Contemporary Issues in Social Sciences and Management Practices (CISSMP)
ISSN: 2959-1023
Volume 3, Issue 4, December 2024, Pages 208-220
Journal DOI: 10.61503
Journal Homepage: https://www.cissmp.com

Role of Financial Technology and Green Finance on Sustainable Development

[1]Huma Ali & [2]Rabia Haneef
[1]Assistant Professor, Institute of Banking and Finance, Bahauddin Zakariya University Multan, Pakistan
[2]Institute of Banking and Finance, Bahauddin Zakariya University Multan, Pakistan.

Article History:
Received: May 21, 2024
Revised: Jul 12, 2024
Accepted: Aug 29, 2024
Available Online: Dec 30, 2024

Keywords: Financial Technology, Green Finance, Sustainable Development, Carbon Emissions

Funding:
This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ABSTRACT

This study explores the impact of financial technology (FinTech) and green finance on sustainable development. Utilizing a quantitative research design, the research analyzes secondary data from 2012 to 2022, examining the relationship between financial technology, financial inclusion, green finance, and their effects on sustainable development indicators such as carbon emissions and energy efficiency. The methodology includes descriptive statistics, correlation matrix analysis, ANOVA, and regression analysis employing SPSS and E.View software. The results suggest that financial technology and financial inclusion significantly impact sustainable development, primarily through influencing carbon dioxide emissions and energy efficiency. However, green finance showed no substantial effect on sustainable development outcomes. This study contributes to the literature by highlighting the role of financial technology in enhancing sustainable development and suggesting a lack of impact from green finance initiatives. Policymakers should focus on enhancing financial technology adoption to maximize its positive impact on sustainability. Recommendations for future research include a more detailed examination of different financial technology mechanisms and their direct effects on various sustainability metrics.

Corresponding Author's Email: Rabiahanif138@gmail.com
DOI: https://doi.org/10.61503/cissmp.v3i3.257
Citation: Ali, H., & Haneef, R. (2024). Role of Financial Technology and Green Finance on Sustainable Development. *Contemporary Issues in Social Sciences and Management Practices*, 3(4), 208-220.

1.0 Introduction

At the beginning of the twenty-first century came a revolution in technology. It can be said that it is a revolutionary century in terms of technology. Innovation in mobile technology, artificial intelligence, big data, cloud computing, blockchain, and digital platforms create a base for developing new business models, in turn, smart contracts and new ways of payments and payment transfer (Azhgaliyeva et al., 2020; Gomber et al., 2017; Hua & Zheng, 2019). However, Fintech has been warmly welcomed in the international financial markets. Currently, many studies are dedicated to fintech, and they see how up-to-date technologies can revolutionize financial services to improve and make transactions and payments faster, easier, secure, and trustable. (Bhuiyan et al., 2018; Chen et al., 2022; Xu et al., 2023).

Financial services supported technologies are diverse from artificial intelligence, data analytics, blockchain, and digital, to name some of the more current technology support financial technology such as internet, mobile and cloud, etc. (Arner et al., 2016).

It has been categorized into two technological advancement phases: i) the first phase was when the analog time, information, and communication technologies (ICT) were introduced, and ii) the second phase was digital transformation. In the second period of 1967 and 2008, we see two major trends:1) a digitization period (1967–1989) when enterprise information systems are digitized, and productivity is enhanced through increased computer processing and storage, followed by a system integration period (1990–2008) which is facilitated by the rapid growth of the Internet (1990–2007). However, integration refers to internal organizational procedures and links to suppliers and customers. Examples include digital transformation (after the mid-2000s) such as mobile technology, cloud computing, etc. Crowdfunding is a technology that includes supporting financial services where one requests contributions from a large group of individuals towards contributing to a venture or project, either online or offline. (Burtch et al., 2018).

