Fintech and Bioeconomy: A Systematic Literature Review

Elkin Vladimir Acosta Velásquez[1], Héctor Heraldo Rojas Jiménez[1], Víctor Antonio Rodríguez Lizano[2]

[1]Universidad Externado de Colombia
[2]Universidad de Costa Rica UCR
Email: elkin.acosta@est.uexternado.edu.co

Abstract

A systematic literature review was conducted on the production and publication of research articles related to the study of variables, financial technology (Fintech), and Bioeconomy. The purpose of this research was to know the main characteristics of the publications registered in the SD, WoS, and Scopus databases during the period 2007-2024, to February 8, 2024, achieving the identification of 46 publications in total. The information provided by these platforms was organized using graphs and figures, categorizing the information by CO-occurrence of Keywords, Year of Publication, Country of Origin, and Area of Knowledge. Once these characteristics were described, a qualitative analysis was conducted to refer to the position of the different authors on the proposed topic. Among the main results of this research, Germany and the United States were the countries with the highest number of publications, with a total of 7 publications each, followed by Brazil with 6 publications, while 60% of the publications are concentrated and originate in European countries. The area of knowledge that contributed the most to the study variables was Environmental Sciences, with 18 articles. This systematic literature review allowed us to conclude that the study of the intersection of bioeconomy and financial technologies is an issue that is gaining attention. There has been a boom in scientific publications in the last decade.

Keywords: Bioeconomy, Financial Technology (Fintech), Systematic Literature Review (SLR).

The emerging field of fintech is experiencing rapid growth internationally, redefining the financial services industry and impacting business models (Birch & Tyfield, 2013). Financial technology (Fintech) combines various technologies, such as e-finance, internet technology, social media services, social media, artificial intelligence, and big data analytics (Aguilar et al., 2019). On the other hand, the bioeconomy is an emerging paradigm that focuses on the sustainable use of renewable biological resources for economic development (Das. 2019; Pollari, 2015). It involves the creation, development, and revitalization of economic systems based on biological materials and products (Suryono, 2019). For Trivedi (2022), the bioeconomy is a political discourse that represents the emerging field of modern

biotechnology and life sciences as a source of sustainable economic growth. Financial technology offers important benefits to users and Fintech represents an excellent opportunity for green entrepreneurship.

On the one hand, there has been an upward trend in the number of publications on financial technology (Fintech), indicating its growing importance in the field of research (Sahabuddin et al., 2023). The research has focused on various aspects of financial technology, such as its functions, limitations, and impact on the financial sector (Garg et al., 2023). The research has also identified gaps in research and new topics of study, providing opportunities for further research and exploration of areas such as digital lending and supply chain finance (Jourdan et al., 2023). In addition, the research has highlighted the revolutionary implications of financial technology (Fintech) on traditional finance, while addressing the challenges and risks associated with its development. (Jain et al., 2023). Overall, academic research on fintech has provided valuable insights into its characteristics, trajectories, and future development opportunities.

On the other hand, the academic literature has extensively addressed the constraints on financing and innovation in small and medium-sized enterprises (SMEs) (Guiso, 1998; Hall & Lerner, 2010; Ughetto, 2009). Fintech has been found to have significant effects on the financial constraints of SMEs (Mwemezi., Senadjki., and Sea., 2022). In addition, the adoption of fintech can boost circular economy practices and organizational sustainability performance in SMEs; where access to finance and absorptive capacity play a moderating role in this relationship (Siddik et al., 2023).

Technological finance (Fintech) can contribute to the development of the circular economy, particularly for SMEs. Fintech innovations improve the quality of financial services and risk prevention capacity, which can help SMEs in their financing strategies and improve their overall quality (Liu, 2023). Fintech can also significantly ease financial constraints on SMEs by alleviating financial sector concentration and information asymmetry (Chen et al., 2023). In addition, digital technologies, green consumption, and circular entrepreneurship are seen as key factors for more circular and sustainable development, especially in the post-pandemic era (Hameed et al., 2023). The transition to a circular business model requires changes in different business management models and strategies, and fintech can play a critical role in this transition by promoting sustainability in companies (Kuik et al., 2023).

The circular economy is proposed as a more sustainable economic system by closing the circuits of material resources and adopting renewable energies and non-toxic materials, seeking a transition from the current linear model. On the other hand, the bioeconomy expands this vision by replacing fossil resources with renewable biological ones, demanding low-carbon energy inputs, sustainable supply chains, and technology to transform these resources. The circular bioeconomy, in turn, represents the convergence between the circular economy and the bioeconomy by focusing on closing the carbon cycle and using biogenic carbon for the production of materials and products that circulate in improved or equivalent cycles of use. (Tan Eric & Lamers Patrick, 2021)

The circular bioeconomy (CBE) is a sustainable economic model with financing challenges, especially in Latin America, where SMEs are key to the transition to this model (D'Amato et al., 2017; Rodríguez et al., 2018; Hernández, 2018). SMEs and CBEs need financing alternatives, and Fintech, which has transformed financial services, can be decisive (Bassi & Dias, 2019; Siddik et al., 2023; Liu et al., 2021).

