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Global Research Trends and Developments in Central Bank Digital Currencies (CBDCs)

Loso Judijanto[1], Nursyam Ar[2], Syamsina[3]
[1] IPOSS Jakarta
[2] Universitas Indonesia Timur
[3] Universitas Indonesia Timur

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ABSTRACT

This study explores global research trends and developments in Central Bank Digital Currencies (CBDCs) using a bibliometric approach based on data retrieved exclusively from the Scopus database. With the rapid evolution of digital financial infrastructure and growing interest from policymakers and researchers alike, CBDCs have emerged as a critical area of academic inquiry. Utilizing VOSviewer, this study analyzes publication growth, leading contributors, co-authorship patterns, thematic clusters, and citation impact from 2010 to 2024. The results reveal a significant acceleration in research output, particularly from 2020 onwards, driven by practical initiatives from central banks and international financial institutions. Influential authors and institutions—including the Bank for International Settlements, International Monetary Fund, and several leading universities—play a central role in shaping the discourse. Thematic analysis highlights dominant research areas such as monetary policy, blockchain technology, financial stability, privacy, and financial inclusion, with emerging interest in regional implementations like the digital euro and eNaira. Co-authorship and country collaboration maps indicate a highly interconnected global research network, though disparities exist in regional participation. This study contributes to a deeper understanding of the intellectual structure of CBDC research and provides a foundation for future academic and policy-oriented work in the evolving landscape of digital currencies.

Corresponding Author:

Name: Loso Judijanto
Institution: IPOSS Jakarta
Email: losojudijantobumn@gmail.com

1. INTRODUCTION

Over the last decade, the global financial landscape has undergone a significant transformation due to rapid advancements in digital technologies and the evolving nature of money. One of the most notable developments in this context is the emergence of Central Bank Digital Currencies (CBDCs). Unlike decentralized cryptocurrencies such as Bitcoin or Ethereum, CBDCs are designed to function as a secure and centralized form of digital money, with the aim of enhancing payment efficiency,

financial inclusion, and monetary policy implementation [1]. As a digital representation of fiat currency, CBDCs have garnered increasing attention from policymakers, economists, and researchers globally, leading to a surge in exploratory initiatives, pilot programs, and academic publications.

The interest in CBDCs has been fueled by a convergence of global trends. The declining use of physical cash in several countries, growing demand for real-time digital payment systems, and the potential threats posed by privately issued stablecoins have motivated central banks to explore the issuance of digital currencies [2]. Furthermore, the COVID-19 pandemic accelerated the transition toward contactless transactions and highlighted the need for resilient and inclusive payment infrastructures. Consequently, major economies including China, the European Union, and the United States have either launched CBDC pilots or are conducting feasibility studies, contributing to a growing body of literature on the subject [3].

As the momentum for CBDC research builds, a diverse range of themes have emerged, encompassing technological architecture, regulatory implications, monetary policy transmission, financial stability, privacy, and cybersecurity [4]. These multidisciplinary intersections make CBDCs a rich field of inquiry, drawing from economics, finance, law, information technology, and public policy. However, the rapid pace of development and the diversity of approaches adopted by different countries have led to a fragmented understanding of the global research landscape on CBDCs. There is a pressing need to consolidate knowledge, map existing trends, and identify gaps to guide future academic and policy-oriented work [5], [6].

Bibliometric analysis has emerged as a powerful methodological tool for synthesizing research output in a structured and systematic way. By quantitatively analyzing publication data, bibliometric studies can identify patterns, trends, and influential contributors within a given research domain [7]. In the context of CBDCs, such analysis can provide valuable insights into how research in this domain has evolved over time, who the key contributors are, what thematic clusters dominate the literature, and where emerging areas of interest lie. Despite the critical importance of CBDCs in shaping the future of monetary systems, there remains a paucity of bibliometric studies specifically focused on this topic.

While the literature on Central Bank Digital Currencies has expanded significantly in recent years, it remains dispersed across a wide range of disciplines, journals, and geographical regions. This dispersion has made it challenging for researchers, policymakers, and practitioners to grasp the overall direction and maturity of the field. Moreover, the lack of bibliometric studies on CBDC research means there is limited knowledge of the most influential works, leading authors, major research institutions, and key thematic trends. Without a systematic overview, efforts to advance the field may be hindered by duplication, overlooked opportunities, or unbalanced focus on certain aspects over others. This study addresses this gap by offering a bibliometric mapping of global CBDC research to better understand its scope, structure, and developmental trajectory. The main objective of this study is to analyze global research trends and developments in the field of Central Bank Digital Currencies (CBDCs) through bibliometric methods.

2. LITERATURE REVIEW

2.1 Definitions and Classifications of CBDCs

The foundation of CBDC research lies in establishing clear definitions and typologies. According to the Bank for International Settlements (BIS), a CBDC is "a digital payment instrument, denominated in the national unit of account, that is a direct liability of the central bank" [8]. Unlike traditional reserves held by commercial banks, CBDCs can be designed for broader public use, including individuals and businesses.

Scholars distinguish between retail CBDCs (available to the general public) and wholesale CBDCs (restricted to financial institutions), each serving distinct monetary policy and operational purposes [9]. The taxonomy proposed by [10] places CBDCs within a broader "money tree" that includes cash, central bank reserves, cryptocurrencies, and stablecoins. Their framework considers key dimensions such as accessibility, technology, and underlying liability. This classification is critical in understanding the scope and intent behind various CBDC models, particularly as countries tailor their designs based on local economic and institutional contexts.