2.0 Literature Review

2.1 Financial Technology

By combining e-finance innovations with information technology and big data techniques Fintech exploded in popularity according to Lee et al. (2018). Through financial technology progress banks and other established financial groups now need to redesign their existing business operations (Davis et al., 2017). According to , most financial technology startup services, including lending and insurance, began relatively recently.

Financial technology receives its abbreviation as Fintech. The term covers both Financial and Technology components that merge in Fintech definition. Finance controls financial operations and technology represents updated computer systems. Technology-based methods drive the modern movement of money as suggested by (Lee et al., 2018)

The beginnings of globalization emerged when the first cable crossed the Atlantic Ocean in 1866 according to Arner et al. (2016) Fintech has developed through three distinguishing periods of growth. In the years 1967-2008 fintech 2.0 emerged because technology pushed finance into a

digital industry from traditional analog systems. The initial fintech period started at this time (Arner et al., 2016).

Throughout 1967-2008 fintech developed from its second stage when Barclay's created the automatic teller machine (ATM). This is called modern fintech 2.0. Beginning in 2008 companies adopted fininacial technology to supply banking and monetary products. This era is called fintech 3.0. Technology has transformed how companies operate their businesses today. People worked together in teams as tasks had not yet been broken down into small parts. People must take part in all business steps. Modern technology has reduced the number of people needed to work in business operations. The workforce of people runs day-to-day business tasks but machine learning systems handle business operation risks (Gomber et al., 2018).

2.2. Relation between Financial Technology and Sustainable Development

Researchers currently study the connection between finance and ecology in small numbers. Zhou et al. (2020) explain that environmental sustainability needs solar energy funds to be properly arranged. According to Chishti and Sinha (2022) research sustainable financing produced better environmental benefits than other ways. Technology-based financial tools have successfully cut harmful carbon dioxide emissions which are bad indicators of sustainable progress acc. According to (Nenavath, 2024) Fintech makes a positive impact on environmental safety. Yang et al. (2021) show in their research that green financing leads to better quality economic development. The author Akomea-Frimpong et al. (2021), regard green financing as a method that helps financial systems drive sustainable economic development. Fintech provides support to businesses investors and consumers by enhancing their green finance practices . Financial technology helps enterprises change their production methods to lower both industrial waste and carbon emissions . Digital technology advances as shown by Lin and Zhu during 2021 help decrease carbon emissions and save energy which improves country sustainability according to their research.(Chishti & Sinha, 2022; Nenavath, 2024; Yang et al., 2021; Zhou et al., 2020)

2.3. Relation between Financial Technology and Financial Inclusion

Financial inclusion forms a separate area of study from Fintech operations. The capital markets have become fully prepared to provide financial services through payment processing and financing activities along with insurance and savings options to enrich the entire financial sector through fintech (Hinson et al., 2019). State governments must plan digital money adoption procedures to improve access to banking services as defined by (Giday, 2023).

FinTech now features advanced technology like artificial intelligence and big data. This innovation offers better methods to improve financial access for everyone. FinTech builds a new financial infrastructure that makes it easier to include people in the banking system (George et al., 2020). The integration of digital technology poses problems to global financial stability even though it plays a major role in developing finance. ICT penetration in developed nations has reached its limit while developing nations in Africa and Asia continue to adopt this technology at a minimum pace (Tchamyou et al., 2019).

2.4. Relation between Financial Inclusion and Sustainable Development

The term financial inclusion means both businesses and individuals can access various financial services that support their daily requirements properly. Research has examined how financial inclusion affects carbon emissions in existing studies across several nations particularly India. (Boutabba, 2014); China (Zhang, 2011); Tunisia (Zhang, 2011); and MENA countries (Farhani & Ozturk, 2015). Lee et al. (2018) explored how financial inclusion affects carbon emissions which represent sustainable development progress in Asian countries. Financial development becomes an environmental threat because it drives customer demand for unsustainably made products. Research shows that including people in finance helps increase fuel usage which causes greater release of harmful carbon gases in the area. Studies show financial growth is linked to raised emissions through missing guidelines. According to (Lee et al., 2018) greater financial development helps us use more energy toward sustainable development.