To date, existing academic research on the effects of FinTech on bioeconomy financing in SMEs remains limited. There is a significant amount of research on the role of fintech in SME financing in developing countries, including the

use of fintech-based non-bank finance and its contribution to improving the financial situation of SMEs (Łasak, 2021). In addition, research has explored the adoption of fintech services by SMEs, focusing on factors such as the perception of convenience, utility, and effectiveness, as well as consumer trends and reputation perception (Moreira-Santos et al., 2022). Thus, studies have explored the influence of fintech development on firms' innovative activities, particularly in reducing information asymmetry and increasing financial support for R+D investment (Hongyue Li., Zhiqiang Lu., & Qili Yin., 2023). Similarly, there is research on the adoption of fintech in the context of circular economy practices, which has been shown to have a positive effect on organizational sustainability performance thanks to the mediation of circular economy practices (Siddik et al., 2023). However, specific research on the financing of the circular bioeconomy in SMEs and its relationship with fintech is lacking.

Taking into account the theoretical and practical background raised, according to the information collected, this study is among the first to investigate the effect of Fintech (technological finance) on the financing of bioeconomy projects in small and medium-sized enterprises (SMEs), contributing to cover the research gap identified in the understanding of this intersection of concepts.

To this end, the following research questions were posed:

What is the current landscape of academic research on Fintech and bioeconomy, and how has it evolved over time?

How has the intersection between Technology Finance and bioeconomy been addressed in the academic literature to date?

Material and methods

Literature reviews can be quantitative, through meta-analysis, or qualitative, through a narrative review or a systematic literature review (SLR). (Suárez et al., 2017). This article follows a systematic literature review approach. SLR, limits bias in the collection, critical appraisal, and synthesis of all relevant studies that address a specific question. (Seuring et al., 2020). Thus, a systemic review of the literature was carried out to identify, synthesize, evaluate and interpret the findings of previous studies and address the research questions analyzed here, i.e., how the academic literature to date on technology finance (Fintech), and bioeconomy has addressed the relationship between these concepts. The main added value of this review is to gather adequate information to cover the intersection between the two concepts, the interpretation of the findings, and the identification of knowledge gaps.

It is important to note that SLR is not a meta-analysis or an in-depth literature review. (López-Morales, 2018: 334). Its three distinguishing characteristics are: (1) systematic and organized; (2) clear, replicable and up to date; and (3) synthetic, because it combines evidence that answers the research questions noted above. Therefore, to make the systematic review of the literature more precise, it was divided, according to Gaur and Kumar (2018), into the following phases:

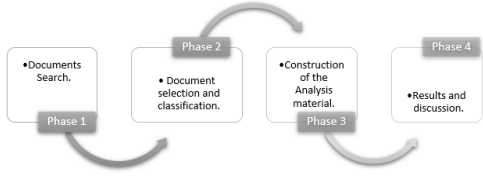

Figure 1. Methodological Design. Own elaboration (2024), based on Gaur & Kumar, (2018).

The article selection criteria and analysis methodology are described below:

2.1. Phase 1. Document Search

The literature search was conducted in Scopus, Web of Science (WoS) and Science Direct (SD). Scopus and WoS are the main bibliographic databases, which provide publication metadata and bibliometric indicators for research evaluation (Pranckutė, 2021). Whereas SD is a full-text database that provides

access to a wide range of scientific literature, including journals, books, and conference proceedings, it can therefore be preferred for its extensive coverage of full-text content (Kokol, 2023).

Subsequently, the following thesauri and keywords were selected to run the search: "Fintech" or "Financial AND Technology", and "Bioeconomy". The exploration was conducted on February 6, 2024, and all previous article-type documents up to this date were included. Different searches were carried out to identify relevant articles for the review, in the 3 selected academic literature databases, through the following sentences and search filters:

a. (TITLE-ABS-KEY (fintech) AND TITLE-ABS-KEY (bioeconomy)) AND (LIMIT-TO (DOCTYPE , "ar"))

From the previous search we obtained: In Scopus and WOS zero articles, while in SD 6 documents were found.

b. (TITLE-ABS-KEY (financial AND technology) AND TITLE-ABS-KEY (bioeconomy)) AND (LIMIT-TO (DOCTYPE , "ar"))

This search yielded; in SD 17, WOS 27 and Scopus 34 documents.

2.2. Phase 2. Document selection and classification.

In phase two, duplicate publications were filtered and a total of 46 articles published in English were obtained. The abstracts of all the articles were read to establish the connection between technological finance (Fintech) and bioeconomy without discriminating the category and date of publication. Thus, all subareas of study directly or indirectly related to the topic and all articles were considered, regardless of the year of publication.

