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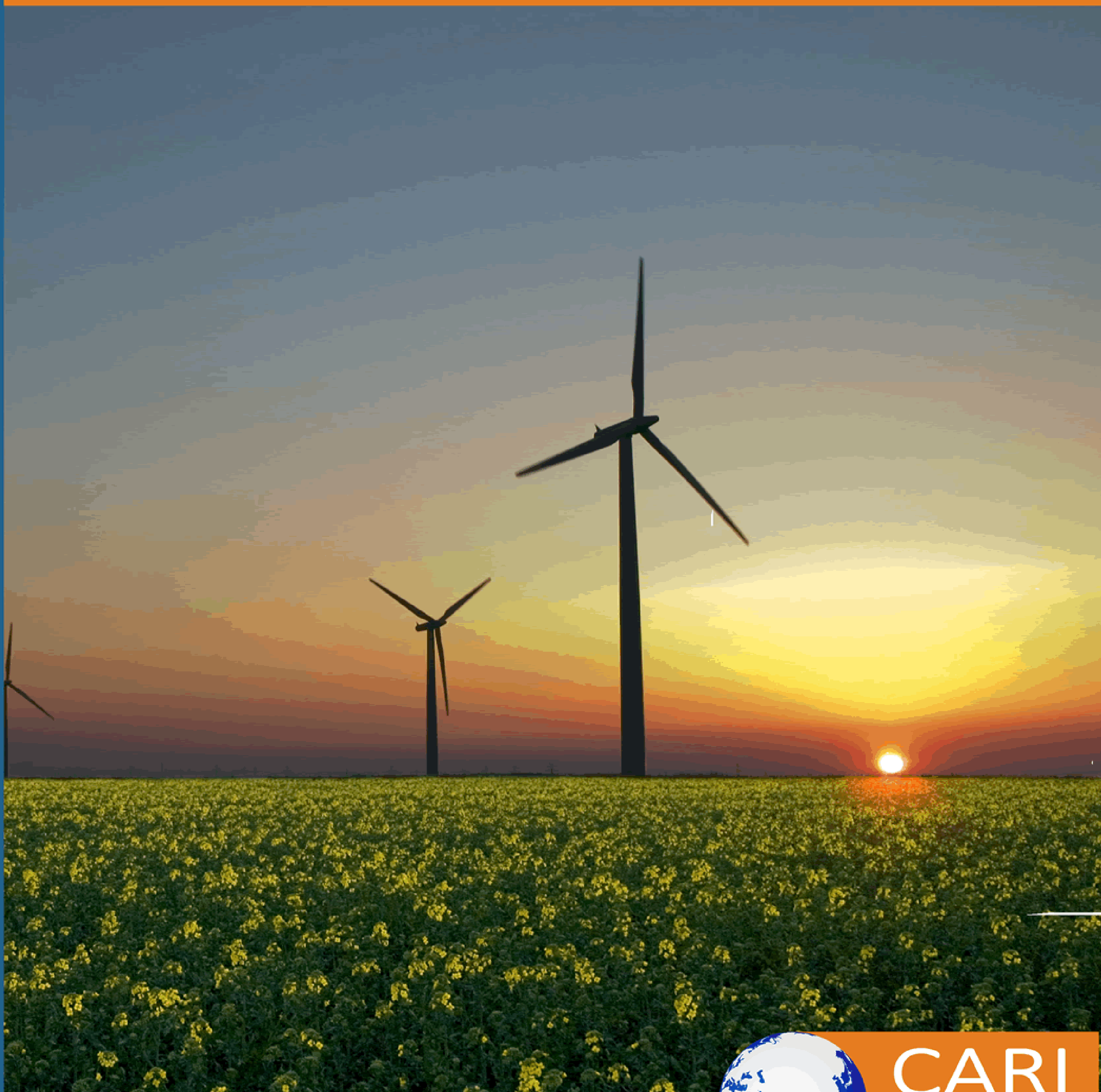

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The impact of Green Financing, Fintech Adoption, Green Innovation and Corporate Social Responsibility on Bank Environmental Performance in Malaysia

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Abstract

Purpose: This study investigates the impact of Green Financing (GF), Fintech Adoption (FA), Green Innovation (GI), and Corporate Social Responsibility (CSR) on Environmental Performance (EP) within the Malaysian banking sector.

