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Review

Fintech, Bigtech Credit and Economic Growth: A Bibliometric Review and Meta Analysis

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Abstract: The financial sector plays a vital role to improve economic performance. Development of innovative lending strategies is necessary since debt is the largest form of finance. FinTech and BigTech credit are such innovative ways in the new era of extreme technological advancements that help ensure the economy is inclusive and grows in a sustainable manner. This paper applies a bibliometric review and meta-analysis by utilizing the SCOPUS database to explore the academic research that has been conducted on FinTech/BigTech credit and economic growth. The VOSviewer software was utilized to construct and visualize the bibliometric networks from the extracted data. Our findings show a massive increase in documents published on this topic between 2019 and 2022. Bank concentration, bank minimum capital requirements, market inefficiencies, financial inclusion and regulation on technological innovation were identified as key factors to influence FinTech/BigTech credit adoption. The significance of the study is that we identify the research gaps from previous studies and demonstrate the importance of establishing the nexus between FinTech/BigTech credit and economic growth.

Keywords: FinTech; BigTech Credit; Economic Growth; Sustainability; Financial Inclusion; Regulation; Bibliometric Review

1. Introduction

The three main forces that drive the economy are productivity growth, short-term debt cycle and the long-term debt cycle (Berger & Udell, 1998). Financial services integrating with digital technologies has significantly bridged the gap that existed previously between the banked and unbanked (Liu, Luan, Wu, Zhang & Hsu, 2021). The credit granting process is now different because technology could analyze a plethora of data and work with individuals considered high risk with a huge probability of default in the past (Beck, 2020). Therefore, assessment by lenders to safeguard their interests on creditworthiness to determine the default rate is more diverse across various variables (Munangi & Sibindi, 2020). Technology helps to produce more as better improved tools are developed which makes work to be done more efficiently over a shorter period (Prisecaru, 2016).

Economics subscribes to the notion that financial sector development or supply of finance results in economic growth (Ahmad & Malik, 2009). The financial sector connects savers to borrowers and provides impetus for economic growth (Sufian & Habibullah, 2012). Credit granting is one tool that ensures people acquire capital and can be productive, therefore, necessitates new lending strategies and new approach to conducting customer due diligence and credit score assessment (Turlais, 2016).

Advanced methodologies adopted with improved analysis cater for idiosyncratic risks of borrowers. BigTech/FinTech credit help to achieve inclusive finance development that stimulates economic growth. Policies for monitoring purposes are needed to ensure there is no reckless lending. Structured policy reforms that create opportunities for everyone to attain regenerative and distributive economies (Rahman & Alam, 2021).

The balance of supply and demand in the credit market leads to sustainable economic development through prevention of over-indebtedness (Nyaruwata, 2009). Lending must be approached with caution since inequalities remain in institutional processes on type of credit and terms and conditions for the loans to previously marginalized groups on assessment of ability to repay (Dwyer, 2018). The financial sector reduces income inequality where there are poor rules of law (Úbeda, Forcadell, Aracil & Mendez, 2022). Debt should not rise faster than income, and income not rise faster than productivity (Rode, 2020). When total money and credit increases but does not match the goods produced this leads to inflation (Girdzijauskas, Streimikiene, Griesiene, Mikalauskiene & Kyriakopoulos, 2022). Inflation is a macroeconomic factor that influences interest rates and policy adoption that alters economic growth (Njoki, 2014).

Monetary policies set interest rates to control inflation (Wambui, 2013). Borrowers find it difficult to borrow when interest rates are high, so money supply grows slowly, which then assists to control inflation (Duncan, 2011). On the other hand, people find it easier to borrow when interest rates are low, so money supply grows quickly, which ultimately raises inflation. Raising productivity leads to a flow of economic growth which is sustainable. Sustainable growth is pivoted on a financial system that prioritizes the best investment projects (Gros & Alcidi, 2013). This involves being agile to adapt to inclusive innovation, such as FinTechs that advocate for green financing (Vergara & Agudo, 2021).

BigTech/FinTech credit lending platforms have grown across the world (Cornelli, Frost, Gambacorta, Rau, Wardrop & Ziegler, 2020). These platforms have resolved the information asymmetry problem. They are managing to expand credit to households and small businesses reducing transaction costs and improving efficiency (Mishkin & Strahan, 1999). Even though lending decisions and efficiency of processes improves, it is however argued that the results show an increase of information asymmetry problems by other authors (Fasano & Cappa, 2022). Technology has been disruptive; however, competition must not be destructive but instead encourage efficiency and collaboration. FinTechs/BigTechs should complement banks so that society benefits through synergy (Suprun, Petrishina & Vasylchuk, 2020). Bank strength being resources and security even against cyber risks, and FinTechs on the other hand bringing new technologies. FinTechs also assist with economic growth and economic development considering welfare and the well-being of a country (Musabegovic, Ozer, Djukovic & Jovanovic, 2019).

FinTech/BigTech credit volumes, their percentage share of the credit markets and potential impact on economic growth must be investigated (Cornelli, Frost, & Gambacorta, 2020). Their growth in credit volumes has been observed to be driven by regulation, competition in the banking sector and an economy's development (Frost & Turner, 2018). A research gap has been observed to exist on the impact of FinTechs on the financial sector as well as on the entire economy (Bahrini & Qaffas, 2019). Against this backdrop the aim of the study is to determine the factors that drive alternative credit and to establish the link between FinTech/BigTech credit and economic growth. A bibliometric literature review is employed in this regard to establish the productive trends, identify some top

influential authors, most influential documents and the most influential sources in this realm. Furthermore, it helps to have a network analysis and visualization that includes citation analysis of documents, co-citation analysis of authors and analysis of co-occurrence. Meta-analysis is also conducted to map a direction for future studies.