2.3. Phase 3. Construction of the Analysis material.

To establish the dimensions of the academic literature and the relationships of the keywords (included in the titles, abstracts and keywords of the selected documents), a scientific mapping of the visualization of bibliometric networks was carried out through VOSviewer (van Eck & Waltman, 2010), using as a basis the "Co-occurrence" type analysis and counting method. as the unit of analysis "All keywords" and as the counting method "Complete count".

Likewise, the identified information was organized and in the result section, numeral 3 of these articles, the classification is presented through figures and tables generated from the Scopus search results analysis tool.

- CO-occurrence of words.
- Year of publication.
- Country of origin of the publication.
- Area of knowledge.

2.4. Phase 4. Results and discussion.

It consisted of the analysis and discussion of the results, and the preparation of the conclusions and the final document.

Results

3.1. Co-occurrence of words.

Bibliometric analysis was carried out using VOSViewer Version 1.6.20 (van Eck & Waltman., 2010). Of the 46 selected articles, 185 authors and 579 keywords were found, and from the selection of CO-occurrence as a type of analysis and method, Figure 2 was obtained.

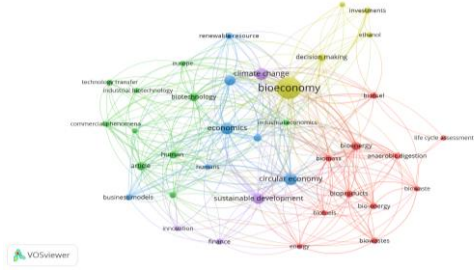

Figure 2. Co-occurrence of words. Own elaboration (2024), based on the 46 articles selected in Phase 2. Using - VOSViewer Version 1.6.20

In Figure 2 above, five clusters are shown. Bioeconomy was the most used keyword in the documents selected in phase 2 of the

methodological design of this article. Cluster 1 in red reflects how the bioeconomy has been studied from biomass, bioenergy, biofuels and bio-products, among other words. For its part, cluster 2 in green expresses the relationship of the bioeconomy with words such as article, research, technology transfers, biotechnology and Europe. In addition to the above, cluster 3 in blue allows us to observe the co-occurrence of the bioeconomy with keywords such as business model, agriculture, and circular economy mainly. In addition, the "yellow" cluster 4 determines the link of the bioeconomy with ethanol, investments and decision-making. Finally, the purple cluster 5 allows the bioeconomy to be related to finance, innovation, climate change, and sustainable development. It is worth mentioning that the expression circular economy is among the most used words, after bioeconomy, which is associated with others such as economic and sustainability.

3.2. Year of publication.

The trend in the number of publications between 2007 and 2022 is shown in Figure 3. For the period from 2007 to 2016, a stable behavior is observed in publications related to the topic in question. However, from 2018 to 2022, the upward trend in related scientific production is clearly identifiable.

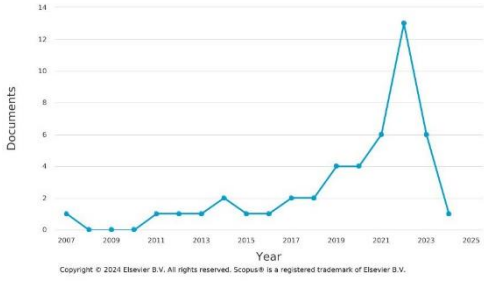

Figure 3. Evolution of annual scientific research on "Fintech" or "Financial AND Technology", and "Bioeconomy", in the period 2007 – 2024 in SD, WoS and Scopus databases. Using the Scopus results analyzer tool.

The year with the highest number of articles published was 2022, with a total of 13 documents, while before 2010, there was only one publication compared to the relationship that is the subject of this document: "Fintech" or "Financial AND Technology", and "Bioeconomy".

3.3. Country of origin of the publication.

Figure 4 illustrates the relationship of the 10 countries with the highest academic production on "Fintech" or "Financial AND Technology", and "Bioeconomy", in the period 2007 – 2024.

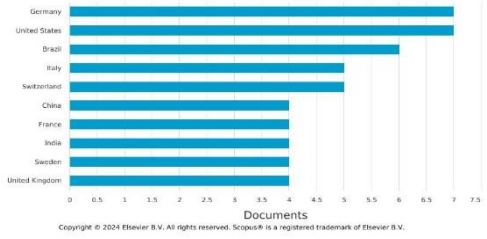

Figure 4. List of the 10 countries with the highest academic production on "Fintech" or "Financial AND Technology", and "Bioeconomy", in the period 2007 – 2024. Using the Scopus results analyzer tool.

The countries with the highest number of publications are Germany and the United States, each with 7 articles. On the other hand, the only country in Latin America that is identified within the top 10 is Brazil, which is in third place with 6 publications. In addition, it is observed that 60% of scientific production originates in European countries, while China and India have produced 4 publications respectively.

3.4. Area of knowledge.

Figure 5. it shows how the production of scientific publications is distributed according to the area of knowledge on "Fintech" or "Financial AND Technology", and "Bioeconomy", in the period 2007 – 2024.

