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GREEN TAXONOMY ALIGNMENT AND FIRM VALUE: THE MEDIATING ROLE OF ESG DISCLOSURE QUALITY AMONG MALAYSIAN LISTED COMPANIES

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Abstract: *Capital markets are increasingly expected to support environmental objectives alongside financial returns but a persistent gap in sustainability reporting exposes investors to greenwashing risks. While ESG disclosure and firm value are widely studied, the role of green taxonomy alignment as a strategic driver for disclosure quality remains underexplored. This study develops a conceptual framework linking green taxonomy alignment, ESG disclosure quality, and firm value within the evolving regulatory landscape of Malaysian listed companies. Grounded in Signalling Theory, the framework positions green taxonomy alignment specifically contextualized from Bank Negara Malaysia's Climate Change and Principle-based Taxonomy (CCPT) as a critical upstream engine that anchors sustainability claims to verifiable transition criteria. We argue that taxonomy alignment improves ESG disclosure quality, which may be conceptualised through a multi-dimensional localized Sustainability Disclosure Quality (SDQ) index. This high-quality disclosure serves as the mediating channel through which credible sustainability signals reach investors to influence market valuation. This study contributes by reframing taxonomy alignment as an antecedent of reporting quality rather than an isolated compliance checklist, extending Signalling Theory to transition-oriented economies, and providing a robust conceptual foundation for future empirical testing and policy iterations by national regulators such as Bursa Malaysia and the Securities Commission.*

Keywords*: Green taxonomy alignment; ESG Disclosure Quality; Firm Value; Sustainable Finance; Signalling Theory; Malaysian Listed Companies*

Introduction

Sustainable finance has moved from the margins of corporate reporting to the centre of how capital markets evaluate firms. Investors increasingly assess climate exposure, governance quality, and long-term sustainability commitments alongside traditional financial metrics, as capital markets respond to environmental information, carbon emissions, and ESG-related disclosure (Matsumura et al., 2014; Fatemi et al., 2018).

That shift has exposed a credibility gap. Annual and sustainability reports are now full of ESG content, but the quality is uneven. Some firms report measurable targets and seek external assurance, while others rely on broad, promotional language. ESG information is only useful when it is transparent, comparable, and verifiable, as weak or excessive disclosure can create a gap between communicated sustainability claims and actual ESG performance. This unevenness leaves investors unable to distinguish genuine sustainability performance from image management or greenwashing (Yu et al., 2020; Lagasio et al., 2024).

Green taxonomies emerged largely in response to this problem. A taxonomy classifies which economic activities qualify as environmentally sustainable, giving the market a common reference point. Ehlers et al. (2021) explain that sustainable finance taxonomies can support the scaling up of sustainable finance by providing a structured way to classify and compare sustainable activities, although many existing taxonomies still lack sufficiently granular indicators and robust verification. This means that a taxonomy's effectiveness depends on how seriously firms align with it. Inderst and Opp (2025) extend this argument to greenwashing, contending that a mandatory taxonomy can be justified precisely because it pushes sustainable finance toward producing real environmental outcomes rather than just labels.

However, taxonomy alignment only becomes meaningful when it is clearly communicated through disclosure. Disclosure is therefore the channel through which taxonomy alignment becomes visible to investors. Nipper et al. (2025) show that standardised metrics under the EU Taxonomy Regulation can shape investor decisions, suggesting that taxonomy-related information becomes useful when presented in a structured and decision relevant way. This supports the argument that taxonomy alignment must be accompanied by high-quality ESG disclosure before it can influence market valuation.

Even so, one important gap remains, as ESG and environmental disclosure research has largely developed separately from research on sustainable finance taxonomies, which has tended to focus on classification design, policy objectives and regulatory implementation (Ehlers et al., 2021; OECD, 2020). Few studies have examined how taxonomy alignment translates into firm value through the disclosure channel, particularly in the context of Malaysian listed companies. This gap is important in Malaysia, where the sustainable finance ecosystem is still developing and increasingly guided by national frameworks such as Value based Intermediation, the Value-based Intermediation Financing and Investment Impact Assessment Framework, and Bank Negara Malaysia's Climate Change and Principle-based Taxonomy (Bank Negara Malaysia, 2018, 2019, 2021; Rastam Shahrom & Kunhibava, 2023).

Specifically, Bank Negara Malaysia (BNM) introduced the Strategy Paper on Value based Intermediation (VBI) in 2018 to drive Islamic financial institutions toward producing positive, long-term impacts on the economy, community and environment. To translate these strategies into auditable risk parameters, BNM subsequently rolled out the Value-based Intermediation Financing and Investment Impact Assessment Framework (VBIAF) in 2019, followed closely by the launch of the Climate Change and Principle-based Taxonomy (CCPT) which took effect

on April 30, 2021 (Rastam Shahrom & Kunhibava, 2023). Unlike developed market frameworks like the EU Taxonomy Regulation, which lean heavily on rigid, quantified Technical Screening Criteria (Nipper et al., 2025), Malaysia's CCPT represents a distinctive transition-oriented, principle-based classification model tailored for an emerging economy navigating a low-carbon shift (Rastam Shahrom & Kunhibava, 2023).

