META-JOURNAL e-ISSN: 3031-0938
MANAGEMENT ECONOMICS TRADE & ACCOUNTING JOURNAL

EXPLORING THE THEORY OF FINANCIAL INNOVATION IN THE CONTEXT OF INDUSTRY 4.0

Benediktus Rolando[1]*, Herry Mulyono[2], Rina Hartanti[3], Alberta Ingriana[4]

[1,2,4]Department of Management, Faculty of Business and Management, University Of Dinamika Bangsa, Indonesia

[3]Department of Accounting, Faculty of Business and Economics, Trisakti University, Indonesia

Correspondence Address: Jl. Jend. Sudirman, The Hok, Kec. Jambi Sel., Kota Jambi, Jambi 36138/ Universitas Dinamika Bangsa

E-mail: [1)]benediktus@unama.ac.id*, [2)]herrymulyono@unama.ac.id , [3)]rinahartanti@trisakti.ac.id , [4)]alberta.ingriana@unama.ac.id

Abstract

The fourth industrial revolution, also known as Industry 4.0 is marked by rapid technological advancements that have significantly impacted various economic sectors, including the financial industry. This paper analyze how financial innovation is shaping the industry in the context of the 4.0 industrial revolution. The study explores the concept of financial innovation and its role in driving the transformation of the financial sector, particularly in the face of emerging technologies such as artificial intelligence, big data, and the Internet of Things. In this research, we utilized the Systematic Literature Review method to analyze over 100 articles from through platforms like Scopus, ScienceDirect, Google Scholar, Taylor & Francis Online, Wiley Online Library, and Copernicus International Index. Which formed the basis of our study results. The findings suggest that financial innovation is a key enabler for the digitalization of financial services, leading to the development of new business models, products, and services. Moreover, the integration of financial innovation with Industry 4.0 technologies has the potential to enhance efficiency, accessibility, and inclusivity in the financial sector. While the integration of financial innovation with Industry 4.0 technologies may indeed bring about efficiency and accessibility in the financial sector, it is important to consider the potential drawbacks and risks associated with this trend. This research is beneficial for academics, policymakers, and financial industry professionals who seek to understand the implications of financial innovation in the context of the fourth industrial revolution.

Keywords : ***Financial Innovation, Industrial Revolution, Industry 4.0, Technological Innovation, Digital Transformation, Digitalization***

1. INTRODUCTION

The 4.0 Industrial Revolution Era, commonly referred to as Industry 4.0, has ushered in a transformative period characterized by the convergence of digital, physical, and biological technologies. This term describes the current trend of automation and data exchange in manufacturing technologies, including cyber-physical systems, the Internet of Things, and cloud computing (Oztemel & Gürsev, 2020). The industrial revolution 4.0 is driving a significant shift in traditional industries, as they adopt new production technologies, machinery, materials, and inputs, with knowledge becoming a crucial factor (Petrillo et al., 2018). The 4.0 Industrial Revolution also encompassing a broad array of terms including "Smart Manufacturing," "Industry 4.0," "Smart Industry," "Smart Factory," and numerous others across different nations

Amidst this technological upheaval, the financial industry has also experienced a wave of innovation, known as financial innovation, which has profoundly impacted the way financial services are delivered, accessed, and utilized. Financial innovation refers to the development of new financial products, services, and processes that aim to improve the efficiency, accessibility, and risk management within the financial sector (Mention & Torkkeli, 2012).

Financial innovation has become a critical component of the 4.0 Industrial Revolution, as it enables businesses and individuals to access capital, manage risks, and facilitate transactions more effectively (Gu et al., 2021). Financial innovations such as fintech, blockchain, mobile banking, and peer-to-peer lending have transformed the financial landscape, empowering individuals and businesses to navigate the complex economic landscape with greater agility and adaptability (Wang et al., 2021). For instance, Financial Technology, also known as FinTech, is a rapidly growing industry that utilizes technology to improve and automate the delivery of financial services. It encompasses a wide range of innovative business models, applications, processes, and products within the financial sector including markets, institutions, and services (Vučinić, 2020). According to the research conducted by Wang et al., (2021) it is evident that the rise of fintech has disrupted traditional financial institutions, allowing for more personalized, accessible, and efficient financial services.