The rest of the article is organized as follows: Section 2 reviews the related literature. Section 3 presents the research methodology employed to execute the study. The research findings are presented and discussed in Section 4. Lastly, Section 5 concludes the article.

2. Literature Review

2.1. Overview of FinTech/BigTech Credit

Developments in technology through innovation is rapidly transforming the financial, monetary and credit systems (Gomber, Kauffman, Parker & Weber, 2018). Online platforms make use of digital technology to interact with customers to offer credit making use of huge amounts of data. FinTech credit has predominantly been more successful in countries with higher income levels but low competitive banking system (Claessens, Frost, Turner & Zhu, 2018). In addition, less stringent regulation encourages FinTech credit advancement. Contrarily, the regulations have built consumer confidence adding to new digital tools and automation pushing marginal costs down and reducing transaction costs (Arner, Barberis & Buckley, 2017). Other factors besides regulation and technological advancements that affect FinTech adoption include competitive environment, unmet demand and changing demographics (Frost, 2020).

Technology companies due to their nature acquire huge amounts of data which they obtain and can process in real time (Shamim, Zeng, Shariq & Khan, 2019). Information obtained allows the Tech firms to effectively measure loan quality and potentially reduce loan defaults. Business models that drive alternative finance are in most cases technology enabled and offering funds quickly from a wide range of investors. Technology has become a useful tool to enhance existing financial capabilities (Dawei, Anzi & Gen, 2018). It improves results from previous studies that highlighted stability of macroeconomic environment leading to sustainable economic growth, well measured economic policies positively impacting growth, inflation rate managed and budget deficit reduced for the economy to grow (Fischer, 1993).

2.2. Theoretical Literature Review

2.2.1. Bank Market Power

Competition eradicates monopoly previously enjoyed by traditional institutions (Gąsiorkiewicz, MonkiewiczJ & MonkiewiczM, 2020). Monopoly without competition through barriers to entry led to inflated prices and resulted in financial exclusion. Competitive behavior of banks affects individual and firm access to financial services. Banks with market power will have resources to invest in technologies to acquire necessary information. However, higher bank market power seems to increase the cost of credit for firms, but the effect is very small. It was only disruptive innovation that could force itself in the financial services market. This led to competition induced innovations and that increases productivity and ultimately grows the economy (Hunt, 2012). FinTechs through their innovative methods have disrupted the financial sector and come up with methods to reach many

customers who were not regarded as credit worthy by using the vast amount of data at their disposal which was not regarded useful.

In developing countries, bank market power has resulted in a negative relationship with cost efficiency, but positive with profit efficiency and stability (Turk Ariss, 2010). The results align to the objective of those already in the market blocking new entrants to maintain huge profits. Established institutions on the other hand enjoy cost asymmetry due to economies of scale. There is also competition for customers when market concentration is low. This leads to low interest rates being charged by those offering credit which makes many people to be able to afford to take loans. Therefore, there is a direct link between bank market power, financial inclusion and economic growth.

2.2.2. Credit Creation Theory

Banks create money and increase money supply through Fractional Reserve banking. Money is created collectively through multiple deposits (Starkey, 2018). When savers deposit money and it is lent out, it in most cases is deposited into banks again by the borrowers through expenditure (more borrowing leads to more expenditure). Banks create credit (Freimanis & Šenfelde, 2019). Reserve requirement is money that should be left in the bank when deposited by a saver that should not be lent. Stability is enabled when borrowers pay on time. Money multiplier which is equal to 1 divided by the reserve ratio. It is the calculation of the amount of money generated by the banks from their reserve requirement. The concept is because we do not all go to the bank at the same time and demand for our money, that causes a bank run leading to default.

2.2.3. Quiet Life Theory

Trading off higher profits for less risk to enjoy a quiet life. Market power influences risk return preference behavior towards risk avoidance (Tabak, Gomes & da Silva Medeiros, 2015). Banks would therefore hold less loans since loans are riskier. This is more the case in monopolistic markets rather than competitive markets. However, a monopolistic creditor in a concentrated credit market is more likely to offer credit to upcoming firms since they can leverage on time, future rents (Petersen & Rajan, 1995). A mixed relationship was regarded the best description between bank competition and risk-taking as results from previous research produced conflicting results (Boyd & de Nicoló, 2005).

2.2.4. Intermediation and Technological Adoption

Financial intermediation is the process by which financial institutions accept savings and lends them out. The theory was developed from the works of Gold Smith, Gurley and Shaw in 1955 who discussed institutionalization of the process of financial intermediation (Amaira & Amairya, 2014). Financial intermediaries are the institutions that transfer the funds between the savers and borrowers. It is the dominant theory of banking with liquidity, risk and information as the three main intermediation functions (Freimanis & Šenfelde, 2019). Fintech credit is credit activity facilitated by electronic (online) platforms. New lending tools and various ways to evaluate credit worthiness have become useful to attain the financial inclusion agenda. Third party payment service providers, that is, Account Information Service Providers (AISPs) and Payment Initiation Service Providers (PISPs) have been introduced as addition to the traditional method (Braun, 2018).