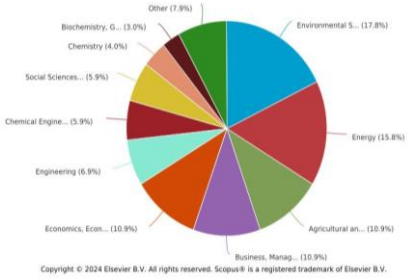

Figure 5. List of the 10 countries with the highest academic production on "Fintech" or "Financial AND Technology", and "Bioeconomy", in the period 2007 – 2024. Using the Scopus results analyzer tool.

Environmental Sciences is the area of knowledge with the highest number of registered documents, with a total of 18 articles concentrating 17.8% of the publications. In this area of knowledge; Donner et al., (2021), argue that companies must evolve towards more dynamic and integrated business models, in which the macro-environment establishes the limit conditions for successful operations, therefore, new business models are needed that value the flows that are currently considered waste. On the other hand, Zhou & Du, (2021), argue that the development of green finance under the SDGs is an important driving force for green technological progress, adding that financial development can promote technological progress with an energy and environmental bias, but the impact that financial development has on biased technological progress is heterogeneous. In addition Salvador et al., (2022), highlights that in order to move towards a circular bioeconomy it is necessary to establish strategies to overcome the lack of financial and capital resources, as well as to develop and/or make available locally the appropriate technology and enable competitiveness.

Likewise, in the area of knowledge in energy with 16 articles and 15.8% of the scientific production; de Moraes et al., (2023), through a study examining the key enablers and barriers influencing alternative protein innovation in Brazil, note that the results show that tax incentives, access to finance, and opportunity costs are important external factors driving innovation in line with the transition to the bioeconomy, where human capital is strategic specifically technical and social skills, but only matters when there is access to financial resources, and they conclude that social capital can overcome some barriers by sharing resources, improving partnerships to explore biodiversity and expanding the network of entrepreneurs. For Pascoli et al., (2022), the bioeconomy is a complex, multivariate and interdisciplinary system that requires a comprehensive assessment of its independent parts to be fully understood, in which public policies must encourage demand, support competitive markets, promote the entry of renewable options and stimulate growth by reducing financial barriers.

In the areas of Agricultural and Biological Sciences, and Business, Administration and Accounting, with 11 articles and a share of 10.9% each, the main barriers identified are economic and financial, due to the dependence on high investments in production process technologies and the consequent uncertainties about the returns for the adoption of the circular economy in ethanol production in Brazil (Jesus et al., 2023). In contrast, innovative financing solutions are observed, such as those presented by Grassi & Pereira, (2019), who identified the RenovaBio program in Brazil; biofuel producers receive financial securities (CBIO), in proportion to the volume and efficiency of biofuel production, and under the condition of respecting environmental legislation, while fuel distributors must acquire CBIOs to offset additional emissions, but these certificates are also available to investors, with potential for valorization. This program seeks to incentivize the notable increase in the production of sustainable biofuels, especially ethanol, which

could become a global commodity of the bioeconomy.

Chauhan et al., (2022), consider that digital technologies combined with business model innovation provide solutions to countless problems in the world, including those related to the transformation of the circular economy. In addition Chutipat et al., (2023), identified that legalization and regulation, quality assurance, financial support, tax incentives, a strategic management organization and budget allocation, a bio-circular-green (BCG) market environment in a developing economy, are key elements influencing the effective implementation of the model.

Discussion

The impact of fintech on the financing of the circular bioeconomy in SMEs has not been directly addressed in the articles analyzed. However, they do discuss the barriers and opportunities of implementing circular economy practices in SMEs. Rizos et al., (2016) and Kumar V. et al., (2019), highlight the lack of financial resources as an obstacle to the transition of SMEs to a more circular economy. In addition, they mention the importance of external financing, such as equity financing, to positively contribute to the growth of SMEs implementing circular green innovations (Kumar P. et al., 2020). While the academic literature found does not specifically address fintech, it provides insights into the challenges and strategies related to financing and implementing circular economy practices in SMEs.

Current academic research on the effects of fintech on financing the circular bioeconomy in SMEs is scarce. However, there are some studies that have explored the impact of fintech on SME financing in general. The study by Piotr Łasak (2021), examines the role of fintech in financing SMEs in developing countries and highlights the contribution of fintech to improving the financial situation of these entities. Moreira-Santos et al., (2022), focus on the adoption of financial technology services by companies and their positive effect on the efficiency, convenience, and security of the financial sector. Hongfei et al., (2020), investigate the application of financial technology by commercial banks and its impact on market structure, including the exclusionary effect of small and medium-sized banks in the field of inclusive finance. Hongyue Li et al., (2023), consider that the development of financial technology has a strong positive effect on the innovative activities of companies, which is attributed to the role of financial technology in reducing information asymmetry and increasing financial support for R+D investment. Siddik et al., (2023), examine the effect of fintech adoption on organizational sustainability performance through circular economy practices in manufacturing SMEs, highlighting the mediating role of circular economy practices and the moderating effects of access to finance and absorptive capacity. Overall, research on the specific topic of the impact of fintech on circular bioeconomy financing in SMEs is limited, but some studies provide insights into the broader effects of fintech on SME financing and innovation.