The availability of financial resources, technological advancements, skilled personnel, and regulatory frameworks are crucial factors in fostering financial innovation. Financial centers concentrate financial resources, facilitating the adoption of innovations (Sheng, 2023). Efficient financial regulations are essential for promoting innovation by reducing financing costs and managing risks (Mursalov, 2020). Financial innovation contributes to the growth of banks and supports financial deepening (Çeştepe et al., 2022). Additionally, financial support has a positive impact on regional technological innovation and productivity (Liu, 2022). The combination of financial resources, human capital, and innovation positively influences business performance (Lores & Siregar, 2022). In summary, financial resources, technological advancements, and regulatory frameworks collectively support and drive financial innovation, leading to economic growth and improved business performance.

Financial innovation requires robust supervision and continuously improved regulation to mitigate risks and ensure compliance with evolving financial crime prevention measures. Technologies such as RegTech and blockchain are crucial in enhancing regulatory compliance and combating financial crimes (Kurum, 2020; Yang, 2022). Establishing effective supervisory mechanisms, particularly in the realm of internet finance, is essential for upholding financial stability and fostering innovation (Zhi-yuan et al., 2021). These endeavors are vital for promoting sustainable financial development and safeguarding the integrity of financial systems amidst technological advancements and evolving financial landscapes.

Qamruzzaman & Wei's 2018 study showed that implementing financial innovations has a two-way causal relationship in the short and long term. The research found strong connections between causes and effects, highlighting the need for effective policy guidelines to enhance financial sector development. This paper seeks to explore the determinants of financial innovation at both micro and macroeconomic levels without duplicating existing terminology, assisting researchers in identifying future research topics related to these areas. Key inquiries addressed include: What are the precursors of financial innovation? What are its outcomes? How does financial innovation impact the 4.0 Industrial Revolution Era?

2. LITERATURE REVIEW

The existing scholarly literature has extensively examined the concept of financial innovation.(Barman et al., 2022) Recent studies have explored the determinants of financial innovation from a global perspective, identifying factors such as competition, financial crisis, regulatory frameworks, and technological advancements as key drivers.

At the macroeconomic level, various studies have investigated the relationship between financial innovation and economic growth. Specifically, Anarfi et al. (2019) examined the role of financial innovation on economic growth in developing countries, finding that financial innovation has a significant positive impact on economic growth (Naeem et al., 2023). Ansong and Marfo-Yiadom's study in Ghana, however, revealed a negative relationship between financial innovation and economic growth, suggesting that excessive financial creativity can have adverse effects on the financial system.

At the firm level, researchers have explored the impact of financial innovation on firm performance. Qamruzzaman and Wei's study in Bangladesh found a positive relationship between financial innovation and firm performance, emphasizing the importance of financial innovation in enhancing business competitiveness (Barman et al., 2022).

Overall, the academic literature highlights the multifaceted nature of financial innovation, with varying implications for economic growth, firm performance, and financial stability. Therefore, identifying and contextualizing the subject in the era of the 4.0 Industrial Revolution is crucial for understanding how financial innovation continues to shape economic and business landscapes.

The shift from traditional to modern industrial practices is rapidly advancing in what is now known as the fourth industrial revolution. This evolution, which began with the invention of the steam engine and continued through discoveries in electricity and mass production, has progressed further with digitalization efforts integrating technology and information across industries. The impact of digital transformation and financial innovation extends to various sectors. Research also highlights a connection between bureaucracy, productivity levels, and environmental sustainability. Moreover, the emergence of digital technologies can streamline tasks within organizations but may also lead to a reevaluation of organizational structures for improved adaptability in this era. Company employees need proper education adjustments to effectively fulfill their roles amidst these technological changes. Furthermore, businesses can integrate all their operations through this digitization process. In banking services, internet influences include reduced operational costs, faster service delivery times including managerial information dissemination; enhanced internal communication; better interactions with clients and partners; along with the acquirement of extensive skills and about financial products or services. Additionally, in terms of investment aspect like mutual funds' side show that financial innovation could enhance its diversification of investment resulting in improved performance overall.

The industrial fourth revolution has given rise to financial digitalization, leading to significant changes in the financial sector. Financial Innovation (FI) involves introducing and implementing new products, business methods, and technologies to enhance the efficiency and effectiveness of financial services. Its primary objective is to improve service quality, decrease costs, expand access, and foster innovation in a wide range of easily accessible financial products and services. A key driver of financial innovation in the 4.0 industry (Yun et al., 2021).