2.5. Relation between Green Finance and Sustainable Development

Energy efficiency needs green finance to work efficiently. Energy projects require financial resources which are the highest priority for banking institutions. Asian economies are now managing different investment projects and numerous countries support green financial initiatives according to (Azhgaliyeva et al., 2020).

Roberto et al. (2019) show that green investment opportunities drive production towards more efficient energy usage. The research team of Tolliver et al. (2021) discovered that green bond releases and green patent applications gained momentum throughout E7 countries alongside China and South Korea for rising effective energy use. Organizations following green management principles can obtain large sums through green financing according to (Shu et al., 2016) and (Xing et al., 2020) which leads these companies to lower their energy consumption and environmental impact. Businesses now combine fintech tools to make customers feel valued when they support green finance projects. Stakeholders can watch over project operations through green money to guarantee that it meets environmental standards. When financial institutions grant credit for new green energy projects they support the sector in switching away from fossil fuels. Researchers conduct tests to document green financing effects on energy efficiency gains. Pavlyk (2020) proves through bibliometric evaluation that supporting renewable energy and energy efficiency needs green financial strategies. The author notes that interest in energy efficiency and green finance is rising based on the growing number of green finance research papers (Pavlyk, 2020).

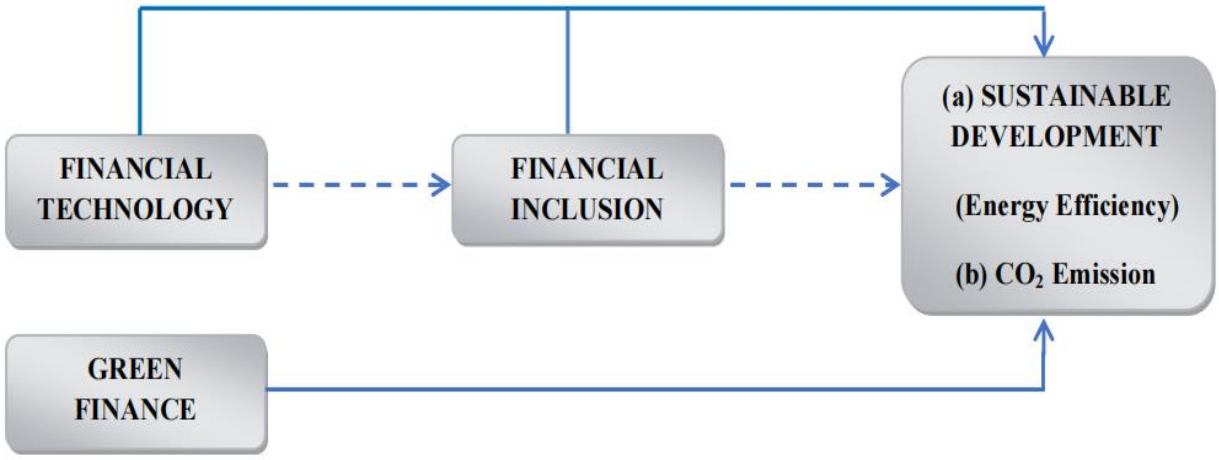
2.6. Relation between Financial Technology, Financial Inclusion, and Sustainable Development

Teufel et al. (2019) currently support blockchain technology features in their research. The researchers at Musabegovic et al. (2019) show how FinTech helps people gain financial access which leads to sustainable development. Puschmann et al. believe Fintech supports development programs that aim for sustainable energy objectives. Research shows Fintech technology supports better energy efficiency which indicates achievement of sustainable development. The current level of progress in modern technology innovation exists yet requires increasing in practical use.