It is important to mention that researchers have analyzed the concept of circular bioeconomy (CBE) and its role in bioeconomic clusters in northwestern Europe (Stegmann et al., 2020). They have also explored the tools, approaches and methods that can support circular business model innovation in the operationalization phase of the circular economy (Bocken et al., 2019). In addition, the literature contains classified publications on the bioeconomy, green economy, and circular economy, highlighting the analysis of implemented policies and issues related to sustainable strategies and organizational models (Ferreira et al., 2018). Tan, E. & Lamers, P. (2021), they have provided their perspective on the conceptual definitions of the circular economy, the bioeconomy and the circular bioeconomy, describing the possible overlaps and differences and proposing a harmonized

interpretation that emphasizes the importance of the carbon cycle and the sustainable transformation of renewable biological resources. On the other hand, Reim et al., (2019), carried out a systematic review of the literature on the activities of the circular business model and the barriers to the bioeconomy, focusing on the forestry sector; This study describes the barriers to circular business models based on the bioeconomy and clarifies the need for alignment between the elements of a business model as a key condition for its successful implementation in a bioeconomy. Meanwhile, Fabiana Gatto & Llaria Re., (2021), highlight the evolution of industrial research in terms of validation, trends and themes of bio-based circular business models, paying particular attention to the empowerment of start-ups and small and medium-sized enterprises (SMEs) to close the ties of renewable biological use and reduce dependence on fossil fuels.

For Zilberman et al., (2013), the evolution of the bioeconomy requires continued public investment in research and innovation, as well as the establishment of a regulatory framework and financial incentives and institutions that lead to continued private sector investment in the development and commercialization of new products. In addition Zhou & Du, (2021), recommend that the financial development strategy and policy be appropriate to local conditions in order to reap the maximum benefits from the positive impact of financial development on green innovation.

Despite the fact that in the articles analyzed he did not address the study of the connection between financial technology and the bioeconomy. It is important to recognize that, Fintech refers to innovative technologies in the financial sector and is mainly concerned with that financial technology and its impact on the financial industry, while the circular bioeconomy focuses on the transition to a more sustainable economic system through the use of renewable resources and the closure of material circuits, which focuses on the use of biological resources for sustainable economic growth. However, it is necessary to record that fintech and circular bioeconomy are gaining attention in academic and policy circles, and while the analysis of this intersection did not yield a close relationship between fintech and the circular bioeconomy, which is mentioned in the abstracts of the articles analyzed, both concepts share the common goal of promoting sustainability and innovation. Where Fintech can play a crucial role in supporting the development and implementation of circular bioeconomy initiatives by providing financial solutions and technological advancements. However, further research is needed to explore the possible synergies and collaborations between Fintech and the circular bioeconomy. (Venkata S. et al., 2019; Mention, 2019; Tan Eric & Lamers Patrick, 2021).

Conclusions

Most of the publications in this area come from Germany, the United States, and Brazil, countries with important advances in the adoption of the bioeconomy. The most common keywords in the literature are "bioeconomy", "circular economy", "sustainability" and "sustainable development". Emerging topics were "finance," "technology transfer," and "business models," and niche topics included "biotechnology," "agriculture," "biomass," "bioproducts," and "decision-making." It is necessary to highlight the absence of keywords such as financing and SMEs in research on bioeconomy and financial technology. This indicates the moderate level of scientific production in this field.

Despite the fact that financing turns out to be a barrier, as some authors recognize, to the adoption of circular economic models, the studies analyzed have not investigated enough on this variable. However, since 2017, important research has been dedicated to the subject, revealing a boom in publications related to this field. It can be said that the study of the

intersection of the bioeconomy and financial technologies is a topic that is gaining attention.

In conclusion, from the intersection between financial technology and bioeconomy, it can be described that there has been a boom in scientific publications in the last five years. Today, this topic, according to the results obtained, is gaining momentum, therefore, this research will allow researchers to find a starting point on the current horizon in order to ensure that future efforts are carried out in a desirable way due to the importance of this article and its practical implications for the future.

5.1. Limitations and future investigations.

Even though SLR is used; Rigorous and well-structured method, some studies may have been excluded due to research decisions, databases used, and selection of keywords, type of publication, and language. In any case, it is considered that the publications identified are representative in the current literature given the use of Boolean operators and the databases where the information was searched. Therefore, future research could focus on deepening the study of these relationships, including the variables SMEs and financing. For Kubule et al., (2019), research on this topic can be complemented by adding other factors that could be influencing the development of the bioeconomy, e.g., financial resources, human health, well-being, etc., and thus reach a better understanding about the influencing factors and the bioeconomy's dependence on them.