Financial organizations must proactively engage in innovative practices to effectively tackle market inefficiencies, ensuring compliance with regulatory requirements, strategically managing tax implications, and efficiently mitigating operational expenses. The financial institutions that are agile and responsive to technological advancements and consumer needs will be better positioned to thrive in the evolving 4.0 industry. Qamruzzaman and Jianguo (2017) highlighted that financial advancements have a substantial and positive influence on the expansion of the economy. They emphasized that improved access to finance can stimulate investment, leading to increased productivity and economic growth. This is due to their potential to encourage the circulation of capital within the financial framework, ultimately fostering economic growth and development.

Financial Technology (Fintech) enterprises have emerged as catalysts for financial innovation, harnessing the power of digital technologies to disrupt traditional financial services. These FinTech companies leverage innovations such as artificial intelligence, big data analytics, blockchain, and mobile applications to provide more personalized, efficient, and accessible financial products and services (Asanprakit & Kraiwanit, 2023). According to a study by Ntenga and Lee, the rise of FinTech has been driven by factors such as the growing demand for digital financial services, increased access to technology, and the need for greater financial inclusion. Fintech has proven to be highly beneficial and effective especially during distress time like it is during the pandemic of during Covid-19, it its proven to help customers reducing face-to-face interactions and also decreasing the operational costs associated with doing banking. It is accessible to all market segments and has shown consistent growth over the years. According to Lee & Shin (2018), fintech consists of several key elements: emerging financial technology companies, which encompass various sectors such as lending, crowdfunding, payments, insurance, and capital markets; developers of technological tools that involve big data analysis, cryptocurrency, and social media; regulatory government agencies responsible for financial oversight and laws; a wide range of diverse financial consumers including individuals and organizations; as well as established conventional financial institutions especially traditional banks with standard systems along with insurance companies.

Ultimately, financial innovation has become increasingly critical in the context of the 4.0 industrial revolution. As the world becomes more digitized, financial institutions and FinTech companies must continuously innovate to meet evolving customer demands, address market inefficiencies, and capitalize on technological advancements. By doing so, they can drive economic growth, enhance financial inclusion, and contribute to the overall progress of the 4.0. industrial revolution (Nejad, 2022) (Iman, 2020) (Roszko-Wójtowicz et al., 2024).

To conclude our literature review section, we found that financial innovation continues to play a pivotal role in shaping the landscape of the 4.0 industry(Treu et al., 2021)(Haotian et al., 2021)(Nejad, 2022). The integration of cutting-edge technologies, such as artificial intelligence, blockchain, and mobile platforms, has transformed the delivery and accessibility of financial services. Savchuk et al., (2012) highlighted the significant influence of technology on the financial industry, particularly in driving innovation. This has resulted in new opportunities for both economic and social progress, while also bringing about changes within organizations and institutions. The integration of technological advancements with financial innovation has

META-JOURNAL e-ISSN: 3031-0938
MANAGEMENT ECONOMICS TRADE & ACCOUNTING JOURNAL

revolutionized the provision of financial services, leading to a transformation in how they are accessed and utilized. Furthermore, Qamruzzaman & Wei (2018) underscored the connection between financial innovation and inclusion, focusing on the availability, accessibility, and usage of services related to banking and finance. A robust financial system holds potential to drive economic growth forward.

3. RESEARCH METHOD

This research paper will utilize a Systematic Literature Review (SLR) approach, drawing upon a comprehensive literature review to explore the relationship between financial innovation and the 4.0 Industry. The systematic literature review approach employed in the study centers on the Financial Innovation variable as a key predictor. The researchers aimed to understand how changes in financial innovation impact other variables of interest. This approach examines the influential elements and outcomes of financial innovation during the current era of Industrial Revolution 4.0. The research employed a Systematic Literature Review following the Preferred Reporting Items for Systematic Review and Meta-Analyses framework (PRISMA), which involves the following steps: (1) Identification of relevant literature, (2) Screening of literature, (3) Eligibility assessment, and (d) Included studies for final analysis. The study focused on sourcing high-quality research studies published in journals, conference proceedings, and other reputable sources related to the topic of financial innovation and Industry 4.0.