Most financial institutions now use advanced technologies to run operations better and this helps decrease capital costs to investors seeking renewable energy assets. Data sharing has made it easier for companies to evaluate market risks. People now research financial technology since it offers automatic process transformation to boost banking services (Musabegovic et al., 2019; Teufel et al., 2019)

According to Musabegovic et al. (2019), financial growth depends on financial development and Lee et al. (2022) show that financial inclusion plays an essential role in that development. When more people can access financial tools they make superior choices about green technology investments. Clean energy technology development and environmental progress require financial inclusion according to Lee et al. (2022). Research findings show that reaching financial inclusion will benefit our efforts at achieving energy efficiency. A nation picks its production specialty under comparative advantage so expanding trade creates more or less environmental harm.

2.7 Theoretical Framework



3.0 Methodology

3.1 Research Design

A research design represents the method which scientists use to address particular research questions according to Saunders et al. (2012). A research design uses multiple components and tactics with procedures for data assessment and collection.

3.2 Research Methodology

The study design is divided into three types, which are explained as follows;

3.2.1 Qualitative Research Approach

Qualitative research, at its core, asks open-ended questions whose answers are not easily put into numbers such as 'how' and 'why.' Due to the open-ended nature of the research questions, qualitative research design is often not linear like quantitative design.

3.2.2 Quantitative Research Approach

Quantitative research gathers data to quantify information and statistically analyze it to

confirm or deny "alternative knowledge assertions" (Creswell et al., 2007). Quantitative research involves data, reasoning, and an impartial viewpoint. Quantitative research focuses on precise, convergent thinking as opposed to divergent reasoning, which is the creation of several ideas concerning a research subject in an unplanned, unstructured way. A sample population is a particular group that can be studied using quantitative methods.

3.2.3 Mixed Method Approach

Research cannot achieve mixed methods status simply because it employs both qualitative and quantitative data collection approaches. Research achieves its defined purpose of value with its dual data strands when investigators combine and interconnect both methodology types. The integration process exists at three research stages including design and methodology and interpretation levels through various integration approaches like constructing and embedding and merging and connecting (Creswell et al., 2011; Fetters et al., 2013). The four primary mixed methods design consist of Embedded Design and Explanatory Design along with Exploratory Design and Triangulation Design.

3.3 Research Design of Present Study

This is a quantitative study in which secondary data is used to analyse the relation among variables. This study is explanatory because it explains the relationship among variables. Explanatory design is used in this study because the researcher believes that it presents the outcomes and findings in fully understanding and meaningful ways, and readers extract the meaning quickly.

3.4 Sampling Technique

A portion of the population representing the whole population is called a sample. There are two basic sampling techniques. Probability sampling and non-probability sampling. The probability sampling technique is used for quantitative research, and the other is for non-probability sampling, which is used for qualitative research. In this study, simple and systematic sampling was used.

3.5 Data Collection Technique

The process of obtaining information from all pertinent sources to solve the study challenge is known as data collection. Evaluating the result of the issue is helpful. One might get to a conclusion about the answer to the pertinent question using the data collection techniques. The majority of firms employ data collection techniques to predict probability and trends in the future. In this study, Secondary data was collected for variables from 2012 to 2022. Data was obtained from various sites and previous case studies.

3.6 Data Analysis Technique

Data analysis tools detect the connections which exist between different variables. This research utilized SPSS together with STATA (statistical software) and E View 12.0 (Econometric Software) and MS Excel. The data collection requires SPSS to generate descriptive analyses. The research employs STATA statistical software to analyze measurement and structural models in addition to E View 12 (Econometric Software). The actual results of variables under investigation can be discovered through further analyses that evaluate variable relationships. The research data

