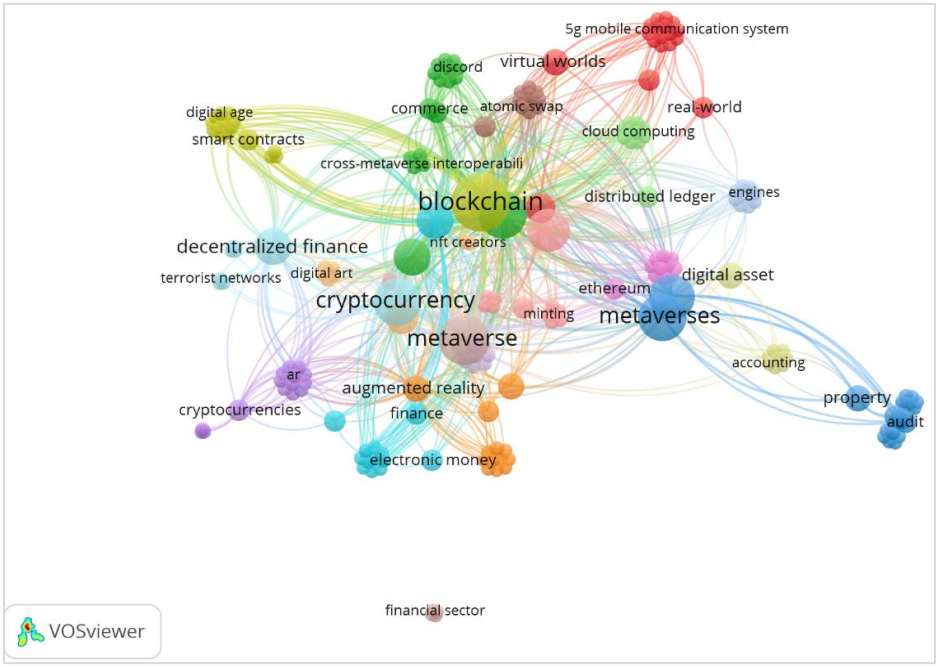
The method of content analysis was subsequently employed. This approach is a research method widely used for systematically analyzing and interpreting textual or visual data to identify patterns, themes, or biases within it. Content analysis is a systematic research method used to interpret and quantify patterns within textual, visual, or multimedia data. It involves categorizing and coding data into meaningful themes, which can reveal underlying ideas, trends, and relationships within the material. This approach allows researchers to analyze communication, attitudes, or representations in various contexts, whether written documents, speeches, media, or visual content. By breaking down the content into manageable units, content analysis helps make qualitative data more accessible for interpretation and often allows for a blend of qualitative and quantitative insights. This method is especially valuable in exploratory research, where themes, concepts, or patterns need to be extracted from large datasets to support broader analytical goals (Harwood & Garry, 2003).

Findings

In this study, we first examine the primary themes of interest through bibliometric software and document analysis. To analyze the extracted studies, we focus on keyword analysis. When entering the data into VOSviewer, given the limited total number of articles, it was determined that each keyword should appear at least once. A total of 206 top keywords from the Scopus database were selected for software analysis. Based on the

"strength and correlation", the software output among all 206 keywords, resulted in Fig 1 (Scopus database). Criteria used to assess keyword strength and correlation include the frequency of keyword occurrences, interdependency among keywords within a study or referenced studies, recurrence over time, and similar factors.