Systematic review of the literature entails using articles from the Scopus database. Initially, entering "financial innovation" as the search keyword produced 2034 outcomes. Subsequently, restrictions were implemented to retrieve relevant articles by specifying the publication year range from 2016 to 2024 and filtering for "all open access" within subject areas such as "Economics, Econometrics and Finance," along with "Business, Management, and Accounting," while also selecting a document type of "article" written in English at its final publication stage. These criteria led to identifying 175 articles. The subsequent step involved obtaining these 175 articles through platforms like Scopus, Google Scholar, Taylor & Francis Online, ScienceDirect, Wiley Online Library, and Copernicus International Index.

From the screened pool of 175 articles, critical review and evaluation were undertaken to assess their eligibility and relevance in addressing the research objectives. 38 articles were selected as suitable for the final analysis, as they directly addressed the relationship between financial innovation and industry 4.0. The initial screening process involved assessing the level of relevance of the title and abstract to all types of contributing factor and consequences of financial innovation. The next crucial step is to thoroughly read through each article in order to obtain findigns that are pertinent to this research objectives and questions. The study then synthesized the key findings from these 38 articles to develop a thorough comprehension of the subject matter and formulate the final research paper.

4. RESULTS AND DISCUSSION

The key findings from the systematic literature review reveal that financial innovation is a critical driver of the 4.0 industrial revolution.(Baig et al., 2022)(Roszko-Wójtowicz et al., 2024)(Moskovicz, 2019)(Roszko-Wójtowicz et al., 2024) The review uncovered several ways in which financial innovation impacts the 4.0 industrial revolution. The study's findings are displayed in two separate sections, each corresponding to the specific research inquiries. Section 1 examines the factors contributing to financial innovation and Section 2 investigates the outcomes of financial innovation in detail.

4.1 Factors Contributing to Financial Innovation

The factors that contribute to the development of financial innovation are manifold and encompass a wide range of influences that affect its emergence within an organization or industry. According to Mention and Torkkeli (2012), financial innovation is shaped by a combination of internal and external drivers. Internal factors refer to the characteristics and capabilities within the organization, such as human capital, organizational culture, and technological infrastructure. Institutions with a strong talent pool and a culture that encourages creativity and risk-taking are more likely to foster financial innovation.

External drivers, on the other hand, relate to the broader macroeconomic, regulatory, and competitive conditions that affect the financial sector (Roszko-Wójtowicz et al., 2024). Technological advancements, for instance, have been a significant catalyst for financial innovation, enabling the development of innovative products, services, and delivery channels (Barman et al., 2022). The study by Ozili highlights how the accelerated pace of technological change and digitization in the financial industry has profoundly impacted the nature and scope of financial innovation.

Additionally, competitive pressures and market demands also play a crucial role in driving financial innovation. Lerner and Tufano assert that financial institutions often engage in innovation to gain a competitive edge, differentiate their offerings, and meet evolving customer needs. The review of the literature indicates that financial innovation is a multi-faceted phenomenon, influenced by a complex interplay of internal organizational factors and external environmental conditions.

Based on the research results in this first section, we have also discovered a strong correlation between financial innovation during the industrial revolution 4.0 era and technology, with fintech playing a central role. The increasing globalization necessitates even more extensive development of fintech. Moreover, there is mounting pressure for the financial world to adapt to financial innovation due to high performance demands, as well as an increase in cashless transactions prompted by the COVID-19 pandemic to prevent its spread. In order to secure a broad market share and respond effectively to these developments, traditional banks and insurance institutions are concentrating more on their core competitive services leading towards financial innovation. A notable example of such innovation includes the introduction of new discount basket certificates which benefit investors when market profits are slow or declining.

Financial innovation requires careful regulation due to its potential to influence economic trends and create instability. The impact of regulation depends on the strength of regulatory measures, the clarity and enforceability of government policies, as well as ethical considerations (Kok Lian, 2017; Pompella & Costantino, 2021; Katusiime, 2021). Both short-term and long-term effects should be considered in crafting regulations. For instance, while macroeconomic policy may produce favorable results in the short term by stimulating economic growth and employment, it could lead to adverse consequences over the long term such as inflation or excessive debt accumulation (Bernier & Plouffe , 2019; Katusiime, 2021). Overseeing intricate financial advancements requires the use of ethical approaches to ensure mutual benefits among stakeholders while also considering foreign banking capital requirements. Understanding factors driving financial innovation is essential for making well-informed decisions and formulating finance-related policies that balance risk management with potential growth opportunities. Evidently, financial innovation entails a complex interplay between internal organizational factors and external environmental conditions.