The new services offered by new players in the financial markets space has led to an increase in FinTech adoption. Information and Communications Technology (ICT) has been found to have a

positive relationship on economic growth in both developing and developed countries (Appiah-Otoo & Song, 2021). Results further revealed that the increased influence is dominant in poor countries. In support, ICT adoption increases economic growth both in the short and long run (Hussain, Batool, Akbar & Nazir, 2021). However, it is one of many drivers of economic growth. Other studies revealed the need for an integrated policy since ICT infrastructure development, financial inclusion and economic growth are interdependent (Pradhan, Arvin, Nair, Hall & Bennett, 2021).

Technology adoption is a complex matter that goes beyond just innovation in technology (Sharma & Mishra, 2014). It involves understanding users' attitude, personality, trust in the system and the society in which the people live among other factors. Technical adoption model can play a significant role in FinTech/BigTech adoption. The determinants of adoption are based on perceived usefulness and perceived ease of use and user acceptance of Information Technology (Davis, 1989).

2.3. Determinants of FinTech/BigTech Credit

2.3.1. Bank Access

Financial inclusion is when both individuals and businesses have access to finances and use financial services in a sustainable manner (Yengeni, 2020). Bank access has improved spending decisions of many individuals through budgeting apps that also help with savings. Algorithms and computer programs for delivery of financial services entails digital financial inclusion (Ozili, 2018). Financial inclusion goes hand in hand with poverty alleviation (Kebede, Naranpanawa & Selvanathan, 2021). Statistics show many people without bank accounts in Africa (Demirgüç-Kunt, Klapper, Singer, Ansar & Hess, 2017). Access to and availability of the facilities due to poor infrastructures continues to be a limiting factor.

2.3.2. Government Intervention

Government is a critical part of the FinTech ecosystem that handles financial regulators and legislature. The level of governance improves financial inclusion and maximizes economic growth (Emara & El, 2021). Government policies also play a role to attain the financial inclusion objective (Evans & Adeoye, 2016). The policies that governments enforce can reduce the tax burden on small businesses and encourage them to operate (Khanh & Loc, 2018). Businesses are generally inclined to invest where there is less red tape and no unnecessary stringent regulations.

2.3.3. Business Models (Ease of doing business)

The six (6) Fintech business models are insurance services, crowdfunding, payment, lending, wealth management, and capital markets (Lee & Shin, 2018). To lead in the current market therefore requires use of technology to gather relevant data, which creates an opportunity to target individuals directly to meet their needs accordingly. There is a significant shift in banking business models from the traditional model. We witness collaboration in the Fintech ecosystem with developments such as open banking (Sitea, 2020). Open banking is a model in which banks share data between two or more affiliated parties to deliver and enhance capabilities to the market place.

The business model canvas involves nine (9) elements of customer segments, customer relationships, channels, revenue streams, cost structures, value propositions, key activities, key resources, and key partners (Keane et al., 2018). This enables platform-based online services to

become more personalized, seamless, quick and safe. However, implementation differs because of heterogeneity in business models of the various FinTech segments of Payments, Insurtech, Regtech, Wealthtech, Blockchain/cryptocurrency, cybersecurity (KPMG, 2021).

2.3.4. Bank Efficiency

A bank is efficient when it is offering excellent services and has reduced its costs. The increase in digitalization is useful to improve effectiveness and minimize costs (Beck, 2020). Systems are refined to lower operational costs and reduce turnaround time as there is real-time managerial information provided. Virtual banks as an example reduce significant costs of maintaining a branch network. FinTechs have low-fee services because they have no offices and incur no maintenance costs on buildings. This in turn lowers the fees and interest rates they charge customers and has resulted in financial institutions performing well despite the competition (Nilsson & Fredholm, 2020). Furthermore, FinTechs have offered fee versus interest driven models in credit.

2.3.5. Trust

Age, educational background, and ethnicity are among the elements that play a role on the numbers for those who choose FinTech credit (Ghosh, 2021). There is a direct nexus between bank misconduct and the expansion of online lending where there is generalized trust (Bertsch et al., 2020). The authors' further mention that perceived unfair treatment by banks and the great recession is a reason why other borrowers explore online alternatives. Security of data, integrity of institutions, privacy, accountability and reliability of service offering are key as this will allow for acceptance and build trust to enable execution (Zhang & Lee, 2003).

2.3.6. Financial Regulation

The interests of all stakeholders must be safeguarded ensuring consumer protection and encouraging FinTech innovation (Jagtiani & John, 2018). This happens when governments create a stable financial environment to support the economic development. The balance of digitized regulation around innovation and financial stability is very important (Arner, Zetzsche, Buckley & Barberis, 2017). This necessitates standardization and governance of Application Programmable Interfaces (APIs) and expedite supervisory oversight. The main challenge is that innovation comes before regulation, hence, plays catch up. The ideal is for regulation to move at the same pace with innovation to support changes. Regulation is slow and incompatible with digital transformation, therefore rethinking new approaches to regulation is required since the link between regulation and innovation ensures sustainability in any industry. It even deals with issues of bias where regulatory risk models are involved.