2.2 *Technological Infrastructure and Design Choices*

Technology is at the core of CBDC development, as it determines security, scalability, efficiency, and privacy. [11] present a seminal analysis of the technological design of retail CBDCs, identifying two main approaches: account-based and token-based systems. Account-based CBDCs function similarly to bank accounts, requiring identity verification to access balances, while token-based systems resemble cash and rely on the authenticity of the token itself rather than user identity. Debates also revolve around whether CBDCs should use centralized databases or distributed ledger technology (DLT), such as blockchain. Some studies argue that DLT can enhance transparency and resilience [12], while others caution about scalability issues and energy inefficiency [13]. The choice of technology also affects interoperability with existing financial infrastructure, including payment service providers and cross-border systems. Security and privacy are further areas of concern. Research has highlighted trade-offs between maintaining transaction anonymity (to protect user privacy) and ensuring traceability (to combat illicit financial activity) [14]. Various models have been proposed to balance these factors, such as zero-knowledge proofs and tiered identity systems.

2.3 *Impacts on Monetary Policy and Financial Stability*

CBDCs have significant implications for the transmission of monetary policy and the structure of financial intermediation. Several studies argue that CBDCs can enhance monetary policy effectiveness by improving interest rate pass-through and allowing for negative nominal interest rates in a zero-lower-bound environment [15]. By offering a risk-free digital alternative to bank deposits, CBDCs may increase competition in the banking sector, potentially leading to better interest rates for consumers. However, CBDCs also raise concerns about financial disintermediation. If individuals shift large portions of their deposits from commercial banks to central bank accounts, it may undermine banks' ability to lend, especially during times of financial stress [16]. Some proposed solutions include imposing holding limits on CBDCs or offering non-interest-bearing designs to prevent excessive substitution. In addition, CBDCs may play a role in enhancing the resilience of the payment system, particularly during crises. Research during the COVID-19 pandemic underscored the vulnerability of cash-based and centralized systems, leading to renewed interest in digital alternatives [17]. CBDCs could also mitigate systemic risks associated with the dominance of private payment platforms and big tech firms.

2.4 Legal, Regulatory, and Institutional Considerations

The introduction of CBDCs requires navigating complex legal and institutional frameworks. Legal scholars have questioned whether existing central bank mandates allow for the issuance of digital currencies, particularly in jurisdictions where central bank authority is narrowly defined [18]. Legal certainty is essential for both domestic and cross-border acceptance of CBDCs. Regulatory coordination is also critical. CBDCs intersect with areas such as data protection, anti-money laundering (AML), know-your-customer (KYC) requirements, and cybersecurity. Some countries, like Sweden and the Bahamas, have begun adapting their regulatory frameworks to accommodate pilot programs, while others remain in the exploratory phase [19]. At the international level, the prospect of cross-border CBDC systems introduces questions about currency sovereignty, exchange rate volatility, and capital flow management. The BIS Innovation Hub has initiated multiple collaborative projects (e.g., mCBDC Bridge and Project Dunbar) to address interoperability and regulatory harmonization across jurisdictions [20].

2.5 Socioeconomic and Ethical Implications

Beyond technical and policy considerations, researchers have begun to explore the social and ethical implications of CBDCs. One of the most frequently cited benefits is the potential for financial inclusion, particularly in countries with large unbanked populations. CBDCs could lower barriers to access by eliminating the need for traditional bank accounts and reducing transaction fees [21]. However, critics warn that without adequate safeguards, CBDCs could exacerbate surveillance and discrimination, especially if linked to centralized identity databases or if used to restrict access to financial services [22]. There are also ethical debates around programmable money—where funds can be coded with restrictions or expiration dates—which may grant governments unprecedented control over individual spending. Gender, income, and geographic disparities in digital access must also be considered. Researchers have called for inclusive design principles that ensure CBDCs do not further marginalize vulnerable groups [23]. Educational initiatives and user-friendly interfaces are seen as key enablers of widespread adoption.

While the literature on CBDCs has expanded across a broad spectrum of themes, several gaps remain. First, much of the existing work is conceptual or policy-oriented, with limited empirical testing due to the nascent nature of implementation. Second, there is a geographic imbalance in research, with most studies emerging from developed economies and international organizations. Third, the literature is dispersed across disciplines, including economics, law, technology, and public policy, with limited cross-pollination. These gaps highlight the need for bibliometric analysis to systematize existing knowledge, identify influential contributions, and map research trajectories.

3. METHOD

This study adopts a quantitative bibliometric approach to examine global research trends and developments in the field of Central Bank Digital Currencies (CBDCs), using data exclusively sourced from the Scopus database. Scopus was selected for its broad multidisciplinary coverage and

detailed bibliographic records, ensuring a comprehensive view of academic contributions to the CBDC discourse. The search strategy involved querying the database using keywords such as "Central Bank Digital Currency", "CBDC", and related variants, filtered by title, abstract, and keywords. The inclusion criteria were limited to peer-reviewed journal articles, conference papers, and reviews published in English between 2017 and 2024. After removing duplicates and irrelevant entries through manual screening, the final dataset was exported in RIS and CSV formats compatible with bibliometric analysis software. The data were analyzed using VOSviewer, a specialized tool for constructing and visualizing bibliometric networks. Key analyses included co-authorship mapping, keyword co-occurrence analysis, citation and co-citation networks, and bibliographic coupling.