This analysis offers indications of the possible links between technological finance (Fintech) and the bioeconomy in general, without establishing the nuances of the effects of financing, access to capital, conditions, type of companies, among other determining factors. More research may be needed to explore the specific effects of fintech on financing the circular bioeconomy in SMEs. More specifically, how does financing and access to capital affect the processes of transition to bioeconomy models in SMEs? And what Fintech services could stimulate the adoption of the circular bioeconomy model in SMEs?

WORKS CITED

Abu, Bakar, Siddik., Li, Yong., Md., Nafizur, Rahman. (2023). The role of Fintech in circular economy practices to improve sustainability performance: a two-staged SEM-ANN approach. Environmental Science and Pollution Research, doi: 10.1007/s11356-023-25576-7

Alfredo, Aguilar., Tomasz, Twardowski., Roland, Wohlgemuth. (2019). Bioeconomy for Sustainable Development. Biotechnology Journal, doi: 10.1002/BIOT.201800638

Anne-Laure, Mention. (2019). The Future of Fintech. Research-technology Management, doi: 10.1080/08956308.2019.1613123

Bassi, F., & Dias, J. G. (2019). The use of circular economy practices in SMEs across the EU. Resources, Conservation and Recycling, 146, 523-533. https://doi.org/10.1016/j.resconrec.2019.03.019

Chauhan, C., Parida, V., & Dhir, A. (2022). Linking circular economy and digitalization technologies: A systematic literature review of past achievements and future promises. Technological Forecasting and Social Change, 177(May 2021), 121508. https://doi.org/10.1016/j.techfore.2022.121508

Chun, Chieh, Chen., Bowen, Xiao., Jie, Wang., Huanzhuo, Ye. (2023). The effects of fintech development on financing constraints of small and medium-sized enterprises—Evidence from China. Managerial and Decision Economics, doi: 10.1002/mde.3920

Chutipat, V., Sonsuphap, R., & Pintong, W. (2023). Bio-Circular-Green Model in a Developing Economy. Corporate Governance and Organizational Behavior Review, 7(1), 150–157. https://doi.org/10.22495/cgobrv7i1p14

D'Amato, D., Droste, N., Allen, B., Kettunen, M., Lähtinen, K., Korhonen, J., & Toppinen, A. (2017). Green, circular, bio economy: A comparative analysis of sustainability avenues. Journal of cleaner production, 168, 716-734. https://doi.org/10.1016/j.jclepro.2017.09.053

de Moraes, C. C., Borin Claro, P., & Picanço Rodrigues, V. (2023). Why can't the alternative become mainstream? Unpacking the barriers and enablers of sustainable protein innovation in Brazil. Sustainable Production and Consumption, 35, 313–324. https://doi.org/10.1016/j.spc.2022.11.008

Diana, Moreira-Santos., Manuel, Au-Yong-Oliveira., Ana, Palma-Moreira. (2022). Fintech Services and the Drivers of Their Implementation in Small and Medium Enterprises. Information, doi: 10.3390/info13090409

Donner, M., Verniquet, A., Broeze, J., Kayser, K., & De Vries, H. (2021). Critical success and risk factors for circular business models valorising agricultural waste and by-products. Resources, Conservation and Recycling, 165, 105236. https://doi.org/10.1016/j.resconrec.2020.105236

Eric, C., D., Tan., Patrick, Lamers. (2021). Circular Bioeconomy Concepts—A Perspective. doi: 10.3389/FRSUS.2021.701509

Fabiana, Gatto., Ilaria, Re. (2021). Circular Bioeconomy Business Models to Overcome the Valley of Death. A Systematic Statistical Analysis of Studies and Projects in Emerging Bio-Based Technologies and Trends Linked to the SME Instrument Support. Sustainability, doi: 10.3390/SU13041899

Gaur, A., & Kumar, M. (2018). A systematic approach to conducting review studies: An assessment of content analysis in 25 years of IB research. Journal of World Business, 53(2), 280–289.

Girish, Garg., Mohd, Shamshad., Mosab, I., Tabash., Basem, M., Hamouri., Linda, Nalini, Daniel. (2023). A Bibliometric Analysis of Fintech Trends: An Empirical Investigation. International Journal of Financial Studies, doi: 10.3390/ijfs11020079

Grassi, M. C. B., & Pereira, G. A. G. (2019). Energy-cane and RenovaBio: Brazilian vectors to boost the development of Biofuels. Industrial Crops and Products, 129(December 2018), 201–205. https://doi.org/10.1016/j.indcrop.2018.12.006

Guiso, L. (1998). High-tech Firms and Credit Rationing. Journal of Economic Behavior & Organization, 35(1), 39-59. https://doi.org/10.1016/S0167-2681(97)00101-7

Hall, B. H., & Lerner, J. (2010). refinancing of R&D and innovation. In B. H. Hall, & N. Rosenberg, Handbook of Economics of Innovation (First ed., Vol. 1, pp. 609-639). Jordan Hill, Oxford, United Kingdom: Elsevier B.V. doi:10.1016/S0169-7218(10)01014-2