Stringent legislative requirements can be a barrier to entry in the financial market for FinTechs even though it does cement financial stability and improves resilience (Claessens, Coleman & Donnelly, 2018). Regulatory sandboxes allow for risk management especially in cases where new business models are implemented (Restoy, 2020).Therefore, it is important to determine the correlation that exist between FinTech credit and regulatory stringency.

2.3.7. Bank Credit

Bank credit had not been easily accessible in the past until the emergence of BigTech and FinTech credit. Failure to access bank credit has been negatively affecting countries' economic growth due to the limited number of people to participate in economic activities. This is because the lending standards had been too stringent (Berlin, 2009). However, the alternative credit seems to complement bank credit because it has reached out to the unbanked (Cornelli, Frost, Gambacorta, Rau, Wardrop & Ziegler, 2020).

2.3.8. Bank Competition

When there is no competition among banks, they are in a stronger position to charge high interest rates. There are greater chances for collusive pricing (Kaluwa & Chirwa, 2017). Since the banks will be holding all the cards, they will not be willing to take any risks (Mishi, Sibanda & Tsegaye, 2016). Bank competition improves bank's efficiency and results in higher profitability (Amidu & Wolfe, 2013). There is greater stability in a competitive environment with higher level of diversification.

2.3.9. Stock Market Development

It is vital to establish the role stock market plays in economic growth. The stock market is not the economy, it is simply a forward-looking pricing machine. Hence, volatility in the market does not always get attention to affect monetary policy. Locals benefit when they buy, sell and issue securities in a well-functioning stock market (Demirgüç-Kunt & Levine, 1996). It is however important to ascertain the relationship between GDP growth and stock returns. It can be argued that economic growth does not benefit stockholders and has a negative correlation with stock market returns (Ritter, 2012). On the contrary however, other authors found increase in GDP to have a positive impact on stock market performance (Indangasi, 2017). Economic growth has a positive relationship with stock market development (Vazakidis & Adamopoulos, 2009).

3. Methodology

3.1. Bibliometric Review and Meta-analysis

A bibliometric review and meta-analysis were applied in this study. The bibliometric review relates to the use of quantitative studies on research publications to assess scientific research. The application uses both statistical and mathematical methods to evaluate the quality and quantity of published documents to establish trends or pattern of a specific research area. The bibliometric review method measures impact of published articles and citations after statistical analysis thereof that show linkages between articles (Fetscherin & Heinrich, 2015). Meta-analysis on the other hand combines the results of multiple scientific studies. Performance of articles is illustrated through matrices such as number of citations and total h index. VOSviewer software has been used to conduct citation analysis of documents, co-citation analysis of authors and analysis of co-occurrence bibliometric techniques.

3.2. Data and Methods

For the purpose of this study, we used: (1) SCOPUS database to acquire data for analysis; (2) Microsoft Excel to calculate the frequencies of the published materials and to design the relevant chart and graph; and (3) VOSviewer software to construct and visualize the bibliometric networks;

The data was retrieved from the SCOPUS database using an appropriate Boolean mix of keywords with query string as "FinTech credit" OR "BigTech credit" AND "Economic Growth". These keywords were entered into the SCOPUS advanced search TITLE-ABS-KEY interface as a part of a title or words mentioned in the abstract. The focus on title and abstract narrows our search to obtain relevant topic that is significant to our research area together with assisting to attain objective of the study. This step returned 50 articles, and after screening only for those written in the English language, a total of 49 documents have been obtained to conduct the bibliometric analysis.

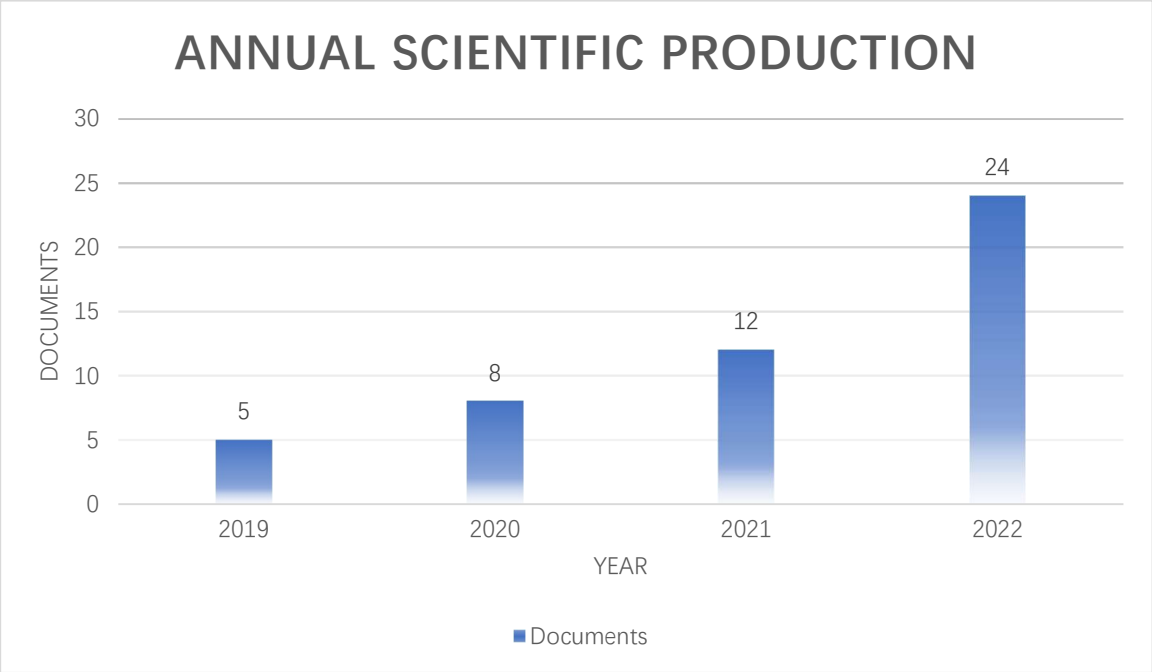
The bibliometric methodological approach reviews the past and assesses the current situation to map beneficial course of action on FinTech/BigTech credit that can improve economic growth if the relevant link is established and various elements of work identified that can add value.