4.2 Outcomes of financial innovation

The primary objective of this section is to evaluate the impact of financial innovation that has been implemented in a company during the fourth industrial revolution. Based on the reviewed literature, financial innovation has had a significant influence on the 4. industrial revolution, particularly in the following areas:

Enhanced operational efficiency: Financial innovations such as automated trading algorithms, blockchain-based settlement systems, and robo-advisory services have improved operational efficiency in the financial sector by reducing manual processing, streamlining workflows, and increasing the speed of transactions (Roszko-Wójtowicz et al., 2024)(Alaassar et al., 2022).

Improved customer experiences: The use of mobile banking apps, personalized investment platforms, and digital lending solutions has enhanced customer experience by providing more convenient, personalized, and accessible financial services.(Mohanty, 2021)

Increased financial inclusion: Innovations like mobile money, peer-to-peer lending, and digital microfinance have expanded access to financial services for underserved populations, contributing to greater financial inclusion(Aron, 2018)

New revenue streams: Financial institutions have been able to generate new revenue streams by offering innovative products and services, such as digital wallets, crowdfunding platforms, and cryptocurrency trading (Abbasi & Weigand, 2017).

Risk management: The development of sophisticated risk modeling tools, derivatives, and hedging strategies has enabled financial institutions to better manage and mitigate various types of financial risks (Nyuyen, 2023)

The literature also suggests that financial innovation has had broader economic implications, such as facilitating capital formation, promoting entrepreneurship, and supporting economic growth and development.(Nejad, 2022).

Financial advancement plays a crucial role in enhancing the financial performance of banks by providing small businesses with the means to create financial services independently and expedite the process. Furthermore, it influences liquidity management within banking and has resulted in improved bank performance following the implementation of electronic payment technology. Financial innovation has had an impact on building capital and can influence capital sufficiency, ultimately bolstering a bank's financial resilience and operational effectiveness. Additionally, leveraging specific forms of financial innovations in banking activities should be tailored according to the different stages of the bank's life cycle (growth, stabilization, decline). This adaptable approach ensures that banks effectively respond to market dynamics while maintaining stability throughout their various phases.

The connection between financial innovation and a nation's economic advancement is undeniably robust. It is fundamental to establish comprehensive policy principles that can effectively harness the potential of financial innovation in developing the financial industry. Moreover, it is imperative for financial institutions to focus on introducing a variety of innovations aimed at enhancing stock market performance and mitigating associated risks. Furthermore, it should be highlighted that regulatory frameworks failing to adapt to technological advancements may encounter challenges in influencing banking practices efficiently.

Financial innovation plays a crucial role in expanding the range of investment choices available to investors, closely connected to global financial market developments. It has a positive impact on mutual fund performance by offering diverse options for investors. The growth of exchange-traded funds can be attributed to financial innovation driven by industrial digitalization, which further broadens the investment landscape for individuals and institutions alike. Thoughtful government regulation is essential in maintaining economic stability and fostering growth amidst these advancements. Additionally, during bank restructuring, the securitization of troubled assets amid bank instability can affect financial stability and improve measures for controlling systemic risk. Institutional capacity, regulation, and technological infrastructure all play critical roles in promoting financial innovation while safeguarding against potential risks posed by rapid changes in the industry.

The reviewed sources emphasize the significant impact of financial innovation on the 4th industrial revolution, particularly in terms of operational efficiency, customer experiences, financial inclusion, new revenue streams, and risk management (Karabay & Çağıl, 2016)(Roszko-Wójtowicz et al., 2024)(Aziz & Hadia, 2009). The literature suggests that financial innovation has had broader economic implications, such as facilitating capital formation, promoting entrepreneurship, and supporting economic growth and development. Effective governance and regulation of financial innovation are crucial to balance risk and reward, foster innovation, and ensure the stability of the financial system (Mishra, 2008)(Aziz & Hadia, 2009)(Alaassar et al., 2022).