4. RESULT AND DISCUSSION

4.1 Result

a. Yearly Publication

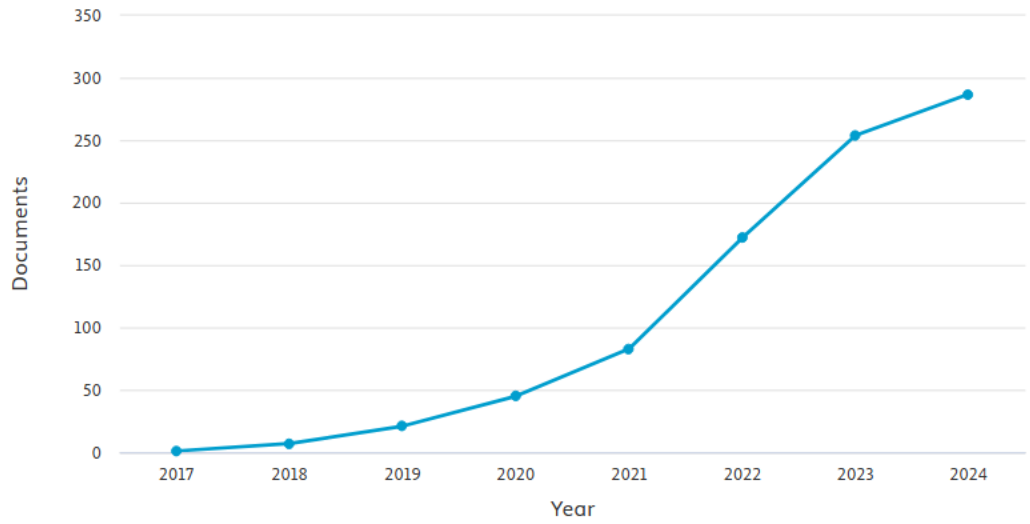

Figure 1. Documents by Year
Source: Scopus Database, 2025

The chart illustrates the annual publication trend of research documents related to Central Bank Digital Currencies (CBDCs) from 2017 to 2024 based on Scopus data. The number of publications has shown a clear and consistent upward trajectory, reflecting growing academic interest in the topic. In 2017, CBDC-related publications were minimal, with fewer than 5 documents. This number gradually increased over the following years, reaching approximately 25 documents by 2019 and nearly doubling to around 45 in 2020. A more pronounced growth occurred from 2021 onwards, with publications surpassing 100 documents. The trend continued steeply, hitting around 180 in 2022 and jumping to over 250 in 2023. In 2024, the number of publications peaked at just under 300, indicating sustained momentum and the solidification of CBDCs as a significant topic in global financial and technological research. This trend underscores the accelerating scholarly focus on digital currencies as central banks worldwide intensify their exploration and development efforts.

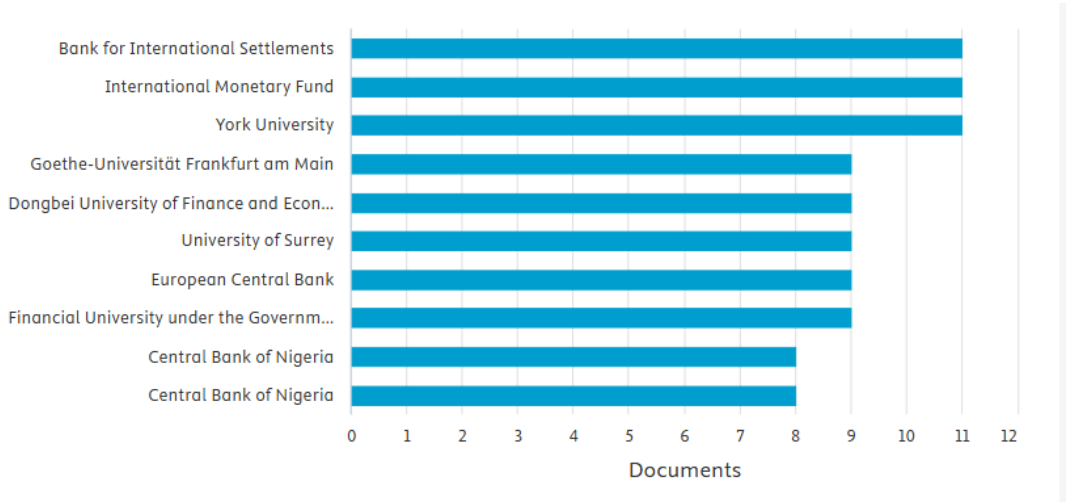

Figure 2. Documents by Affiliation
Source: Scopus Database, 2025

The chart presents the top contributing institutions in Central Bank Digital Currency (CBDC) research, based on the number of documents indexed in Scopus. Three institutions—Bank for International Settlements (BIS), International Monetary Fund (IMF), and York University—are the leading contributors, each with 11 publications. These institutions reflect the strong presence of both global financial authorities and academic bodies in shaping the discourse around CBDCs. Following closely are Goethe-Universität Frankfurt am Main, Dongbei University of Finance and Economics, University of Surrey, European Central Bank, and Financial University under the Government of the Russian Federation, each contributing 9 documents, indicating robust academic engagement across Europe and Asia. The Central Bank of Nigeria appears twice with 8 documents, highlighting its emerging role in CBDC research, possibly reflecting Nigeria's active digital currency initiatives such as the eNaira.