4. Research Findings

4.1. Main Information About Data

The sample data for this study was collected for the period 2019 to 2022 and found 49 documents limited to the English language that consist of 41 articles, 2 review studies, 2 books and 4 book chapters. Subject area of Economics, Econometrics and Finance as expected has the most documents with a total of 33,00%, followed by Business, Management and Accounting with 20,90% due to the nature of the study.

4.2. Production Trends from the Sample of the Study



Source: Authors' own compilation (Data sourced from SCOPUS).

Figure 1. Number of documents and year of publishing.

Figure 1 shows the state of publishing from our sample in the research area on FinTech/BigTech credit and economic growth. There has been an exponential increase from 2019 to 2022 the timeframe the data was analyzed. This shows that the nexus between FinTech/BigTech credit and its potential impact on economic growth has become more relevant in recent years. This could be as a result of COVID-19 that escalated the need to be more reliant on technology, therefore making users comfortable and knowledgeable of its use. In addition, the world economy has been under tremendous strain experiencing stunted growth, therefore it has become crucial to establish and develop creative ways that can provide solutions.

4.3. Most Influential Authors from Sample of the Study

Table 1 illustrates the impact of authors based on the total citations. These authors act as respected reputable voices around area of study. A list of 6 most prolific authors based on our sample in the research area is presented with details of their first year of publishing, total published papers, h-index (a metric that evaluates author's research performance based on quantity and quality of work), total citations, current affiliation and country.

Table 1. Influential authors from sample of study.

List of 6 most prolific authors in research area

Author	Scopus Author ID	Year of 1st Publication	TP	h-index	TC	Current affiliation	Country
Allen Franklin	7102515412	1982	122	47	12458	Imperial College London	United Kingdom
Huang Yiping	55716988300	1995	96	18	1371	Peking University	China
Le Tu DQ	57195804943	2017	32	9	263	Viet Nam National University	Viet Nam
Lechman Ewa	56499101500	2014	29	8	209	Gdansk University of Technology	Poland
Marszk Adam	56499260300	2014	17	7	130	Gdansk University of Technology	Poland
Nguyen Dat T.	57221266939	2020	11	3	25	Viet Nam National University	Viet Nam

***TP**: Total Publication **TC**: Total Citation*

*Note: **h-index** is based upon number of documents and number of citations*

Source: Authors' own compilation (Data sourced from SCOPUS).

4.4. Most Influential Documents from Sample of the Study

Table 2 is arguably the most important as it helps to identify areas for future research. Literature that speaks to the connections relevant to the topic under the research study that paves a way for future research exposing the research gaps. Scope for future research can be retrieved from two of the most influential documents from our sample with the highest Field-Weighted Citation Impact (FWCI) figures. The first document published in 2022 with a FWCI score of 13,92 by Allen, F., Gu, X., and Jagtiani, J identified challenges in regulation of technology as a future area of study (Allen, Gu & Jagtiani, 2022). This is in line with emphasis on the importance of regulatory supervision to protect customers and maintain financial stability when enjoying opportunities of financial innovation as stated by Frost J. with the third highest FWCI score of 7,13 in 2020 (Frost, 2020). The other influential document by Hodula, M., with an FWCI score of 10,37 identified the areas for future research to emanate from market inefficiencies such as higher interest margins, slow loan application procedures that may lead to room for FinTech credit (Hodula, 2022).

Table 2. Most cited authors and the article title.