Figure 1.
Bibliometric Map Based on Keyword Strength and Correlation

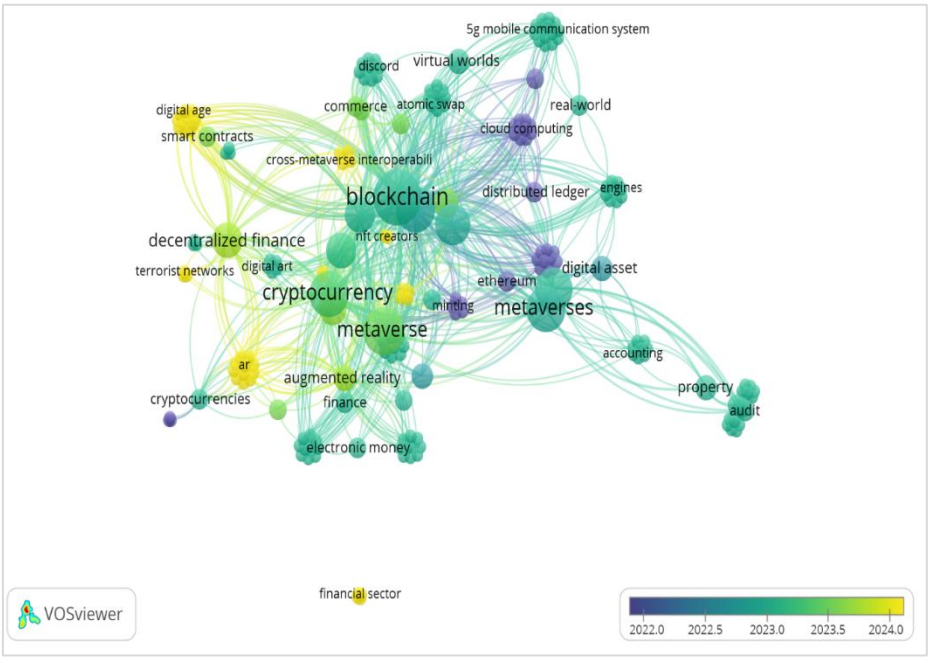


(Source: Researcher's Findings)

In the bibliometric map shown in Figure 1, terms like “Blockchain,” “cryptocurrency,” “metaverse,” and “metaverses” are positioned at the network's center, indicating the high importance and frequency of these concepts in recent research. These three areas are closely interlinked, underscoring the value of examining their shared applications. Terms like “decentralized finance (DeFi),” “NFT creators,” “virtual worlds,” “augmented reality,” and “distributed ledger” are connected to the central keywords, highlighting the focus on key topics related to decentralized finance, non-fungible tokens, virtual worlds, and distributed ledgers within the metaverse. These concepts play an essential role in shaping financial and economic interactions, particularly in the metaverse,. On the other hand, terms such as “atomic swap,” “cloud computing,” “digital asset,” and “finance” represent emerging trends studied in recent research on financial technology and the metaverse. These topics explore novel aspects of finance in the metaverse and the development of new financial structures based on Blockchain technology.

Figure 2 also reflects the chronological trend of keywords: darker terms indicate attention in earlier periods, while lighter ones represent topics that have gained prominence in more recent research. This demonstrates how specific topics have evolved over time, with research gradually shifting focus from initial concepts to more advanced topics in this field.

Figure 2.
Visualization of the Overlapping Terms and Associated Keywords Based on Time



(Source: Researcher's Findings)

In Figure 2, the emphasis on specific keywords is observed more distinctly, allowing a temporal analysis by comparing these trends over time. The color variations in the figure represent different periods in which these keywords garnered researcher attention: darker hues denote terms frequently studied in earlier years (like 2022), while brighter hues (yellow) highlight concepts that have gained prominence recently (up to 2024). Terms such as "decentralized finance (DeFi)," "smart contracts," and "cross-metaverse interoperability" appear in yellow, underscoring a growing interest in these emerging topics in 2023 and 2024. These keywords point to recent trends that currently attract significant research interest.

In contrast, foundational terms like "Blockchain," "cryptocurrency," and "metaverse," displayed in green and blue, were especially prominent in 2022. Although these terms continue to be relevant, they have become less of a central focus compared to newer terms. Their interconnectedness reflects that studies in one area frequently overlap with other core concepts in this domain. The strong links among terms like "distributed ledger," "finance," and "NFT" highlight the interplay and overlap between these ideas. Terms such as "financial sector" and "audit," observed on the right side of the visualization, suggest that applications of Blockchain and cryptocurrencies have progressively expanded into financial and accounting sectors, which have gained more research interest in recent studies.

This diagram indicates a trend in recent research towards emerging concepts such as Decentralized Finance (DeFi), smart contracts, and cross-metaverse interoperability, highlighting a shift in focus towards new and diverse applications of Blockchain and cryptocurrency in the metaverse. This focus signifies an evolving interest in exploring

novel applications, with Blockchain and financial interconnectivity underscoring the rising importance of these technologies in financial decision-making and digital asset management within the metaverse.

The second research question was answered using content analysis. A search of the Scopus and Web of Science databases and excluding duplicate and conference articles yielded a set of 24 research papers. These papers, analyzed using content analysis and summarized in Table 2, provide a detailed examination of current research topics and approaches within this evolving field.