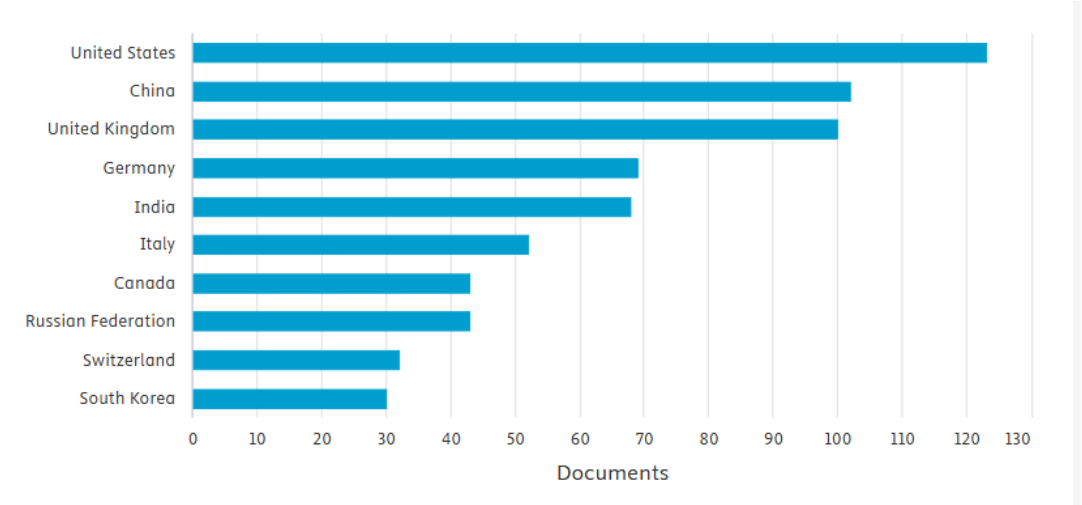

Figure 3. Documents by Country
Source: Scopus Database, 2025

The chart displays the top ten countries contributing to Central Bank Digital Currency (CBDC) research based on the number of publications indexed in Scopus. The United States leads the global research output with approximately 128 documents, followed closely by China with over 110 publications and the United Kingdom with around 100 publications. These three countries represent the major hubs of CBDC-related research, reflecting both their academic capacity and policy interest in digital currency innovation. Germany, India, and Italy form the next tier, with contributions ranging between 60 and 50 documents, showcasing growing engagement from both European and Asian economies. Canada, the Russian Federation, Switzerland, and South Korea each contribute between 30 and 45 documents, indicating notable participation in the ongoing discourse.

b. Citation Analysis

Table 1. Most Cited Article

Citations	Author and Year	Title
3490	[24]	A Next Generation Smart Contract & Decentralized Application Platform
361	[25]	Central Bank Digital Currency and the Future of Monetary Policy
323	[26]	Analysis of Blockchain technology: pros, cons and SWOT
293	[27]	Assessing the Impact of Central Bank Digital Currency on Private Banks
274	[28]	The Macroeconomics of Central Bank Issued Digital Currencies
270	[29]	The Rise of Digital Money
259	[3]	Designing Central Bank Digital Currencies
234	[6]	Rise of the Central Bank Digital Currencies: Drivers, Approaches and Technologies
230	[8]	Central Bank Digital Currency: Central Banking For All?
229	[30]	Beyond Bitcoin: Issues in Regulating Blockchain Transactions

Source: Scopus, 2025

The citation analysis highlights the most influential publications shaping the academic discourse on Central Bank Digital Currencies (CBDCs) and related technologies. Leading the list with 3,490 citations is Vitalik Buterin's foundational work "A Next Generation Smart Contract & Decentralized Application Platform", which, although not directly focused on CBDCs, has significantly influenced the broader blockchain ecosystem underpinning digital currency infrastructures. Among CBDC-specific research [25] paper "Central Bank Digital Currency and the Future of Monetary Policy" stands out with 361 citations, emphasizing its critical role in linking CBDCs to monetary policy innovation. Technical and evaluative perspectives are also prominent, such as [26] "Analysis of Blockchain Technology" with 323 citations, and [27] study assessing CBDCs' impact on private banks, which has accrued 293 citations. Other highly cited works include macroeconomic and design-focused analyses by [28], [29] (270), and [3] (259), reflecting strong academic interest in the implications, structure, and policy challenges of CBDCs. Additionally, [5] (234) provide valuable insights into global CBDC trends and technologies, while [8] and [30] (229) contribute to discussions on accessibility, regulation, and the potential for

central banks to democratize financial services.