Author	Title	Source	Year	Citations	FWCI
Croutzet, A., Dabbous, A.	Do FinTech trigger renewable energy use? Evidence from OECD countries	Renewable Energy 179, pp. 1608-1617	2021	15	2.22
Hua, X, Huang, Y	Understanding China's fintech sector: development, impacts and risks	European Journal of Finance 27(4-5), pp. 321-333	2021	13	4.75
Kanungo, R.P., Gupta, S.	Financial Inclusion through digitilisation of services for well-being	Technological Forecasting and Social Change	2021	12	2.76
Allen, F., Gu, X., Jagtiani, J.	FinTech, Cryptocurrencies, and CBDC: Financial Structural Transformation in China	Journal of International Money and Finance	2022	10	13.92
Jiao, Z., Shahid, M.S., Mirza, N., Tan, Z.	Should the fourth industrial revolution be widespread or confined geographically? A country-level analysis of fintech economies	Technological Forecasting and Social Change	2021	9	2.21
Hodula, M.	Does FinTech credit substitute for traditional credit? Evidence from 78 countries	Finance Research Letters	2022	8	10.37
Yeo, E., Jun, J.	Peer-to-peer lending and bank risks: A closer look	Sustainability (Switzerland) 12(15)	2020	8	0.82
Petralia, K. Philippon, T., Rice, T., Veron, N.	Banking disrupted?: Financial intermediation in an era of transformational technology	Geneva Reports on the World Economy 2019(22)	2019	7	1.08
Lechman, E. Marszk, A	ICT-driven economic and financial development: Analyses of European Countries	ICT-Driven Economic and Financial Development: Analyses of European Countries pp. 1-311	2019	7	1.95
Tritto, A., He, Y., Junaedi, V.A.	Governing the gold rushinto emerging markets: a case study of Indonesia's regulatory responses to the expansion of Chinese-backed online P2P lending	Financial Innovation 6(1), 51	2020	6	0.97
Allen, F., Qian, J., Qian, M	A Review of China's Institutions	Annual Review of Financial Economics 11, pp. 39-64	2019	6	0.54
Nguyen, L., Tran, S., Ho, T.	FinTech credit, bank regulations and bank performance: a cross-country analysis	Asia-Pacific Journal of Business Administration	2021	5	1.69
Frost, J	The economic forces driving fintech adoption across countries (Book Chapter)	The Technological Revolution in Financial Services: How Banks, FinTechs, and Customers Win Together pp. 70-89	2020	5	7.13
Marszk, A., Lechman, E., Kato, Y.	The Emergence of ETFs in Asia-Pacific (Book)	The Emergence of ETFs in Asia-Pacific pp. 1-24	2019	5	1.39

***FWCI**: Field-Weighted Citation Impact (How well cited document is when compared to similar documents*

4.5. Most Influential Sources from Sample of the Study

Table 3. The highly published journals and their most cited article.

The 5 most productive journals with their most cited article

JOURNAL	TP	TC	CiteScore Sept 2022	The most cited article	Times Cited	Publisher
Sustainability Switzerland	11 416	206 310	5.1	The impact of financial development and FDI on Renewable Energy in the UAE: A path towards sustainable Development	32	Multidisciplinary Digital Publishing Institute
Technological Forecasting And Social Change	734	29 960	13.6	Investigating the spill overs and connectedness between financial globalization, high-tech industries and environmental footprints: Fresh eidence in context of China	69	Elsevier
Accounting Economics And Law A Convivium	15	100	1.6	Unreliable accounts: How regulators Fabricate Conceptual Narrative to Diffuse Criticism	2	Walter de Gruyter
Annual Review of Financial Economics	19	154	3.4	Climate Finance	22	Annual Reviews Inc
Applied Economics Letters	646	2 536	2.1	Is there a pattern in how COVID-19 has affected Australia's stock returns	36	Taylor & Francis

TP: Total Publications TC: Total Citations

Table 3 below shows the 5 most productive journals from our sample with their most cited article and publisher. The cite score as of 5 September 2022 is also provided based on SCOPUS updates. Details of total publications and total citations up to the period in September is also presented for each journal.

4.6. Network Analysis and Visualisation

The following section is based on network analysis and visualization. Citation analysis of documents, co-citation analysis of authors and occurrence analysis of keywords are conducted using VOSviewer application to visualize the research trends in the FinTech/ BigTech credit and economic growth research.

4.6.1. Citation Analysis of Documents

Figure 2 presents the impact of research by measuring the total number of citations of documents (Ahmi, Tapa & Hamza, 2020). It has a total of 49 items and 47 clusters. Cluster 1 (Red): 2 items comprising of Chorzempa M. and Hua X. Cluster 2 (Green): 2 items comprising of Hodula M. and Stankeviciene J. The remainder of the clusters all have 1 item each. The closer the documents are to each other translates to the relatedness of the documents. Size of bubbles illustrate the number of citations of documents.

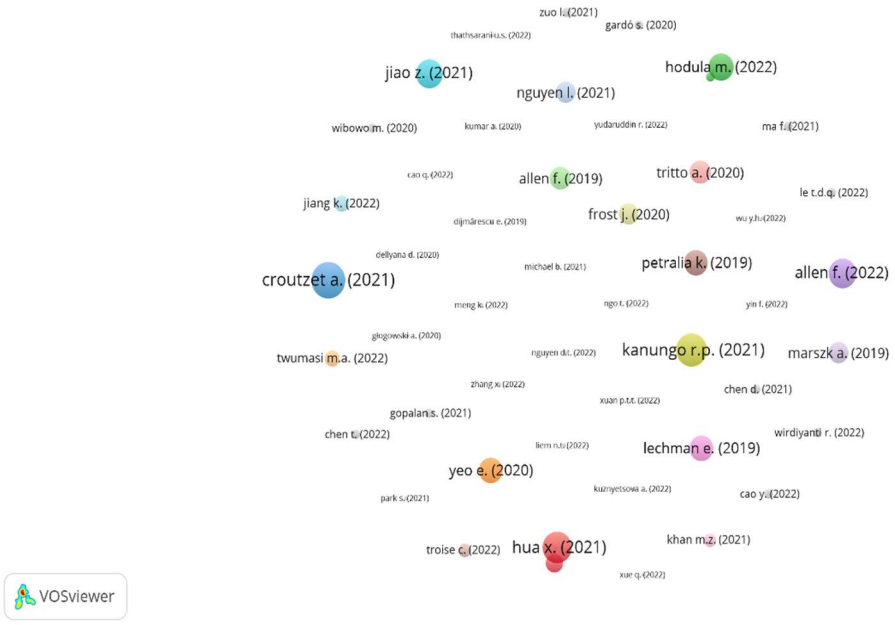


Figure 2. Citation analysis of documents.