Hameem, Bin, Hameed., Andrea, Urbinati., Valentina, Lazzarotti. (2023). Exploiting circular economy enablers for SMEs to advance towards a more sustainable development: An empirical study in the post COVID-19 era. Resources, conservation & recycling advances, doi: 10.1016/j.rcradv.2023.200164

Hernández, C. (2018). This is how the MSMEs of the Region are doing. Retrieved from: https://www.incp.org.co/asivan-las-mipymes-la-region/

Hongyue, Li., Zhiqiang, Lu., Qili, Yin. (2023). The Development of Fintech and SME Innovation: Empirical Evidence from China. Sustainability, doi: 10.3390/su15032541

Hyytinen, A. & Toivanen, O. (2005). Do financial constraints hold back innovation and growth? Evidence on the role of public policy. Research Policy, 34(9), 1385-1403. doi:10.1016/j.respol.2005.06.004

Ian, Pollari. (2015). The rise of Fintech opportunities and challenges. Jassa-the Finsia Journal of Applied Finance,

Jesus, G. M. K., Jugend, D., Paes, L. A. B., Siqueira, R. M., & Leandrin, M. A. (2023). Barriers to the adoption of the circular economy in the Brazilian sugarcane ethanol sector. Clean Technologies and Environmental Policy, 25(2), 381–395. https://doi.org/10.1007/s10098-021-02129-5

Jin, Hongfei., Li, Hongji., Liu, Yinlu. (2020). FinTech, Banking Risks and Market Crowding-out Effect. Journal of finance and economics, doi: 10.16538/J.CNKI. JFE.2020.05.004

Justus, Mwemezi., Abdelhak, Senadjki., Lau, Lin, Sea. (2022). Augmenting Bank Credit Flow to Agro-Processing SMEs through Financial Technology (FinTech): Evidence from Tanzania. Wseas Transactions On Business And Economics, doi: 10.37394/23207.2022.19.172

Kean, Birch., David, Tyfield. (2013). Theorizing the Bioeconomy: Biovalue, Biocapital, Bioeconomics or . . . What?. Science, Technology, & Human Values, doi: 10.1177/0162243912442398

Kubule, A., Indzere, Z., & Muizniece, I. (2019). Modelling of the bioeconomy system using interpretive structural modelling. Agronomy Research, 17(4), 1665–1678. https://doi.org/10.15159/AR.19.170

Liu Y, Saleem S, Shabbir R et al. (2021) The relationship between corporate social responsibility and financial performance: a moderate role of fintech technology. Environ Sci Pollut Res 28, 20174–20187 (2021). https://doi.org/10.1007/s11356-020-11822-9