Globalization has both positive and negative effects on the global financial system. It can enhance the quality, efficiency, and stability of banks, but it also raises concerns about its impact on credit performance and bankruptcy risk. Moreover, globalization plays an important role in advancing digital financial products that have positive environmental effects and promote innovative finance for developing nations. Additionally, digital payments have played a crucial role during unexpected events such as the Covid-19 pandemic - particularly for small and medium-sized businesses utilizing technological advancements to market their goods and services effectively.

In conclusion, financial innovation has significantly impacted the 4th industrial revolution era by improving operational efficiency, enhancing customer experiences, increasing financial inclusion, generating new revenue streams, and enabling better risk management.

4.2 Challenges and limitations of financial innovation

While financial innovation has undoubtedly delivered numerous benefits, it has also introduced new challenges and limitations that must be addressed. Financial advancements in the 4.0 era have brought about both favorable and unfavorable effects. Fintech is seen as a transformative force that shakes up conventional financial sectors, presenting new ways of operation and significant advantages through artificial intelligence. However, it also introduces risks to the stability of the financial system, national security, economic equilibrium, and consumer well-being (Gasiorkiewicz et al., 2020; Bašić & Ćurić , 2021; Vučinić , 2020). Therefore, it is crucial for policymakers to carefully manage the demand for money given the substantial impact of financial innovation on various aspects of society.

Some key challenges and limitations of financial innovation in the 4. industrial revolution era include:

a. Regulatory uncertainty: The rapid pace of innovation often outpaces the ability of regulators to develop appropriate policies and frameworks, leading to regulatory uncertainty and inconsistencies.
b. Cybersecurity and data privacy issues: The increased reliance on digital technologies and the collection of vast amounts of consumer data heighten the risk of cyberattacks, data breaches, and privacy violations.
c. Potential for financial instability: Innovative financial instruments and practices, such as high-frequency trading and complex derivatives, can contribute to increased volatility and systemic risk within the financial system.
d. Ethical concerns: The use of algorithms, artificial intelligence, and automated decision-making in financial services raises ethical questions about fairness, transparency, and the potential for bias in the provision of financial services.
e. Socioeconomic implications: Financial innovations may exacerbate wealth inequality and social disparities if the benefits are not evenly distributed across society.

To address these challenges, policymakers, regulators, and industry stakeholders must collaborate to develop comprehensive regulatory frameworks, enhance cybersecurity measures, and promote ethical and socially responsible financial innovation.

5. CONCLUSION

In conclusion, financial innovation has been a crucial driver of the 4.0 industrial revolution, transforming the financial landscape and shaping the future of the global economy. The reviewed literature highlights the positive impact of financial innovation on operational efficiency, customer experiences, financial inclusion, new revenue streams, and risk management.(Goel, 2019). Financial innovation has been a critical driver of the 4th industrial revolution, enabling advancements in operational efficiency, customer experiences, financial inclusion, new revenue streams, and risk management. However, this innovation has also introduced new challenges and limitations, such as regulatory uncertainty, cybersecurity risks, financial instability, ethical concerns, and socioeconomic implications.(Moshirian et al., 2019)Effective governance and regulation are essential to balance the risks and rewards of financial innovation, foster sustainable progress, and ensure the stability and resilience of the financial system in the 4.0 industrial revolution era.

This research is valuable for both scholarly and practical purposes, offering a comprehensive understanding of the intricate relationship between financial innovation and the 4.0 industrial revolution. It can serve as a basis for further research on the evolving role of finance in the digital era within academic circles, while also providing crucial insights to inform policymakers, regulators, and industry stakeholders in their endeavors to leverage the advantages of financial innovation while addressing its associated risks and challenges.

The research has limitations, as it requires an extensive reference article database. Many related articles are behind paywalls or not freely accessible, which limits this article to a literature review. However, scholars have proposed further investigation of this topic using empirical testing methods or field research to overcome these limitations and provide more comprehensive insights into the subject matter. Future research should focus on the broader economic implications of financial innovation, the role of regulation, and the socioeconomic impacts to develop a more holistic understanding of this critical topic.