c. Keyword Co-Occurrence Network Visualization

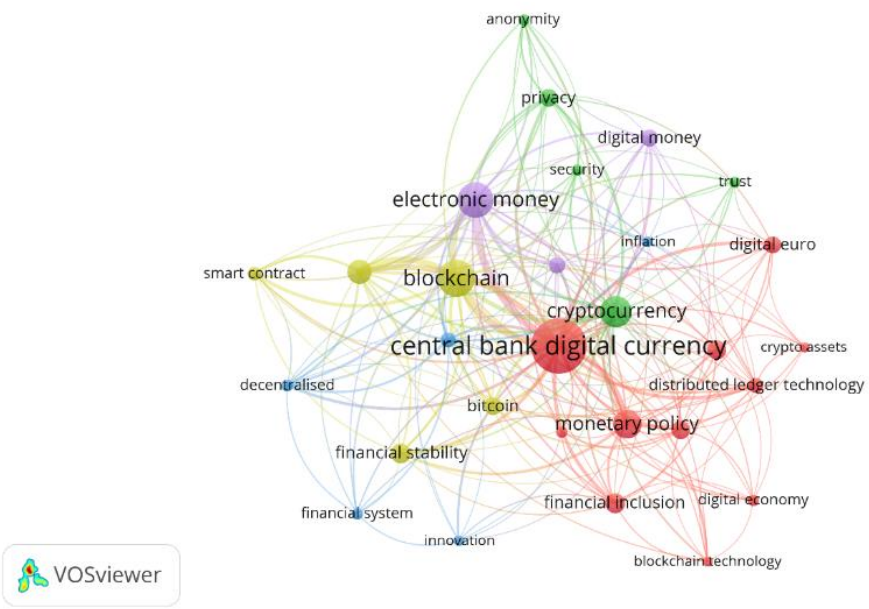

Figure 4. Network Visualization
Source: Data Analysis, 2025

The keyword co-occurrence network offers a comprehensive visualization of the thematic structure within the literature on Central Bank Digital Currencies (CBDCs). At the center of the network is the dominant keyword "central bank digital currency", highlighted in large red font, indicating its high frequency and centrality in the research discourse. Closely linked to it are other core terms like "monetary policy," "cryptocurrency," "blockchain," and "financial stability," reflecting the multidisciplinary nature of CBDC research, which spans monetary economics, technology, and financial regulation. The proximity and density of these keywords suggest frequent co-occurrence, emphasizing their conceptual interdependence.

One major thematic cluster, represented in red, focuses on the economic and policy implications of CBDCs. This cluster includes keywords such as monetary policy, financial inclusion, digital euro, distributed ledger technology, and digital economy. These terms indicate that researchers are actively exploring how CBDCs could influence macroeconomic frameworks, including monetary transmission, inflation control, and the modernization of payment systems. The presence of terms like financial inclusion also suggests growing interest in the role of CBDCs in democratizing access to financial services, particularly in underbanked populations.

The green cluster reveals a second thematic area centered around privacy, anonymity, and trust—critical issues in the public adoption of CBDCs. Terms like anonymity, privacy, trust, and security frequently co-occur, reflecting debates on how to balance individual privacy rights with the need for regulatory compliance, particularly in combating illicit activities. The connection between digital money

and these terms suggests that privacy considerations are not exclusive to CBDCs but are part of broader conversations about digital payments and data protection. Another distinct cluster, marked in yellow, is built around technological foundations, particularly blockchain, smart contract, and decentralized systems. These terms indicate that researchers are not only evaluating CBDCs from a policy standpoint but are also engaging with the underlying architecture that could support digital currencies. The presence of Bitcoin and blockchain technology in this cluster underscores the influence of earlier cryptocurrency models in shaping current CBDC designs, even though CBDCs are fundamentally centralized in nature.

The blue cluster explores themes related to financial systems, innovation, and system resilience. Keywords such as financial system, innovation, and financial stability highlight concerns about how CBDCs will integrate with existing banking infrastructures and influence systemic risk. The interlinking of these terms with blockchain and monetary policy suggests that scholars are exploring both the opportunities and the disruptive potential of CBDCs. Altogether, this keyword network illustrates that CBDC research is not confined to one domain but is shaped by dynamic interactions between technology, policy, regulation, and societal needs.

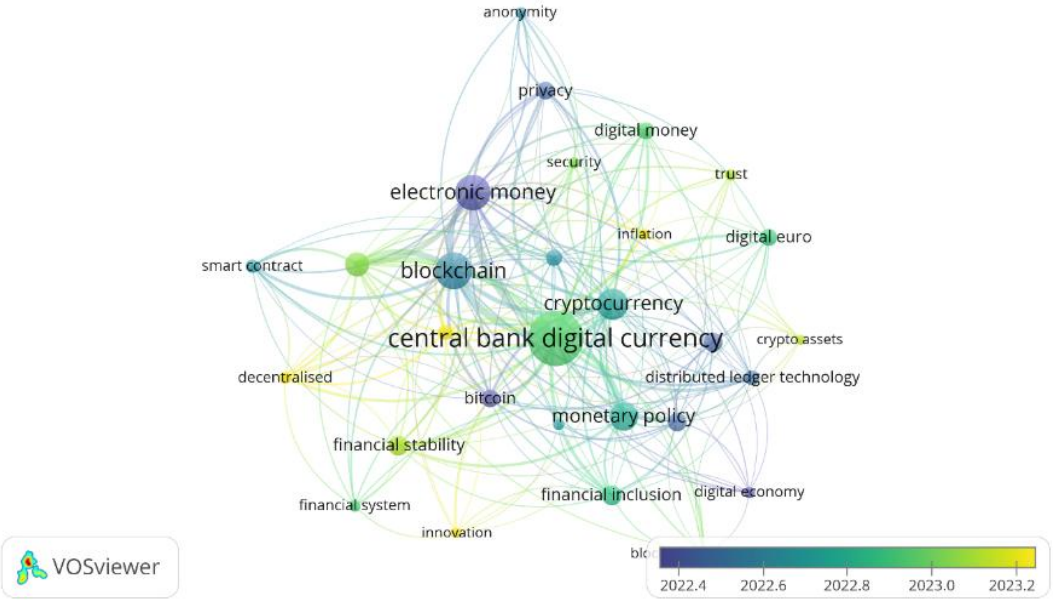

Figure 5. Overlay Visualization
Source: Data Analysis, 2025

The overlay visualization map provides a temporal view of keyword usage trends in Central Bank Digital Currency (CBDC) research. In this map, colors represent the average publication year of documents associated with each keyword, ranging from purple (earlier, around 2022.4) to yellow (more recent, around 2023.2). The central term, "central bank digital currency," appears in green, indicating it has remained a consistently relevant keyword, especially in publications from mid-to-late 2022 onward. Closely associated terms such as monetary policy, blockchain, and

cryptocurrency also appear in green and blue-green shades, suggesting they are ongoing focal points of research rather than fleeting topics.