4.6.2. Co-citation Analysis of Authors

Table 4 groups authors into the 4 different clusters based on contents of the documents and citation's relationship.

Figure 3 shows measurement of the similarity of the contents of the documents based on the citation's relationship. The analysis has been conducted using the VOSviewer software for network visualization based on bibliometric data. The minimum number of citations selected of an author is 10. Out of 5617 authors, 63 met the threshold.

Table 4. Co-citation of authors and the clusters.

Cluster	Number of items	Authors
1 (Red)	21	Allen F, Chen I, Gambacorta I, Hau H, Huang Y, Jagtiana J, Li J, Lin C, Liu J, Qian J, Qian M, Shan H, Shen Y, Sheng Z. Troise C, Wang J, Wang X, Wang Y, Xiong W, Zhang X, Zhou H.
2 (Green)	21	Arner D. W, Asongu S.A, Buckley R.P, Freeman C, Haddad C, Helpman E, Hornuf I, Katz ML, Kauffman R, Klapper I, Lechman E, Li X, Madhavan A, Marszk A, Mokyr J, Perez C, Pradhan R, Rosenberg N, Shapiro C, Trajtenberg M, Zhang Y.
3 (Blue)	16	Becker T, Berger A, Cihak M, Claessens S, Demirguc-kunt A, Frost J, Le TD, Levine R, Liu J, Ngo T, Nguyen DT, Pagano M, Philippon T, Shahbaz M, Thakor av, Turner G, Zhu F.
4 (Yellow)	5	Agarwal A, Agarwal J, Agarwal M, Agarwal Y, Sahay R.

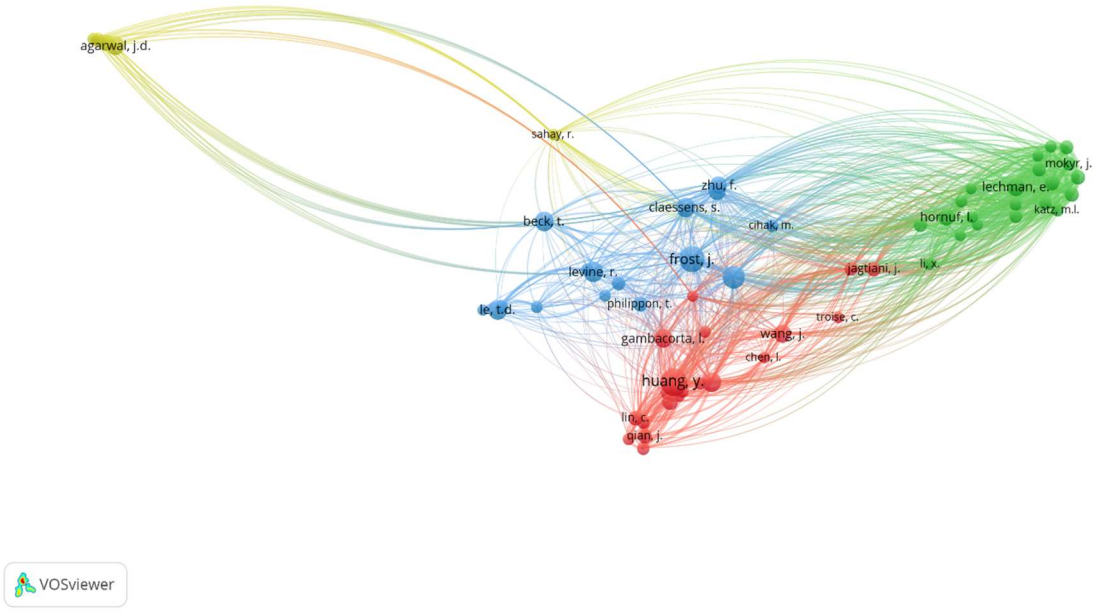


Figure 3. Co-citation analysis of co-authors.

4.6.3. Analysis of Co-occurrence

Table 5 shows further analysis using VOSviewer software to construct and visualize bibliometric networks.

Figure 4 illustrates the network visualization of the authors' keywords produced by VOSviewer, showing color, circle size, font size, and thickness of connecting lines as the nexus of strength of the relationship among key words. Out of the 1279 terms, 79 meet threshold when occurrence is kept at 5 – 60% default choice for most relevant terms, therefore 47 selected and further removed 7 that were less relevant and remained with 40 items in 6 clusters.

Table 5. Occurrence of key words and their clusters.