appeared in tables before being used for presentation purposes

4.0 Findings and Results

4.1 Quantitative Data Analysis

4.1.1 Descriptive Statistics

According to Table 4.1 the study presents descriptive information about its variables' data points. The table shows SD data including mean, minimum, maximum and standard deviation and total observation number. Minimum SD value stands at 123107.4 and maximum at 3494270. The data reveals an average of 13302168 GWh with standard deviation at 1335490. Statistics show that the highest CO2 emissions per person reach 9.908431 tons whereas the lowest emissions stand at 0.362291 tons. The mean CO2 emissions come to 3.3885216 tons per capita. The average variation is 3.84855. Research shows that the average green finance investment stands at 147.4458 million dollars while the lowest investment amounts to 0.0000 million dollars and shows up to 1462.152 million dollars. Financial technology shows an average investment value of 21.63970 million USD although its minimum stands at 4.630000 million USD and maximum reaches 42.56143 million USD. Financial inclusion in the context of the statistical analysis has a mathematical mean of 57.35027 million USD. The minimum recorded figure was 5.640000 USD while the maximum value reached 98.65 million USD. Assessments reveal that the standard deviation amounts to USD 30.490030 million. There are 50 observations.

4.2 Regression Analysis

The study utilized a balanced annual panel dataset covering the period from 2012 to 2022. The data structure comprises both a time-series dimension (t = 1, 2, 3, …, T) and a cross-sectional dimension (i = 1, 2, …, N). The panel dataset includes a total of 50 observations, where each cross-sectional unit (i) is observed over multiple time periods (t).

4.3 Direct effect measurement

$$Y_{it} = \beta_0 + \beta_1 X + \beta 2\, M + + \beta 3\, M + \mu_{it} \qquad i = 1, 2, 3\ldots\ldots N \qquad t = 1, 2, 3\ldots\ldots T \qquad \textbf{Eq\# 01}$$

Table 4.2: H1 (a): Financial Inclusion and Financial Technology has combined Effect on Sustainable Development (energy efficiency.)

SD	Coefficient	Standard Of Error	T	P>(T)	95% Confidence Of Interval		Hypothesis
FI	48352.890	14158.810	3.42	0.002	18989.31	77716.46	**ACCEPTED**
FT	-97522.390	32820.120	-2.97	0.007	-165587.1	-29457.63	

SD: sustainable Development, FI: Financial Inclusion, FT: Financial Technology

Table 4.3: H1 (b): financial technology and financial inclusion has combined effect on carbon dioxide emission.

CE	Coefficient	Standard Of Error	T	P>(T)	95% Confidence Of Interval		Hypothesis
FI	0.065	0.029	2.23	0.036	18989.31	77716.46	**ACCEPTED**
FT	0.099	0.067	1.47	0.155	-0.0404	0.238	

CE: carbon dioxide emission, FI: financial Inclusion, FT: financial technology

4.4 Measurement of Indirect Effect

$$Y = B_0 + B_1X + \mu \qquad \textbf{Eq\# 02}$$

According equation # 02 effect of financial technology on financial inclusion is measured. Following table shows the results.

Table 4.4: H2: Financial Technology has impact on financial Inclusion

FI	Coefficient	Standard Of Error	T	P>(T)	95% Confidence Of Interval		Hypothesis
FT	1.964	0.508	7.61	0.00	1.4	2.4	**ACCEPTED**
CONS	14.883	6.489	2.29	0.031	1.46	28.30	

$$\mathbf{Y = B_o + B_2M + \mu} \qquad \textbf{Eq\# 03}$$

4.5: H3 (a): Financial Inclusion has significant effect on sustainable development (Energy efficiency)

Equation #03 calculated the effect of financial inclusion on sustainable development (energy efficiency). Results are shown by following table 4.5.

Sd	Coefficient	Standard Of Error	T	P>(T)	95% Confidence Of Interval	Interval	Hypothesis
FI	6590.2	3048.447	2.06	0.048	0.068	-30829.55	Accepted

SD: sustainable development, FI: Financial Inclusion.

4.6: H3 (b): Financial Inclusion has significant effect on carbon dioxide Emission

$$Y = B_o + B_3M + \mu \qquad \text{Eq\# 04}$$

Equation 04 calculated the effect of financial inclusion (FI) on CO_2 emission.