Interestingly, terms such as "electronic money," "anonymity," and "privacy" are shaded in darker blue to purple tones, indicating that they were more prominent in earlier studies, likely as foundational or exploratory topics during the early stages of CBDC research. These terms laid the groundwork for understanding the digital transformation of money and raised early concerns about data protection and surveillance. On the other hand, newer and more topical keywords such as "digital euro," "inflation," "cryptoassets," and "trust" appear in lighter green to yellow hues, signaling a recent shift in research attention toward policy design, regulatory trust, and region-specific implementations of CBDCs.

The emergence of newer keywords in yellow, points to a geographical and technological evolution in the discourse, where national and regional initiatives are becoming more specific and defined. These recent themes reflect increasing research on practical implementation, cross-border implications, and the integration of CBDCs into broader financial ecosystems. As global institutions and governments begin to move beyond conceptual studies toward real-world pilots and policy discussions, the research focus has naturally evolved, highlighting the field's dynamic and rapidly progressing nature.

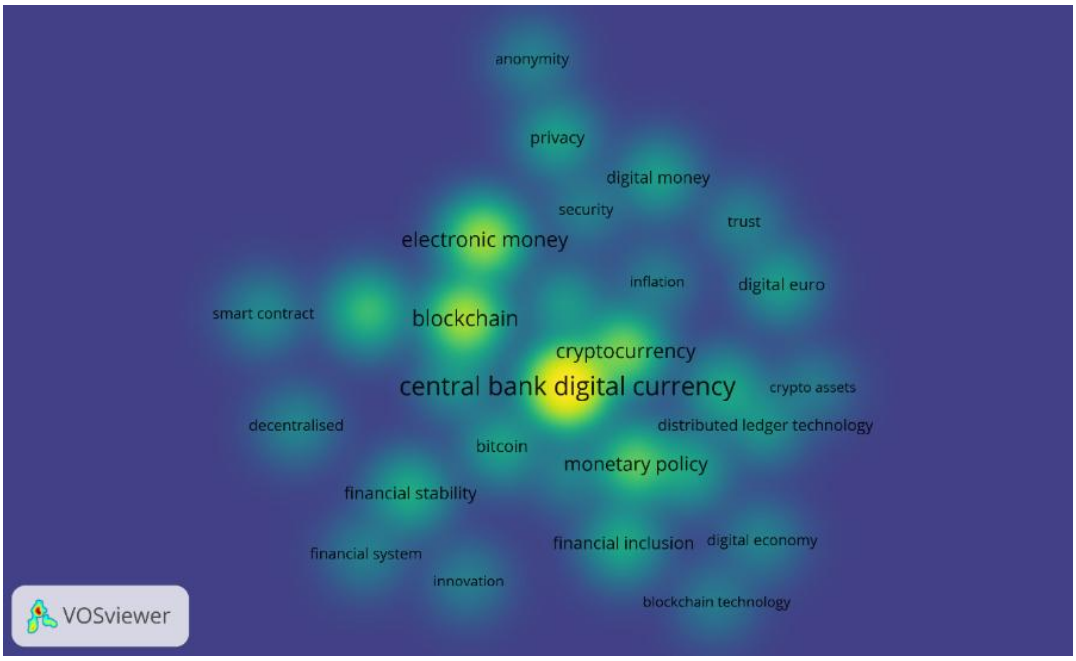

Figure 6. Density Visualization
Source: Data Analysis, 2025

The heatmap visualization highlights the frequency and intensity of keyword usage in Central Bank Digital Currency (CBDC) research. The brightest areas (yellow) represent high-density clusters of research activity, while the darker areas (blue to green) show lower levels of co-occurrence. At the center of the map, the keyword "central bank digital currency" shines the brightest, confirming its position as the most central and frequently discussed term in the field. Closely

associated terms such as cryptocurrency, monetary policy, blockchain, and electronic money also appear in green-to-yellow gradients, indicating their frequent co-mention in CBDC-related literature and their conceptual proximity to the core topic. Surrounding these central terms, a constellation of supporting keywords like financial stability, privacy, smart contract, digital euro, and distributed ledger technology shows moderate to high activity, reflecting specialized but significant subtopics within the broader discourse. These keywords are critical to discussions on the technological, economic, and regulatory aspects of CBDC implementation. Meanwhile, terms like innovation, cryptoassets, inflation, and trust appear in cooler tones, indicating that while they are relevant, they occur less frequently or are emerging as newer areas of interest.