Table 2.
Research Findings

NO.	Dimensions	Factors	Source
1	Trust and Transparency in Digital and Blockchain Transactions	Enhancing financial trust through arbitration in dispute resolution	(Chen, 2022)
		Reducing instability through Blockchain transparency	(Liu et al., 2022)
		Building trust through decentralized credit systems	(Ying et al., 2023)
		Building Financial trust through smart contracts	(Imperius & Alahmar, 2022)
		Impact of governance and decentralized organizations on financial behavior	(Goldberg & Schär, 2023)
		Effect of legal regulations on financial trust	(Блихар et al., 2023)
2	Financial Risks and Social Impacts in Cryptocurrency and NFT Transactions	Risks from illegal cryptocurrency activities	(Burgess et al., 2024)
		Market volatility and NFTs' stability in financial strategies	(Bourron, 2023)
		Motivations of financial participation by NFT creators	(Lee & Shen, 2024)
		Blockchain adaptation to cultural and economic needs	(Zhao et al., 2023)
		Fraud risks in the metaverse	(Smaili & de Rancourt-Raymond, 2022)
3	Innovations and Economic Opportunities in the Metaverse and Decentralized Technologies	Economic models of the metaverse and their impact on financial markets	(Sahiner, 2023)
		New financial opportunities in the NFT market	(Balaji et al., 2023)
		Financial behavior shifts through Web 3.0 and decentralized technologies	(Xu et al., 2023)
		Economic systems in the metaverse and investment patterns	(Huawei et al., 2023)
		Role of virtual worlds in digital financial transactions	(Kumar et al., 2023)
		Financial innovations in the metaverse	(D'Ulizia et al., 2024)
		Digital asset management in Blockchain	(Ersoy & Gürfidan, 2023)
		Decentralized asset management in the metaverse	(Alston, 2024)
4	Financial Motivations and Adoption in Digital and Metaverse Communities	Excessive expectations from the metaverse economy	(Vidal-Tomás, 2023)
		Gender influence on cryptocurrency adoption and participation	(Henshaw, 2023)
		Perception and acceptance of cryptocurrencies by younger generations	(Maciejasz et al., 2023)
		Acceptance of metaverse auditing and financial transparency	(Handoko et al., 2023)
		Motivation and appeal of digital real estate investment	(Ante et al., 2023)

(Source: Researcher's Findings)

Based on the classifications, it can be concluded that Blockchain and cryptocurrency technologies shape financial behaviors within the metaverse and digital economy by influencing various variables. These effects can be examined as follows:

1. *Increased Transparency and Financial Trust*: Blockchain technology enhances transparency in transactions and credit systems, strengthening users' trust in the digital economy. Decentralized tools like smart contracts and cryptocurrency dispute resolution systems help mitigate risk and bolster financial security within digital environments. Consequently, users are more inclined to engage with these platforms and participate in financial transactions within the metaverse, leading to increased financial engagement and trading activity.
2. *Diversification of economic and investment opportunities*: Blockchain and cryptocurrencies have created novel economic opportunities, including NFT markets and decentralized economic models within the metaverse. These opportunities allow users to gain profits and returns through digital assets, virtual investments, and even digital real estate. This introduces new forms of financial behavior and investment practices and broadens the diversity within financial markets.
3. *Asset management and decentralized economy*: Applying Blockchain and cryptocurrency technologies in the metaverse has expanded the concept of decentralized asset management. Users can manage and transfer their assets independently, without intermediaries, fostering a shift in financial behaviors toward financial autonomy and reduced reliance on traditional institutions. Additionally, digital assets can be exchanged across different metaverses, giving users direct control over asset management.
4. *Diverse financial motivations and acceptance based on demographic and cultural characteristics*: Research indicates that acceptance of Blockchain and cryptocurrency technologies in the metaverse is influenced by users' cultural and gender-specific traits. For instance, gender, age, and cultural background directly affect users' motivations for entering this field and their financial participation patterns. Therefore, Blockchain technologies and the metaverse pave the way for broader financial inclusion and foster new financial behaviors across diverse groups.

Discussion and Conclusion

The evolution of Blockchain and cryptocurrency technologies within the metaverse presents significant changes in user financial behaviors and interactions with digital economies. This study indicates that these technologies not only enhance transparency and trust in financial transactions but also create new economic opportunities, fundamentally transforming user engagement in financial activities.

The findings reveal that Blockchain's inherent transparency can mitigate the risks associated with traditional financial systems, increasing user confidence in digital asset

transactions. The integration of smart contracts and decentralized dispute resolution mechanisms further bolsters this trust, encouraging users to participate in the financial landscape of the metaverse actively. As users become more adept at navigating these digital environments, the frequency and volume of transactions will likely rise, contributing to the growth of a vibrant virtual economy.