Results are shown in the following table 4.7.

Ce	Coefficient	Standard Of Error	T	P>(T)	95% Confidence Of Interval	Interval	Hypothesis
FI	0.1	0.156	6.37	0	0.068	0.133	Accepted

CE: carbon dioxide emission, FI: financial Inclusion,

H4 (a): Green Finance has an effect on sustainable Development (Energy Efficiency)

Result H4: Data shows that probability value is greater than 0.05 that is why hypothesis is rejected. Confidence level is also in negative value.

Green finance has significant effect on CO_2 emission that was assumed in this study. Regression analysis explains the effect of by table 4.16.

H4 (b): Green finance has an effect on CO_2 Emission

The results demonstrate hypothesis rejection because the 0.05 threshold is surpassed by the probability value. This research analyzes sustainable development effects on green finance through carbon dioxide emission measurement which uses regression analysis on STATA statistical software. The result indicates the rejection of hypothesis because the probability value exceeds 0.05. The regression analysis between financial inclusion and CO2 emission yields hypothesis acceptance due to the probability value below 0.05.

5.0 Discussion and Conclusion

This study presents relevant findings that policymakers need to understand the new ideas and tactical approach for financial management. The assessment of how Fin Tech expansion leads to changes in renewable energy adoption stands as the core research focus of this investigation. The study needs information about future renewable energy use and renewable power generation. A model was developed by implementing regression analysis to study how financial technology growth impacts renewable energy use and production while fulfilling all essential assumptions including linearity, normality, auto correlation, heteroscedasticity and independent error of residues. According to Li et al. (2021) FinTech provides both investment possibilities as well as risk control instruments together with other advantages. Financial technology delivers improved attention as well as information transmission through its sector thus enabling financial inclusion. The merging advantages of these factors help strengthen the development of renewable energy systems (Alemzero et al., 2021). Green financing affects energy efficiency through two aspects namely onshore hydropower generation investment and public funding for renewable energy production. The two paths to enhance energy efficiency begin with developing policy groups and proceeding with efficient policy execution toward defined objectives. Today environmental legislation primarily targets CO2 level reductions. The systematic control of environmental

protection through public inclusion at local levels leads to better energy practices and environmental outcomes. Emissions of CO2 increased due to more industrial activity and customer use of non renewable energy resources resulting in relaxed environmental regulations. Current research about the link between green finance and environmental quality production remains scarce. A limited set of research documents analyze how green financial instruments affect economic sustainability alongside carbon dioxide emission levels (Dikau et al. 2018 and Sachs et al 2018). All evidence obtained through this research indicates that green finance produces no impact on sustainable development or carbon dioxide emission levels. Some alternative elements need to exist which affect CO2 emission alongside sustainable development. The present situation creates space for researchers to conduct investigation and perform research studies.

5.1 Conclusion

This study shows financial development refers to how new financial technology tools enter the market. The stable unit costs for financial inter mediation throughout the last century has spurred the development of financial technical innovations. An accumulation of technological advancements from wireless networks and mobile devices with web-based technologies creates the field we know as FinTech today. Banking insurance and regulation serve as the primary fields through which experts organize fintech operations. The current study supports recent research demonstrating how Fintech relates to sustainable development (Azhgaliyeva and Liddle 2020). Study findings demonstrate that financial technology together with financial inclusion creates meaningful positive impacts on sustainable development measured through carbondioxide emission along with energy efficiency. The study revealed that green finance does not have any meaningful impact on sustainable development since the promotion of green finance through green bonds and green investment does not result in carbon emission changes.

5.2 Research contribution

The research team discovered that sustainable development measured through renewable energy production alongside renewable energy consumption and carbon dioxide emission investigation lacks any documented study except those using financial inclusion as a mediating variable. Research does not demonstrate how green finance through onshore wind energy generation investments and hydro power generation investments influences sustainable development. Through this research the author fills an absence in existing publications and delivers valuable knowledge to both academic scholars and policy developers. Policy creators will learn about the necessary ease that producers need to promote renewable energy.