REFERENCES

Abbasi, T., & Weigand, H. (2017, January 1). The Impact of Digital Financial Services on Firm's Performance: a Literature Review. https://doi.org/10.48550/arxiv.1705.10294

Alaassar, A., Mention, A., & Helge, T. (2022, February 11). Facilitating innovation in FinTech: a review and research agenda. Springer Science+Business Media, 17(1), 33-66. https://doi.org/10.1007/s11846-022-00531-x

Aron, J. (2018, August 1). Mobile Money and the Economy: A Review of the Evidence. https://doi.org/10.1093/wbro/lky001

Asanprakit, S., & Kraiwanit, T. (2023, December 1). Causal factors influencing the use of social commerce platforms. Springer Science+Business Media, 9(4), 100172-100172. https://doi.org/10.1016/j.joitmc.2023.100172

Baig, U., Zehra, S., Anjum, S., & Hussain, M. (2022, August 10). FinTech Past and Future:Ecosystem, Business Model and its Proximate Challenges. Institute of Business Management, 24(1). https://doi.org/10.22555/pbr.v24i1.645

Barman, R D., Hanfy, F B A., Rajendran, R., Masood, G., Dias, B., & Maroor, J P. (2022, January 1). A critical review of determinants of financial innovation in global perspective. Elsevier BV, 51, 88-94. https://doi.org/10.1016/j.matpr.2021.04.565

Bašić, D., & Ćurić, P. (2021). Adaptability of Securitization Model to Conditions of Volatile Financial Structure. Economics, 9(1), 205–219. https://doi.org/10.2478/eoik-2021-0012

Gąsiorkiewicz, L., Monkiewicz, J., & Monkiewicz, M. (2020). Technology-Driven Innovations in Financial Services: The Rise of Alternative Finance. Foundations of Management, 12(1), 137–150. https://doi.org/10.2478/fman-2020-0011

Goel, A M. (2019, January 1). What Do We Know About Financial Innovation?. RELX Group (Netherlands). https://doi.org/10.2139/ssrn.3392434

Gu, J., Gouliamos, K., Lobonţ, O., & Moldovan, N. (2021, April 1). Is the fourth industrial revolution transforming the relationship between financial development and its determinants in emerging economies?. Elsevier BV, 165, 120563-120563. https://doi.org/10.1016/j.techfore.2020.120563

Haotian, H., Dong, Y., & Yi-tao, L. (2021, January 10). The Analyse of Financial Technology Industry and Case Study of Some Typical Companies. https://doi.org/10.1145/3450148.3450186

Iman, N. (2020, January 1). The rise and rise of financial technology: The good, the bad, and the verdict. Cogent OA, 7(1), 1725309-1725309. https://doi.org/10.1080/23311975.2020.1725309

Karabay, M E., & Çağıl, G. (2016, December 8). Examining Financial Innovation and Performance in Financial Sector: A Comprehensive Review of Emerging Markets. Springer Nature, 353-369. https://doi.org/10.1007/978-3-319-44591-5_24

Katusiime, L. (2021). Mobile money use: The impact of macroeconomic policy and regulation. Economies, 9(2). https://doi.org/10.3390/economies9020051

Kok Lian, W. (2017). How Chinese commercial banks innovate: Process and practice. Journal of Innovation Management, 5(2), 81–110. https://doi.org/10.24840/2183-0606_005.002_0007

Lee, I., & Shin, Y. J. (2018). Fintech: Ecosystem, business models, investment decisions, and challenges. Business Horizons, 61(1), 35–46. https://doi.org/10.1016/j.bushor.2017.09.003

Mention, A., & Torkkeli, M. (2012, January 1). Drivers, processes and consequences of financial innovation: a research agenda. Inderscience Publishers, 16(1/2), 5-5. https://doi.org/10.1504/ijeim.2012.050441

Mohanty, P. (2021, November 26). Changing financial landscape due to digital lending platforms. https://www.celusion.com/2021/11/26/the-changing-financial-landscape-due-to-digital-lending-platforms/

Moshirian, F., Susantono, B., & Yu, F R. (2019, January 1). Challenges and Opportunities Associate with Financial Technology in the 21st Century. RELX Group (Netherlands). https://doi.org/10.2139/ssrn.3337918

Moskovicz, A. (2019, January 1). Financial Qualitative Research: A Comprehensive Guide for Case Study usage. ARMG Publishing, 3(4), 106-116. https://doi.org/10.21272/fmir.3(4).106-116.2019

Naeem, M H., Subhan, M., Alam, M S., Al-Faryan, M A S., & Yameen, M. (2023, February 26). Examining the role of financial innovation on economic growth: Fresh empirical evidence from developing and developed countries. Cogent OA, 11(1). https://doi.org/10.1080/23322039.2023.2170000

Nejad, M G. (2022, January 10). Research on financial innovations: an interdisciplinary review. Emerald Publishing Limited, 40(3), 578-612. https://doi.org/10.1108/ijbm-07-2021-0305

Nejad, M. G. (2022). Research on financial innovations: an interdisciplinary review. In International Journal of Bank Marketing (Vol. 40, Issue 3). https://doi.org/10.1108/IJBM-07-2021-0305

Nguyen, H H. (2023, January 1). Credit Risk and Financial Performance of Commercial Banks: Evidence from Vietnam. https://doi.org/10.48550/arXiv.2304.