Methodology: The study employs a quantitative research approach using secondary data extracted from the sustainability reports, annual financial disclosures, and ESG databases of commercial banks in Malaysia. A purposive sampling method was used to select 20 banks that actively engage in green initiatives. The data was analyzed using SPSS software, applying descriptive statistics, regression analysis, correlation analysis, and chi-square tests.

Findings: Preliminary results suggest that all four independent variables—Green Financing, Fintech Adoption, Green Innovation, and Corporate Social Responsibility —have a significant and positive influence on Environmental Performance. Among these, Green Innovation shows the strongest correlation, followed by Fintech Adoption. The findings also highlight gaps in standardized environmental performance metrics, particularly in reporting and transparency across institutions.

Unique contribution to theory, practice and policy: Theoretically, the study contributes to Legitimacy Theory by demonstrating how financial institutions align with societal values through sustainability practices. In policy terms, the results can be used to justify further development and introduction of frameworks, such as the Climate Change and Principle-Based Taxonomy (CCPT) by Bank Negara Malaysia. In practical terms, the research provides banks in which to set their action plans on green policies and stakeholder confidence. It also focuses on the necessity of uniformity of measurement systems and inter-sector cooperation, when it comes to reinforcing environmental management in the financial industry in Malaysia.

Keywords: *Green Financing, Fintech Adoption, Green Innovation, Corporate Social Responsibility, Environmental Performance*

1.0 Introduction

Environmental performance is the performance of an army and actions of the organizations in issues of environmental sustainability and is critical in long-term environmental stewardship. With the increasing effects of climate change, including global warming, biodiversity degradation, and environmental pollution, there is growing public concern about the adverse impact of unsustainable human activities on the natural environment (Long et al., 2022; Grijalvo & García-Wang, 2023). Banks and other financial institutions have been pushed to incorporate environmental strategies in their activities to be able to keep up with the competition among other institutions and meet the global target on sustainability (Shahrom & Kunhibava, 2023; Yun, 2025).

Although banks are not inherently resource-intensive, financing decisions made by banks significantly influence environmental outcomes (Gulzar et al., 2024). In Malaysia, green financing has risen to significance; this refers to fund provision to projects that have positive effects on the environment. Projects such as renewable energy, low-carbon transport, and sustainable agriculture are examples where banks can drive ecological improvement (Liu & Lai, 2021; Idris et al., 2024). This financial channelling reflects a broader trend of environmental responsibility in the financial sector.

Although banking operations do not directly produce large carbon footprints, their investments and loan portfolios impact environmentally sensitive industries. Therefore, banks are instrumental in shaping ecological outcomes by embedding environmental risk evaluations and sustainability metrics into credit assessments (Al-Qudah et al., 2023; Zhou et al., 2022).

In Malaysia, the banking sector is a key pillar of economic resilience. As of March 2021, total assets of Malaysian banks stood at RM3,016 billion, with commercial lending reaching RM733 billion—approximately 90% of total loans (BNM, 2022). Over 54% of these loans are directed toward sectors that heavily depend on ecosystem services, such as construction, agriculture, and manufacturing. This highlights the need for stronger environmental considerations in lending policies.

Malaysia's environmental progress is uneven. While strides have been made in air quality and water sanitation, the nation continues to face challenges in biodiversity loss and deforestation (Othman et al., 2023; SAN ONG et al., 2021). In addition, the emissions associated with greenhouse gases based on the activities that the banks finance make the case of sustainable banks framework even stronger (BNM, 2022).

Green financing is only one of them. Another game changer in the way of sustainable finances has been the use of fintech. Real-time data analytics, blockchain, and artificial intelligence represent tools that improve the transparency of green investments, their efficiency, and traceability (Bhuiyan et al., 2024; Safi et al., 2024). This piece of technology is crucial, especially following the COVID-19 epidemic, which accelerated digitalization of the entire financial market (Li & Wang, 2023).