Moreover, this research, in line with Yadav et al. (2022), highlights that diversifying economic opportunities through Blockchain and cryptocurrency enables the emergence of innovative investment practices. Users are engaged with established financial instruments and can explore new avenues such as non-fungible tokens (NFTs) and decentralized finance (DeFi) platforms. This diversification reflects a broader trend toward financial innovation, empowering users to take control of their financial futures through direct engagement with digital assets. The implications of this trend are substantial, suggesting a move towards a more participatory financial ecosystem that prioritizes user agency over traditional financial intermediaries.

In exploring the social and cultural dimensions of Blockchain and cryptocurrency adoption in the metaverse, this research underscores the importance of demographic factors in shaping financial behaviors. Variations in acceptance and participation rates based on gender, age, and cultural backgrounds indicate that financial technologies must be inclusive and adaptable to meet the diverse needs of users. As the metaverse evolves, stakeholders need to address these differences to promote widespread financial inclusion and equitable access to digital financial opportunities.

The research also identifies emerging trends that might influence future inquiries in this rapidly evolving field. Continuous examination of the effects of Blockchain and cryptocurrency technologies on economic frameworks and user behaviors is crucial, as emphasized by Afzal and Asif (2019). Future studies should focus on how these technologies can enhance financial literacy and inclusion, particularly for marginalized communities. Additionally, understanding the long-term effects of decentralized financial systems on traditional economic models will be vital for policymakers and financial institutions as they adapt to this changing landscape.

In conclusion, the intersection of Blockchain, cryptocurrency, and the metaverse represents a promising frontier for understanding financial behaviors, offering enhanced transparency, new economic opportunities, and greater financial autonomy. The insights gained from this study lay a foundational understanding of these technologies within the digital economy, paving the way for future inquiries into their broader societal implications. As researchers continue to explore this rapidly evolving domain, the potential for Blockchain and cryptocurrency to drive innovation in financial behaviors remains vast and largely untapped.

Limitations of the Research

Some of the limitations of the research include:

- Limited data: This study relies on data from specific databases such as Scopus and Web of Science. This may restrict the scope of the research and overlook

some relevant articles or findings in other databases.

- Timeframe: The research examines publications from a specific period (2021 to 2024). This choice may lead to a lack of attention to previous trends or relevant historical data, which could result in an incomplete picture of the impact of Blockchain and cryptocurrencies on financial behaviors.
- Language diversity: Only articles in English have been considered. This may lead to losinng important perspectives and research from non-English-speaking countries, which could contribute to a better understanding of the social and economic impacts of Blockchain and cryptocurrencies.
- Focus on research articles: This study has focused solely on research and review articles, excluding conference papers and books from the analysis. This may lead to overlooking some significant insights provided in these formats.
- Not considering other variables: The research focuses on the impacts of Blockchain and cryptocurrencies on financial behaviors, but other influencing variables in this field, such as psychological or cultural factors are disregarded in the analysis.

Suggestions for Future Research

The following practical suggestions can assist authors and researchers interested in further exploring the applications of Blockchain and cryptocurrencies in the metaverse and their implications for financial behavior:

- Expand Data Sources: Researchers should consider utilizing a more comprehensive range of databases beyond Scopus and Web of Science, such as Google Scholar or industry-specific repositories. This approach helps uncover additional relevant articles and findings that enhance the overall understanding of Blockchain and cryptocurrency applications in the metaverse.
- Broaden Timeframe: Future studies should examine publications from a longer historical period to identify trends and patterns over time. By including literature before 2021, researchers can gain valuable insights into the evolution of Blockchain and cryptocurrency technologies and their effects on financial behaviors.
- Incorporate Multilingual Research: To capture diverse perspectives, researchers should include articles published in multiple languages. Collaborating with international scholars or using translation tools can help integrate important findings from non-English-speaking countries, enriching the understanding of the global social and economic impacts of these technologies.
- Include Diverse Publication Formats: Future research should not only focus on research and review articles but also consider conference papers, white papers, and books. These formats may contain significant insights and innovative ideas that can contribute to a more comprehensive understanding of the applications of Blockchain and cryptocurrencies.

- Investigate Additional Variables: Future studies should explore psychological and cultural factors that influence user engagement with Blockchain and cryptocurrency technologies to create a holistic view of financial behaviors. Understanding these variables can provide deeper insights into how individuals interact with financial systems in the metaverse.
- Engage with Stakeholders: Researchers should actively collaborate with industry stakeholders, including technology developers, financial institutions, and policymakers, to gather practical insights and real-world data. This engagement can facilitate a better understanding of the practical applications and challenges associated with Blockchain and cryptocurrency adoption in the metaverse.

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