Cluster	Number of items	Occurrence
1 (Red)	9	Digital financing, Disintermediation, Financial innovation, financial literacy, financial service, financial stability, Policy, Structure, Systemic risk
2 (Green)	8	Banking, Digital transformation, Efficiency, Internet finance, Investment, Overcapacity, Relationship, Sustainable Development Goals (SDGs)
3 (Blue)	7	Digital finance, Fintech start-up, Happiness, Indonesia, Islamic bank, Performance, Practical implication
4 (Yellow)	6	Bank performance, Bank regulation, Bank stability, credit information sharing, Fintech credit, Income inequality
5 (Purple)	5	Economy, Exchange-Traded Funds (ETFs) market, ETFs, financial market, market
6 (Light Blue)	5	Bank risk, Charter value, Government, p2p lending, risk

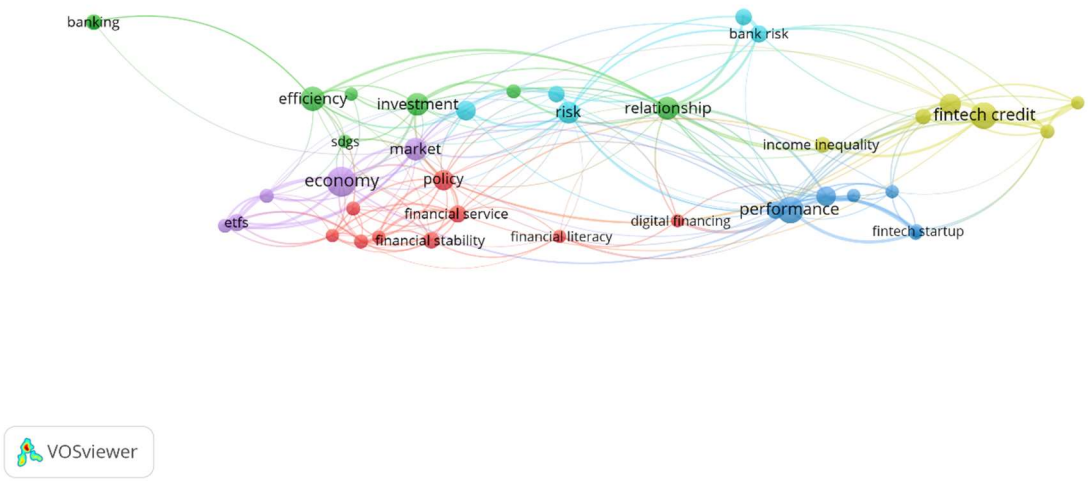


Figure 4. Occurrence analysis of keywords.

5. Discussion

Data was collected from the SCOPUS database and thereafter we conducted a bibliometric meta-analysis. This method was effective to unpack how FinTech and BigTech credit and economic growth research has evolved from 2019 to 2022. Furthermore, the analysis shows most cited articles together with the most influential authors giving awareness of the relevant journals.

The results of study documented that financial innovation that comes from digital technology has been on the rise in recent years. Many people have embraced the changes coming with machine learning, artificial intelligence and robotics in the fourth industrial revolution. Initially FinTechs/BigTechs had been viewed as disruptors in the financial industry, however, they seem to be moving more towards collaboration with banks establishing exciting synergies for clients. Previous studies do point to key issues around monitoring regulation that is requiring more attention

due to rampant cyber-attacks that may result as a major setback to FinTech adoption (Solms & Niekerk, 2013).

Big data and ability to decode useful information where credit risk assessment will be concerned plays a huge factor going forward. Table 5 on occurrence of keywords groups a cluster with financial service, financial innovation, digital financing and financial stability. Furthermore, FinTech credit is linked to addressing income inequality issues, maximizing on credit information sharing and impact closely related to bank performance and regulation. Citation analysis of documents on Figure 2 however, showed results with no linkages which illustrates that area of study is growing and more work must be done.

Economic growth and sustainability are topical issues considering many countries are not performing well and there is economic pressure. Credit being the driver of the financial industry and technology advancements on the rise leaves FinTech/BigTech credit a viable option for future sustainable economies. The results of the study are instrumental on the significance of the study and help establish key areas to focus on based on relevance. Knowing keywords and most cited articles together with co-citations helps identify not only gaps in knowledge but gives ability to add value to previous research.

6. Conclusions

The primary goal was to establish trends over the period 2019 to 2022 and identify research gaps in the area of FinTech/BigTech credit and economic growth. The study adopted a bibliometric and meta-analysis by utilizing studies that were extracted from the SCOPUS database.

The study reports the trend of the previous studies using the Boolean mix of 'FinTech credit" OR "BigTech credit" AND "Economic Growth' as bibliometric indicators obtained from the SCOPUS database. In total, the bibliometric details of 49 documents were extracted from the SCOPUS database. The data was then exported onto VOSviewer software and used to provide network analysis and visualization.

The results of the study showed an increase in the number of documents relevant to the topic from 2019. It is interesting to note that even though the keywords are connected, there are no strong links of citation between the relevant documents. In addition, few documents show close relatedness from the analysis. Establishing the linkage between the related topics on area of study does indeed open doors for future research.

Even though bibliometric and meta-analysis is a good scientific statistical analysis method, it remains subjective and therefore may affect results. Limitations are as a result of time period which may differ coupled with the variety of terms to search for data. In addition, the results of our findings are based on what we obtained from the SCOPUS database, and other authors may have their articles not indexed in SCOPUS and hence excluded from analysis. However, despite the stated limitations, it is important to note that this study presents a holistic overview based on our sample of current research on a global scale of FinTech/BigTech credit and economic growth.

The scope for future research therefore is regulation that extends to monitoring of the technological innovation and enforcement that is financially inclusive. The other areas for future research include exploring bank concentration and market inefficiencies nexus with FinTech credit, and considering the relationship between FinTech credit and bank capital regulation. The above

analysis solidifies the relevance to conduct further research on the connectedness of FinTech/BigTech credit and economic growth.

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