5.3 Future Research Recommendation

The study needs sequential approach methodology to achieve deeper insights into research variables and their causal effects. The study modifies its variable measurement to understand investments in offshore wind energy and biofuel development to measure green finance activities. Sulfur dioxide and Lead production act as air and water contaminants that serve as indicators of sustainable development achievement. Literature could benefit from the introduction of financial technology mode through block chain crowd funding which takes on the principal variable and demonstrates its actual deployment. The research reveals that green finance, sustainable

development and carbon dioxide emission show no association with one another. The study reveals that scientists need to investigate other variables which influence sustainable development or provide better outcomes.

Huma Ali: Problem Identification and Theoretical Framework
Rabia Haneef: Data Analysis, Supervision and Drafting

Conflict of Interests/Disclosures

The authors declared no potential conflicts of interest in this article's research, authorship,and publication.

References

Akomea-Frimpong, I., Jin, X., & Osei-Kyei, R. (2021). A holistic review of research studies on financial risk management in public–private partnership projects. *Engineering, construction and architectural management*, *28*(9), 2549-2569.

Arner, D. W., Barberis, J., & Buckey, R. P. (2016). FinTech, RegTech, and the reconceptualization of financial regulation. *Nw. J. Int'l L. & Bus.*, *37*, 371.

Azhgaliyeva, D., Liu, Y., & Liddle, B. (2020). An empirical analysis of energy intensity and the role of policy instruments. *Energy Policy*, *145*, 111773.

Bhuiyan, M. A., Jabeen, M., Zaman, K., Khan, A., Ahmad, J., & Hishan, S. S. (2018). The impact of climate change and energy resources on biodiversity loss: Evidence from a panel of selected Asian countries. *Renewable energy*, *117*, 324-340.

Boutabba, M. A. (2014). The impact of financial development, income, energy and trade on carbon emissions: evidence from the Indian economy. *Economic Modelling*, *40*, 33-41.

Chen, H., Shi, Y., & Zhao, X. (2022). Investment in renewable energy resources, sustainable financial inclusion and energy efficiency: A case of US economy. *Resources Policy*, *77*, 102680.

Chishti, M. Z., & Sinha, A. (2022). Do the shocks in technological and financial innovation influence the environmental quality? Evidence from BRICS economies. *Technology in Society*, *68*, 101828.

Creswell, J. W., Hanson, W. E., Clark Plano, V. L., & Morales, A. (2007). Qualitative research designs: Selection and implementation. *The counseling psychologist*, *35*(2), 236-264.

Creswell, J. W., Klassen, A. C., Plano Clark, V. L., & Smith, K. C. (2011). Best practices for mixed methods research in the health sciences. *Bethesda (Maryland): National Institutes of Health*, *2013*, 541-545.

Davis, K., Maddock, R., & Foo, M. (2017). Catching up with Indonesia's fintech industry. *Law and Financial Markets Review*, *11*(1), 33-40.

Farhani, S., & Ozturk, I. (2015). Causal relationship between CO 2 emissions, real GDP, energy consumption, financial development, trade openness, and urbanization in Tunisia. *Environmental Science and Pollution Research*, *22*, 15663-15676.

Fetters, M. D., Curry, L. A., & Creswell, J. W. (2013). Achieving integration in mixed methods designs—principles and practices. *Health services research*, *48*(6pt2), 2134-2156.

George, G., Lakhani, K., & Puranam, P. (2020). What has changed? The impact of Covid pandemic on the technology and innovation management research agenda. *Journal of Management Studies*.

Giday, H. G. (2023). Financial inclusion and its demand-side determinants: Evidence from Ethiopia. *Cogent Economics & Finance*, *11*(1), 2186031.