Oztemel, E., & Gürsev, S. (2020, March 25). A Taxonomy of Industry 4.0 and Related Technologies. https://www.intechopen.com/citation-pdf-url/70051

Petrillo, A., Felice, F D., Cioffi, R., & FedericoZomparelli. (2018, February 28). Fourth Industrial Revolution: Current Practices, Challenges, and Opportunities. https://doi.org/10.5772/intechopen.72304

Pompella, M., & Costantino, L. (2021). Financial innovation and technology after COVID-19 a few directions for policy makers and regulators in the view of old and new disruptors. Ekonomika, 100(2), 40–62. https://doi.org/10.15388/EKON.2021.100.2.2

Qamruzzaman, M. (2021). Nexus between financial innovations, remittances and credit performance: Evidence from augmented ardl and nonlinear ardl. In Investment Management and Financial Innovations (Vol. 18, Issue 3, pp. 295–311). https://doi.org/10.21511/imfi.18(3).2021.25

Qamruzzaman, M., & Jianguo, W. (2017). Financial innovation and economic growth in Bangladesh. Financial Innovation, 3(1). https://doi.org/10.1186/s40854-017-0070-0

Roszko-Wójtowicz, E., Sharma, G D., Dańska-Borsiak, B., & Grzelak, M M. (2024, February 13). Innovation-Driven E-Commerce Growth in the EU: An Empirical Study of the Propensity for Online Purchases and Sustainable Consumption. Multidisciplinary Digital Publishing Institute, 16(4), 1563-1563. https://doi.org/10.3390/su16041563

Savchuk, N., Bludova, T., Leonov, D., Murashko, O., & Shelud'Ko, N. (2021). Innovation imperatives of global financial innovation and development of their matrix models. Investment Management and Financial Innovations, 18(3), 312–326. https://doi.org/10.21511/imfi.18(3).2021.26

Savchuk, N., Bludova, T., Leonov, D., Murashko, O., & Shelud'Ko, N. (2021). Innovation imperatives of global financial innovation and development of their matrix models. Investment Management and Financial Innovations, 18(3), 312–326. https://doi.org/10.21511/imfi.18(3).2021.26

Shaikh, A. A., Glavee-Geo, R., & Karjaluoto, H. (2017). Exploring the nexus between financial sector reforms and the emergence of digital banking culture – Evidences from a developing country. *Research in International Business and Finance*, 42(November 2016), 1030–1039. https://doi.org/10.1016/j.ribaf.2017.07.039

Suryono, R R., Budi, I., & Purwandari, B. (2020, December 21). Challenges and Trends of Financial Technology (Fintech): A Systematic Literature Review. Multidisciplinary Digital Publishing Institute, 11(12), 590-590. https://doi.org/10.3390/info11120590

Treu, J., Elss, V I., Buono, G., & Winkler, P. (2021, April 20). The Rising of Fintech - How the Tech Revolution in Financial Services Represents A Paradigm Shift. https://doi.org/10.37227/jibm-2021-03-718

Vučinić, M. (2020). Fintech and Financial Stability Potential Influence of FinTech on Financial Stability, Risks and Benefits. Journal of Central Banking Theory and Practice, 9(2), 43–66. https://doi.org/10.2478/jcbtp-2020-0013

Wang, X., Sadiq, R., Khan, T M., & Wang, R. (2021, February 2). Industry 4.0 and intellectual capital in the age of FinTech. https://www.sciencedirect.com/science/article/pii/S0040162521000305

Yun, J J., Zheng, L., & Zhao, X. (2021, May 6). Introduction: Ambidextrous Open Innovation in the 4th Industrial Revolution. SAGE Publishing, 26(2), 183-200. https://doi.org/10.1177/09717218211006969