d. Co-Authorship Network Visualization

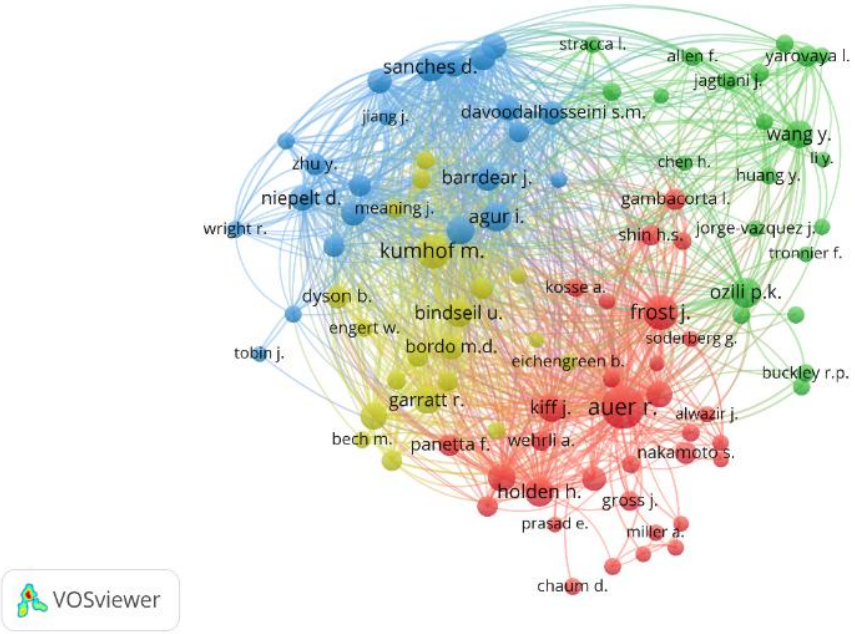

Figure 7. Author Visualization
Source: Data Analysis, 2025

The co-authorship network visualization illustrates the collaborative structure among leading authors in the field of Central Bank Digital Currency (CBDC) research. Each node represents an individual author, and the links between them signify co-authored publications, with color clusters indicating distinct collaborative communities. The red cluster, anchored by prolific contributors such as Auer, Frost, Kiff, and Holden, highlights a highly interconnected group focused on policy and institutional analysis, often associated with central banks and international financial organizations. The yellow cluster, centered around authors like Kumhof, Barrdear, and Bordo, appears to engage more with macroeconomic and theoretical modeling of CBDCs. Meanwhile, the blue cluster, featuring Sanches, Niepelt, and Davoodalhosseini, represents another strong academic grouping, likely focused on financial system implications and simulation-based research. Lastly, the green cluster, led by authors such as Ozili,

Wang, and Yarovaya, may reflect a more geographically diverse or emerging research group with a focus on regional implementations, regulation, or fintech perspectives.

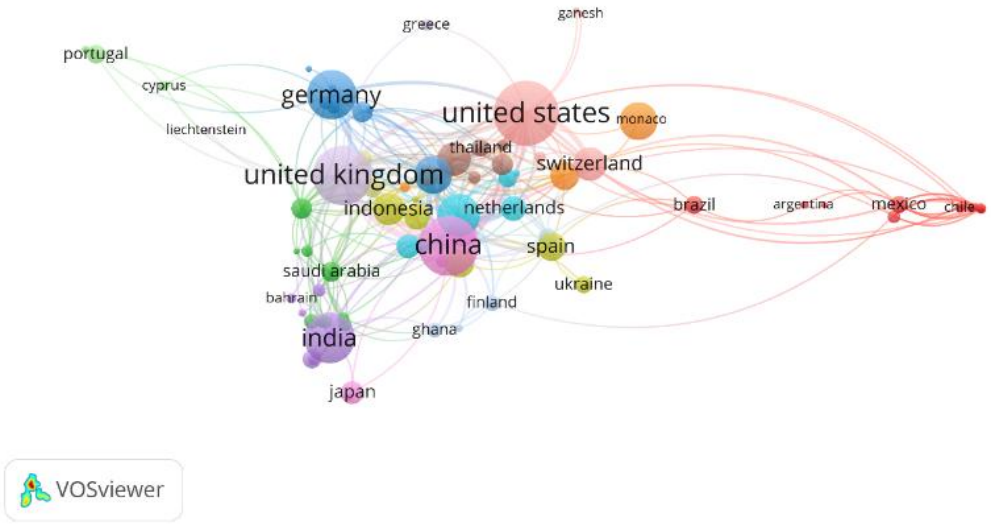

Figure 8. Country Visualization
Source: Data Analysis, 2025

The country collaboration network visualization illustrates the global research cooperation on Central Bank Digital Currencies (CBDCs), with each node representing a country and links indicating co-authored publications. The United States appears as the most central and interconnected country, denoted by its large node size and extensive links to numerous other countries, signifying its dominant role in international CBDC research. Strong collaborative ties are also visible among European nations, particularly the United Kingdom, Germany, and Switzerland, forming a dense research cluster with countries such as Netherlands, Spain, and Finland. China and India are also prominently positioned, actively collaborating with both Western and Asian partners, reflecting their growing influence in CBDC development. Emerging participation from countries like Indonesia, Saudi Arabia, and Brazil highlights increasing contributions from the Global South. In contrast, countries like Mexico, Chile, and Argentina appear more isolated, with fewer international collaborations, suggesting potential areas for expanding global research integration.

4.2 Discussion

a. Accelerating Growth and Global Relevance

The steady and steep increase in the number of CBDC-related publications from 2017 to 2024 signals a clear and growing global interest in the topic. Starting from just a handful of documents in 2017, research output surged to nearly 300 in 2024, marking a tenfold increase within a short span. This trajectory reflects not only heightened academic attention but also the rapidly shifting priorities of central banks, policymakers, and financial institutions worldwide. The timing of this growth also aligns with major events—such as the announcement of China's digital yuan, the European Central Bank's digital euro initiatives, and the launch of Nigeria's eNaira—which likely served as catalysts for scholarly

inquiry. This surge also indicates that CBDCs are no longer viewed merely as theoretical constructs but have moved into the realm of practical experimentation and policy implementation. The urgency with which central banks are addressing the issue has been mirrored in academia's response, resulting in interdisciplinary studies spanning economics, law, information systems, cryptography, and political science.

b. Institutional Leadership and Author Influence

Analysis of institutional contributions reveals that supranational financial institutions such as the Bank for International Settlements (BIS) and the International Monetary Fund (IMF) are among the most prolific contributors, each producing 11 documents indexed in Scopus. This finding underscores their influential roles in shaping global narratives and technical guidance on CBDC development. Notably, their work tends to bridge research and policy, focusing on cross-border interoperability, regulatory design, and financial stability. Universities such as York University, Goethe University Frankfurt, and University of Surrey also rank highly, indicating that academic institutions are not only engaging with the technological and economic dimensions of CBDCs but are also contributing to critical and conceptual analysis. The presence of central banks like the European Central Bank and Central Bank of Nigeria in the top 10 list of contributors further reflects the active participation of central monetary authorities in the academic domain, a relatively rare phenomenon in other areas of economic research.