Gomber, P., Kauffman, R. J., Parker, C., & Weber, B. W. (2018). On the fintech revolution: Interpreting the forces of innovation, disruption, and transformation in financial services. *Journal of management information systems*, *35*(1), 220-265.

Gomber, P., Koch, J.-A., & Siering, M. (2017). Digital Finance and FinTech: current research and future research directions. *Journal of Business Economics*, *87*, 537-580.

Hinson, R., Lensink, R., & Mueller, A. (2019). Transforming agribusiness in developing countries: SDGs and the role of FinTech. *Current Opinion in Environmental Sustainability*, *41*, 1-9.

Hua, X., & Zheng, Y. (2019). *Financial technologies: Artificial intelligence, blockchain, and crowdfunding*. Emerald Publishing Limited London.

Lee, B., Park, J.-H., Kwon, L., Moon, Y.-H., Shin, Y., Kim, G., & Kim, H.-j. (2018). About relationship between business text patterns and financial performance in corporate data. *Journal of Open Innovation: Technology, Market, and Complexity*, *4*(1), 1-18.

Lee, C.-C., Yuan, Z., Lee, C.-C., & Chang, Y.-F. (2022). The impact of renewable energy technology innovation on energy poverty: does climate risk matter? *Energy Economics*, *116*, 106427.

Musabegovic, I., Özer, M., Djukovic, S., & Jovanovic, S. (2019). Influence of financial technology (FinTech) on financial industry. *Економика пољопривреде*, *66*(4), 1003-1021.

Nenavath, S. (2024). Exploring the dynamics of fintech impact, financial regulation, and corporate financial trends: An analysis of India. *Asia Pacific Management Review*.

Pavlyk, V. (2020). Assessment of green investment impact on the energy efficiency gap of the national economy.

Roberto, C. A., Lawman, H. G., LeVasseur, M. T., Mitra, N., Peterhans, A., Herring, B., & Bleich, S. N. (2019). Association of a beverage tax on sugar-sweetened and artificially sweetened beverages with changes in beverage prices and sales at chain retailers in a large urban setting. *Jama*, *321*(18), 1799-1810.

Shu, S., Lin, C. Y., He, H. H., Witwicki, R. M., Tabassum, D. P., Roberts, J. M., Janiszewska, M., Jin Huh, S., Liang, Y., & Ryan, J. (2016). Response and resistance to BET bromodomain inhibitors in triple-negative breast cancer. *Nature*, *529*(7586), 413-417.

Tchamyou, V. S., Erreygers, G., & Cassimon, D. (2019). Inequality, ICT and financial access in Africa. *Technological Forecasting and Social Change*, *139*, 169-184.

Teufel, B., Sentic, A., & Barmet, M. (2019). Blockchain energy: Blockchain in future energy systems. *Journal of Electronic Science and Technology*, *17*(4), 100011.

Tolliver, C., Fujii, H., Keeley, A. R., & Managi, S. (2021). Green innovation and finance in Asia. *Asian Economic Policy Review*, *16*(1), 67-87.

Xing, Y., Mo, P., Xiao, Y., Zhao, O., Zhang, Y., & Wang, F. (2020). Post-discharge surveillance and positive virus detection in two medical staff recovered from coronavirus disease 2019 (COVID-19), China, January to February 2020. *Eurosurveillance*, *25*(10), 2000191.

Xu, A., Zhu, Y., & Wang, W. (2023). Micro green technology innovation effects of green finance pilot policy—From the perspectives of action points and green value. *Journal of Business Research*, *159*, 113724.

Yang, Y., Su, X., & Yao, S. (2021). Nexus between green finance, fintech, and high-quality economic development: Empirical evidence from China. *Resources Policy*, *74*, 102445.

Zhang, Z.-Q. (2011). *Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness*. Magnolia press.

Zhou, X., Tang, X., & Zhang, R. (2020). Impact of green finance on economic development and environmental quality: a study based on provincial panel data from China. *Environmental Science and Pollution Research*, *27*, 19915-19932 .