Green innovation is another pillar that encompasses creation of green technologies, implementation of energy-saving systems, and low carbon footprint of financial operations (Kong et al., 2022; Yuan et al., 2021). In Malaysia, as the banks adopt technology, they are also becoming more environmentally friendly through the use of paperless banking, introduction of green buildings, and low-energy infrastructure.

Corporate Social Responsibility (CSR) is also a very important aspect. However, the surveys indicate that there is a strong positive correlation between CSR initiatives and environmental performance amongst banks (Mostepaniuk et al., 2022; Meseguer-Sanchez et al., 2021). CSR disclosures enhance trust, fulfil regulatory expectations, and improve brand image—critical for investor confidence (Lui et al., 2021; Tan et al., 2022).

However, most literature addresses green finance, fintech, green innovation, or corporate social responsibility in isolation. There is limited empirical research exploring their combined effect on environmental performance, particularly in Malaysia's banking sector. Studies that address ESG disclosures and environmental outcomes exist (Gutiérrez-Ponce & Wibowo, 2024; Pham et al., 2025), but holistic integration is underexplored.

This research is therefore necessary to close the knowledge gap. By examining the integrated influence of green financing, fintech adoption, green innovation, and corporate social responsibility on environmental performance, this study aims to deliver evidence-based recommendations for sustainable banking in Malaysia. Furthermore, it aligns with national and regional policies such as the Sustainable Finance Framework in ASEAN and Bank Negara Malaysia's sustainability guidelines, ensuring both academic value and policy relevance (Perdana et al., 2023; Shahrom & Kunhibava, 2023).

1.1 Problem Statement

The banking sector plays a critical role in Malaysia's economic development but simultaneously contributes—both directly and indirectly—to environmental degradation. While banking operations may not emit significant pollutants, their financing decisions have a cascading impact on sectors linked to deforestation, resource exploitation, and high carbon emissions. As of 2020, 54% of commercial lending portfolios in Malaysia were tied to industries heavily reliant on ecosystem services, increasing their exposure to physical and transition risks (Bank Negara Malaysia, 2022). Despite regulatory frameworks such as the Climate Change and Principle-based Taxonomy (CCPT), Malaysia's financial institutions still face challenges in fully embedding environmental considerations into core banking practices.

Green finance has emerged globally as a strategic lever to fund environmentally sustainable initiatives, yet its adoption and performance impact in the Malaysian banking sector remain underexplored (Franco et al., 2021). In turn, despite the fact that financial technology (fintech) solutions, including artificial intelligence (AI), blockchain, and the use of big data, provide a means to track the ecological footprint, enhance transparency, and maximize green investments, there has been limited empirical analysis of their use in Malaysian banking (Guo et al., 2023; Muganyi et al., 2021).

The other strategy that is poorly employed by banks in Malaysia is green innovation, which entails the development and implementation of eco-friendly technology owing to its high costs, technical capacity, and regulations (Kawai et al., 2018). Moreover, although most of the CSR activities in the Malaysian banking industry are concentrated in philanthropy and education, they have been conducted in a disjointed manner that does not combine well with the global indicators of environmental performance (Suganthi, 2020; Gunawan et al., 2022).

Although the number of studies encouraging banks to become more environmentally accountable is growing, there is a lack of literature that explains how all of these factors can impact the environmental performance of the banks of Malaysia simultaneously. Available literature mostly mirrors the Western context and does not consider the specifics of the Malaysian regulatory, cultural, and ecological climates (Tawiah et al., 2021). The absence of universally accepted environmental performance measures also causes inconveniences to scholarly research and corporate practice (Akhter et al., 2023; Hidayat-ur-Rehman & Hossain, 2024).