At the author level, scholars such as Raphael Auer, Jon Frost, Michael Kumhof, Tommaso Mancini-Griffoli, and David Andolfatto emerge as central figures in the co-authorship network. Their work often lies at the intersection of theory and policy and is widely cited. These authors represent institutions like the BIS, IMF, and central banks, reinforcing the point that CBDC research is heavily influenced by individuals embedded within policy-making ecosystems. The dense and colorful co-authorship network also illustrates a high degree of collaboration, suggesting that CBDC research benefits from strong interdisciplinary and inter-institutional partnerships.

c. Dominant and Emerging Themes

Keyword co-occurrence and density visualizations reveal that the thematic core of CBDC research is centered around terms like "central bank digital currency," "blockchain," "cryptocurrency," "monetary policy," and "financial stability." These keywords signify the dominant concerns of the field: technological foundations, macroeconomic implications, and institutional impact. Closely related terms such as "electronic money," "digital economy," and "distributed ledger technology" emphasize the infrastructural and operational aspects of CBDCs. The presence of terms such as "privacy," "anonymity," and "trust" indicates increasing attention to ethical and social concerns, particularly around surveillance, data security, and user acceptance. These issues are critical as central banks explore the balance between transparency and confidentiality in digital transactions. The thematic inclusion of "financial inclusion" also suggests a parallel policy narrative: that CBDCs can serve as tools for economic equity, especially in developing and underbanked regions. Overlay and temporal visualizations further show that topics like "digital euro,"

"cryptoassets," and "inflation" are more recent additions to the research landscape, indicating evolving areas of interest. These emerging terms point to the next frontier in CBDC research—where design models are being localized, cross-border implications are scrutinized, and macroeconomic impacts are tested against real-world inflation and financial cycle scenarios.

d. Geographical Distribution and Collaboration

The analysis of country contributions reveals a dominant presence of the United States, China, and the United Kingdom, which together account for the highest volume of publications. This reflects not only these countries' research capacity but also their strategic interest in digital currency innovation and leadership. Notably, the United States and China have taken differing approaches: the former adopts a cautious, policy-heavy route through its Federal Reserve system, while the latter has already deployed and tested a retail CBDC model through the digital yuan. The UK, on the other hand, stands out for its academic rigor and central bank-driven exploratory work. Countries like Germany, India, Italy, and Canada follow closely, contributing substantial scholarly work and often collaborating with international partners. The co-authorship map shows a well-connected global research community, with strong cross-border ties—particularly between the U.S., European nations, and Asian powerhouses. However, regional clusters such as Latin America appear more isolated, with limited international linkage, suggesting the need for greater inclusion in global research efforts, especially as countries like Brazil, Mexico, and Chile also begin exploring digital currency solutions.

e. Intellectual Structure and Citation Influence

The citation analysis provides insights into the intellectual structure underpinning CBDC research. Highly cited works such as Bordo and Levin's paper on the future of monetary policy, Andolfatto's assessment of CBDC impacts on private banks, and Auer et al.'s exploration of CBDC drivers and technologies are foundational to the field. These papers serve as cornerstones for subsequent studies, offering both theoretical frameworks and empirical findings that guide policy experimentation. Notably, Vitalik Buterin's Ethereum whitepaper remains the most cited publication, though it falls outside the strict CBDC category. Its influence underscores the foundational role of blockchain technologies in shaping the infrastructure of digital currencies, even those managed by central authorities. This highlights the permeability between academic, technical, and practical domains in CBDC research and the importance of cross-sector knowledge exchange.

f. Implications and Future Directions

The findings of this bibliometric study carry several implications. First, the rapid growth of CBDC research necessitates continual mapping to stay abreast of evolving trends and to avoid duplication. Second, the centrality of policy institutions in driving research suggests the need for academic independence to maintain balanced, critical inquiry. Third, the emergence of new themes such as programmable money, digital identity, and cross-border interoperability points to the diversification of the field and the potential for niche specialization. Future research may benefit from deeper exploration of user adoption behavior, cross-comparative case studies of CBDC pilots, and the legal

infrastructure required for implementation. There is also a gap in the literature regarding CBDC's impact on geopolitics and the international monetary system—a domain increasingly relevant as digital currencies become tools of economic influence.

5. CONCLUSION

This bibliometric study provides a comprehensive overview of the global research landscape on Central Bank Digital Currencies (CBDCs), revealing significant growth in academic output, diverse institutional and geographic participation, and evolving thematic focuses. The findings demonstrate that CBDC research has transitioned from conceptual exploration to applied and policy-driven inquiry, with major contributions from central banks, international financial institutions, and academic scholars. Key themes such as monetary policy, blockchain technology, privacy, and financial inclusion dominate the discourse, while recent trends highlight growing interest in regional implementations and cross-border considerations. The collaborative nature of the field, as evidenced by dense co-authorship and country-level networks, suggests a dynamic and globally interconnected research environment. These insights not only map the intellectual structure of CBDC scholarship but also offer a foundation for future studies to build upon, particularly as the world moves closer to the real-world deployment of central bank digital currencies.

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