López-Morales, J. S. (2018). Multilatinas: A systematic literature review. Review of International Business and Strategy, 28(3/4), 331–357.
Md., Sahabuddin., Md., Nazmus, Sakib., Adamu, Jibir., Mochammad, Fahlavi., Mohammed, Aljuaid., Sandra, Grabowska. (2023). The Evolution of FinTech in Scientific Research: A Bibliometric Analysis. Sustainability, doi: 10.3390/su15097176
Nancy, Bocken., Nancy, Bocken., Lars, Strupeit., Katherine, Whalen., Julia, L.K., Nußholz. (2019). A Review and Evaluation of Circular Business Model Innovation Tools. Sustainability, doi: 10.3390/SU11082210
Pascoli, D. U., Aui, A., Frank, J., Therasme, O., Dixon, K., Gustafson, R., Kelly, B., Volk, T. A., & Wright, M. M. (2022). The US bioeconomy at the intersection of technology, policy, and education. Biofuels, Bioproducts and Biorefining, 16(1), 9–26. https://doi.org/10.1002/bbb.2302
Paul, Stegmann., Marc, Londo., Martin, Junginger. (2020). The circular bioeconomy: Its elements and role in European bioeconomy clusters. doi: 10.1016/J.RCRX.2019.100029
Peter, Kokol. (2023). Discrepancies among Scopus and Web of Science, coverage of funding information in medical journal articles: a follow-up study. Journal of The Medical Library Association, doi: 10.5195/jmla.2023.1513
Piotr, Łasak. (2021). The role of financial technology and entrepreneurial finance practices in funding small and medium-sized enterprises. Journal of Entrepreneurship, Management and Innovation, doi: 10.7341/20221811
Prasanta, Kumar, Dey., Chrisovaladis, Malesios., Debashree, De., Pawan, Budhwar., Soumyadeb, Chowdhury., Walid, Cheffi. (2020). Circular economy to enhance sustainability of small and medium-sized enterprises. Business Strategy and The Environment, doi: 10.1002/BSE.2492
Premal, M., Trivedi. (2022). FinTech: An Innovative Green Entrepreneurship Model. Environmental footprints and eco-design of products and processes, doi: 10.1007/978-981-19-8895-0_11
Raminta, Pranckutė. (2021). Web of Science (WoS) and Scopus: The Titans of Bibliographic Information in Today's Academic World. Publications, doi: 10.3390/PUBLICATIONS9010012
Rodríguez, A. G., Aramendis, R. H., & Mondaini, A. O. (2018). Bioeconomy financing in selected countries in Europe, Asia and Africa: experiences for Latin America and the Caribbean. https://hdl.handle.net/11362/44287
Ruchika, Jain., Satinder, Kumar., Kiran, Sood., Simon, Grima., Ramona, Rupeika-Apoga. (2023). A Systematic Literature Review of the Risk Landscape in Fintech. Risks, doi: 10.3390/risks11020036
Ryan, Randy, Suryono. (2019). Financial technology (fintech) dalam perspektif aksiologi. doi: 10.17933/MTI.V10I1.138
S., Venkata, Mohan., S., Venkata, Mohan., Shikha, Dahiya., Shikha, Dahiya., K., Amulya., K., Amulya., Ranaprathap, Katakojwala., Ranaprathap, Katakojwala., T.K., Vanitha. (2019). Can circular bioeconomy be fueled by waste biorefineries — A closer look. Bioresource Technology Reports, doi: 10.1016/J.BITEB.2019.100277
Salvador, R., Barros, M. V., Donner, M., Brito, P., Halog, A., & De Francisco, A. C. (2022). How to advance regional circular bioeconomy systems? Identifying barriers, challenges, drivers, and opportunities. Sustainable Production and Consumption, 32, 248–269. https://doi.org/10.1016/j.spc.2022.04.025
Sanjiv, Ranjan, Das. (2019). The future of fintech. Financial Management, doi: 10.1111/FIMA.12297
Seuring, S., Yawar, S. A., Land, A., Khalid, R. U., & Sauer, P. C. (2020). The application of theory in literature reviews – Illustrated with examples from supply chain management. International Journal of Operations and Production Management, 41(1), 1–20. https://doi.org/10.1108/IJOPM-04-2020-0247
Suárez, E., Calvo-Mora, A., Roldán, J.L., & Periáñez-Cristóbal, R. (2017). Quantitative research on the EFQM excellence model: A systematic literature review (1991–2015). European Research on Management and Business Economics, 23, 147–156.
Swee, S., Kuik., Akhila, A, Kumar., Li, Diong., Joowon, Ban. (2023). A Systematic Literature Review on the Transition to Circular Business Models for Small and Medium-Sized Enterprises (SMEs). Sustainability, doi: 10.3390/su15129352
Ughetto, E. (2009). Industrial districts and financial constraints to innovation. International Review of Applied Economics, 23(5), 597-624. https://doi.org/10.1080/02692170903007599
Valeria, Ferreira, Gregorio., Laia, Pié., Antonio, Terceño. (2018). A Systematic Literature Review of Bio, Green and Circular Economy Trends in Publications in the Field of Economics and Business Management. Sustainability, doi: 10.3390/SU10114232

van Eck, N. J., & Waltman, L. (2010). Software Survey: VOSviewer, a computer program for bibliometric mapping. Scientometrics, 84(2), 523–538. DOI:10.1007/S11192-009-0146-3.

Vasileios, Rizos., Arno, Behrens., Wytze, van, der, Gaast., Erwin, Hofman., Anastasia, Ioannou., Terri, Kafyeke., Alexandros, Flamos., Roberto, Rinaldi., Sotiris, Papadelis., Martin, Hirschnitz-Garbers., Corrado, Topi. (2016). Implementation of Circular Economy Business Models by Small and Medium-Sized Enterprises (SMEs): Barriers and Enablers. Sustainability, doi: 10.3390/SU8111212

Vikas, Kumar., Ihsan, Sezersan., Jose, Arturo, Garza-Reyes., Ernesto, D.R., Santibanez, Gonzalez., Moh'd, Anwer, AL-Shboul. (2019). Circular economy in the manufacturing sector: benefits, opportunities and barriers. Management Decision, doi: 10.1108/MD-09-2018-1070

Wiebke, Reim., Vinit, Parida., David, Rönnberg, Sjödin. (2019). Circular Business Models for the Bio-Economy: A Review and New Directions for Future Research. Sustainability, doi: 10.3390/SU11092558

Xiaocheng, Liu. (2023). Development of Financial Ecosystem of Industrial Chain Supported by Fintech in Big Data Environment. International Journal of Big Data Intelligent Technology, doi: 10.38007/ijbdit.2023.040104

Zack, Jourdan., J, Ken, Corley., Randall, Valentine., Arthur, M., Tran. (2023). Fintech: A content analysis of the finance and information systems literature. Electronic Markets, doi: 10.1007/s12525-023-00624-9

Zhou, X., & Du, J. (2021). Does environmental regulation induce improved financial development for green technological innovation in China? Journal of Environmental Management, 300(January), 113685. https://doi.org/10.1016/j.jenvman.2021.113685

Zilberman, D., Kim, E., Kirschner, S., Kaplan, S., & Reeves, J. (2013). Technology and the future bioeconomy. Agricultural Economics (United Kingdom), 44(SUPPL1), 95–102. https://doi.org/10.1111/agec.12054