Accordingly, the study forges an empirical gap in which the level of green finance impact on fintech adoption, green innovation, and CSR are examined, and in turn, environmental performance within the Malaysian banks are influenced. By this, it has something to add to the scholarly discussion of sustainable banking and deliver some useful ideas to the stakeholders such as regulators, financial institutions, and policymakers. The study also meets the sustainability agenda of Malaysia, such as commitments to the Paris Agreement and the United Nations Sustainable Development Goals (SDGs), because it presents the evidence-based suggestions to incorporate the environmental performance as part of the strategic core of bank activity.

Finally, the development of the Malaysian banking industry into the sustainable segment faces the need of the innovative financial instruments and the technological progress as well as the strength of institutional frameworks, the inter-sectoral cooperation, and the research that is regionally contextualized. In this study, a holistic view point is offered to defend that change.

2.0 Literature Review

2.1 Theoretical Review

Theoretical frameworks tend to establish empirical research by offering a prism through which a researcher can comprehend and describe the connections between variables. These theories comprise of interconnected notions and suggestions that are meant to describe, explain and foretell phenomena. Thus, in the given study, it will be presumed that Legitimacy Theory (Dowling & Pfeffer, 1975) monitors the role of green financing, fintech adoption, green innovation, and corporate social responsibility on the environmental performance of Malaysian banks. This theory offers a good ground to investigate why the rationale of the organizations, particularly in heavily regulated industries like banking, have employed the sustainability practices to align with expectation of the societies.

According to the Legitimacy Theory, organizations are presumed to monitor their activities under the premises of social norms and environmental values in order to maintain legitimacy and win the trust of the involved parties as well as license to operate within the ambience. In the era of the climate-conscious world, being an environmentally responsible bank is increasingly important not only to comply with regulations but also to obtain a favourable picture among a wider range of society (Crossley et al., 2021; Akhter et al., 2023).

Some of the significant tools used by the banks in gaining this legitimacy include Green Financing. By having the capital directed towards renewable energy industries, sustainable infrastructure, and pollution control, the banks will be applying their conformance with the green desires. As stipulated in the explanations given by Liu & Lai (2021), and Idris et al. (2024), green sukuk and other Islamic green financial products are considered important in the bank system of Malaysia in terms of legitimacy. This is backed by Bank Negara Malaysia (2022), which highlights that green lending provides an opportunity to coordinate environmental risks proactively by allowing banks to realize their purpose in the sustainability agenda on the national level.

Fintech Adoption also increases legitimacy through enhancement in clarity of reporting and investment practices on sustainability, transparency, and accountability. AI, blockchain, and big data analytics technologies enable banks to track emissions, track green investments and fulfil the increasing stakeholder demand of climate disclosures. According to Bhuiyan et al. (2024) and Safi et al. (2024), the integration of fintech assists banks in being innovative and capable of adjusting to sustainability laws, thereby consolidating their reputability in the eyes of the world. Fintech in Malaysia is not only the force of digital transformation of the country, but also enables the regulatory force to propel sustainable banking (Li & Wang, 2023).

The next pillar is called Green Innovation and it speaks about development or implementation of technologies and systems that have less impact on environment. These are paperless operations, strong buildings with low energy consumption, and green financial products using the digital mode. Kong et al. (2022) and Yuan et al. (2021) state that this form of the innovation not only contributes to performance improvement but also to stakeholder perception and trust. Green innovation is good news to the environment that banks are sincere in their commitment to the environment, particularly in the context of the sustainable development agenda (Huang et al., 2022).

Corporate Social Responsibility (CSR) represents another legitimacy-enhancing instrument. CSR on the environmental front, including tree-planting campaign, climate education and promoting clean energy, also enables banks to show that they adhere to societal values and Sustainable Development Goals (SDGs). According to studies by Mostepaniuk et al. (2022) and Meseguer-Sanchez et al. (2021), strategic CSR helps to achieve favourable environmental results and makes a contribution to enforcing the perception of financial institutions among people. The CSR strategies in Malaysia are still developing, and more banks are integrating the environmental brunch in reporting and reaching out to their communities (Lui et al., 2021; Tan et al., 2022).

Legitimacy Theory is gaining empirical evidence in the banking sphere of knowledge. Just as an illustration, Chen et al. (2022) uncovered that the practice of green banking positively affected the environmental impact of the banks that had adopted it, as well as the stakeholders trust towards the mentioned banks. On the same note, Gunawan et al. (2022) demonstrated that environmental legitimacy and efficiency of the bank are closely entwined with the practices of sustainability disclosures.

To sum up, Legitimacy Theory offers a solid prism to comprehend how Malaysian banks can improve in environmental performance. Banks incorporate green financing, green innovation, fintech, and CSR in their main strategies, but they also adhere to the social demand to become environmentally conscious financial institutions. Such congruence makes them more legitimate in what they do, and they become central players in promoting the sustainable banking agenda in Malaysia (Shahrom & Kunhibava, 2023; Yun, 2025).

2.2 Conceptual Framework

The conceptual framework of this study illustrates the hypothesized relationships between four key independent variables—Green Financing (GF), Fintech Adoption (FA), Green Innovation (GI), and Corporate Social Responsibility (CSR)—and the dependent variable, Environmental Performance (EP), within the Malaysian banking sector. Grounded in Legitimacy Theory, the framework assumes that these sustainability practices are strategic tools employed by banks to enhance their environmental outcomes and align with societal expectations. The model serves as a foundation for empirical testing to determine the extent to which each variable influences EP, both individually and collectively.

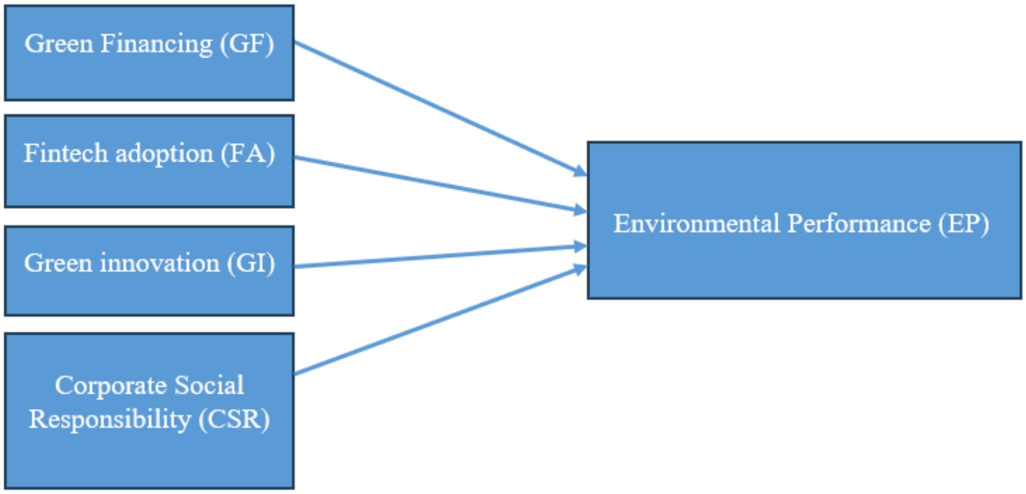

Figure 1 Conceptual Framework

2.3 Research Gaps

Although there is increased worldwide support on sustainability, there are a number of research gaps on how green practices can lead to improved environmental performance especially in the banking sector in developing economies such as Malaysia. The originality of this study addresses these gaps as it examines the joint effect that green financing, the use of fintech, green innovation, and corporate social responsibility (CSR) on the environmental performance of Malaysian banks have on the Malaysian banks.

To begin with, little empirical study has been conducted in the banking industry of Malaysia. Although international research (e.g., Huang et al., 2022; Kong et al., 2022) helps to draw comprehensive conclusions about sustainability approaches, it does not pay much attention to the environmental conditions unique to Malaysia (e.g., the threat to biodiversity, natural forest destruction, or air pollution). Even though regulations like the Climate Change and Principle-based Taxonomy (CCPT) have been implemented by Bank Negara Malaysia (2022), there is little empirical evaluation of the application and effects of these guidelines (Shahrom & Kunhibava, 2023; Yun, 2025). Moreover, fintech and big data have sufficient potential to facilitate environmental sustainability in Malaysian banks, although it is not focused on research (Bhuiyan et al., 2024; Safi et al., 2024).

Second, studies published between 2021 and 2024 are inclined to study green financing, fintech, green innovation, or CSR separately, which makes it impossible to reflect synergistic effects between these greening objects. Although previous researches have stressed the significance of single aspects (e.g., Meseguer-Sanchez et al., 2021; Tan et al., 2022), there is little analysis of the interaction between these variables as a way to enhance environmental performance. The lack of a coherent model, which is indicative of the relationship between green initiatives, restricts the capacity of policymakers and banks to lay down comprehensive sustainability plans.

Third, published material is biased towards developed economies, which have superior regulatory mechanisms, technological and financial ecosystems. Such findings therefore might not be applicable in the emerging markets such as Malaysia. As an example, green capital access, digital transformation readiness, and stakeholder maturity are substantially different across various regions, (Perdana et al., 2023; Liu & Lai, 2021). In turn, the study that examines the functioning of Malaysian banks within the various institutional and socio-economic restraints requires the context-specific research.

Fourth, environmental performance in the banking business lacks standardized grammar. Despite the common measures against measuring carbon footprint, green loan issuance, and energy efficiency, measures to be used by banks are also not similar in Malaysia. This inconsistency hinders benchmarking, cross-comparison, and the formulation of national sustainability standards (Chen et al., 2022; Gulzar et al., 2024). Without agreed-upon indicators, banks may selectively report on favourable outcomes, resulting in greenwashing or limited accountability.

Fifth, known about the role of the stakeholders in the determination of environmental programs in the banking system in Malaysia. The increasing pressures of regulators, customers, and investors to be more transparent and act towards environmental concerns have not been studied extensively with regard to affecting the adoption behaviour (Gunawan et al., 2022; Ruan et al., 2022). Profiling stakeholder expectations is an influential tool in the banks to create effective strategies that exist in accordance with market needs and the legitimacy of the banking institutions (Crossley et al., 2021; Akhter et al., 2023).

3.0 Material and Methods

The research design employed in this study is quantitative and, therefore, secondary data will be analyzed to establish the correlation between green financing, fintech implementation, and green innovation with corporate social responsibility to environmental performance of banks. The study was done in Malaysia targeting specifically all the licensed commercial banks whose activities were under the supervision of the Bank Negara Malaysia (BNM). Twenty banks were selected using purposeful sampling strategy to manifest proactive Environmental, Social, and Governance (ESG) disclosure and have a high level of sustainability practice. The data were gathered in the period of 2022-2024 in the annual reports and sustainability disclosures of Bank Negara Malaysia and its publications. Statistical Package for the Social Sciences (SPSS) was utilized to analyze the data. Such statistical procedures as descriptive analysis, correlation analysis, regression analysis, and chi-square tests were part of the research plan to check the associations, as well as the statistical significance among the identified variables.

4.0 Findings

The research should contribute immensely to the theory and practice of research. On the theory, it adds to the scope of the Legitimacy Theory by testing empirically on the effects of the sustainability practices upon each other namely, green financing, fintech adoption, green innovation, and corporate social responsibility, as a collective influence on the environmental performance of Malaysian banks. Considering several variables of sustainability in one framework serves as an advantage with the study presenting a complete picture of how banks can achieve a sense of legitimacy and trust by their readership as the results of actions to care of the environment due to a positive contribution to sustainable finance and environmental management literature.

In the empirical world, the results will provide useful information to the banking institutions, regulators, and policymakers in Malaysia. It will also assist in designing stronger sustainability approaches in accordance with the guidelines of Bank Negara Malaysia and other international frameworks on sustainability like the UN SDGs. In addition, the research will provide the industry players with information about the potential of integrating green initiatives with digitally powered environment to achieve operational efficiency, transparency, and engagement with stakeholders. Such evidence-based methodology will assist in creating custom policies and frameworks to cultivate the transition of Malaysia to a greener financial ecosystem.

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