This Malaysian context is also aligned with the broader Sustainable Development Goals (SDGs), particularly SDG 13 on Climate Action, SDG 12 on Responsible Consumption and Production, and SDG 16 on strong institutions (United Nations, 2015). By improving the credibility of sustainability disclosure, green taxonomy alignment can support more responsible capital allocation and strengthen the link between firm-level reporting and sustainable development objectives.
This study argues that taxonomy alignment should not be treated as a direct value driver alone. Instead, ESG disclosure quality should be viewed as the mediating mechanism through which alignment becomes visible and value relevant.

The study is grounded in Signalling Theory, which explains how parties communicate under information asymmetry. Firms know more about their sustainability practices than investors do. So, disclosure becomes the basis for judging credibility. Signals are useful because they narrow this information gap. In this framework, taxonomy alignment strengthens the credibility of the signal, ESG disclosure quality is the signal itself, and firm value is the market response. Mapped onto Malaysian listed companies, the study develops a conceptual model in which green taxonomy alignment influences firm value through ESG disclosure quality, advancing four propositions to provide a theoretical foundation for empirical testing in this developing market.

Research Objectives

The main objective of this study is to develop a conceptual framework that explains the green taxonomy alignment may influence firm value through the mediating role of ESG disclosure quality among Malaysian listed companies. The specific objectives of this study are:

i. To examine the conceptual relationship between green taxonomy alignment and ESG disclosure quality.
ii. To examine the conceptual relationship between ESG disclosure quality and firm value.
iii. To examine the conceptual relationship between green taxonomy alignment and firm value.
iv. To explain the mediating role of ESG disclosure quality in the relationship between green taxonomy alignment and firm value.

Literature Review

Sustainable Finance and the Need for Green Taxonomy

Sustainable finance integrates ESG considerations into financial decision-making, on the premise that markets should weigh long-term sustainability risk alongside short-term financial return. As pressure mounts on firms to show real progress on environmental objectives, investors increasingly need credible and decision-useful disclosure to distinguish substantive sustainability performance from symbolic communication (Dhaliwal et al., 2011; Cheng et al., 2014). However, the rapid spread of ESG-labelled products and sustainability claims has made it genuinely difficult to separate substantive

performance from symbolic communication. Inderst and Opp (2025) argue that ESG fund markets are exposed to this greenwashing risk and that taxonomy can be justified precisely because it helps ensure sustainable finance produces real environmental effects rather than marketing.

Green taxonomies respond to this by giving firms, investors and regulators a shared classification vocabulary (Ehlers et al., 2021). However, a classification system only works if backed by measurable criteria and credible disclosure. Ehlers et al. (2021) note that many taxonomies still suffer from weak indicators, insufficient granularity and limited verification. Taxonomy alignment, in other words, is not a compliance checkbox. It is a structured fit between what a firm does, its stated environmental objectives, and what it reports.

In Malaysia, this framework is deeply intertwined with regulatory mandates designed to formalize corporate accountability. Historically, corporate sustainability reporting quality in Malaysia suffered due to a systemic lack of rigid legislative tracking, minimal external assurance mandates, and an over-reliance by listed firms on broad, promotional corporate social responsibility branding (Abdul Latif et al., 2023). To bridge this credibility gap, the national regulatory framework underwent a major transition. Beginning in December 2016, Bursa Malaysia phased in mandatory sustainability statement requirements in annual reports under Appendix 9C, Paragraph 29 of the Listing Requirements, scaling from large-cap firms down to all listed entities by late 2018 (Abdul Latif et al., 2023). This institutional push has been further consolidated through the deployment of the National Sustainability Reporting Framework (NSRF), which actively guides large corporate entities to align their nonfinancial reporting with global baseline disclosures such as IFRS S1 and IFRS S2 standards.

Green Taxonomy Alignment

Green taxonomy alignment describes how closely a firm's sustainability activities, investments, and disclosures match recognised green classification principles. It reflects whether the firm can show its activities genuinely contribute to the objectives such as climate mitigation, pollution prevention, biodiversity protection or resource efficiency. This study considers alignment to include several dimensions, namely clarity of classification, measurable criteria, alignment with environmental objectives, safeguards against trade-offs and verification. Without these elements, a taxonomy risks becoming symbolic rather than decision useful. Standardised metrics, such as green revenue under the EU Taxonomy Regulation, measurably shift investor decisions, while a mandatory taxonomy disciplines an ESG market otherwise prone to greenwashing. Together, these strands support treating taxonomy alignment as an upstream driver of disclosure quality.

To operationalize this dimension within the Malaysian context, future empirical study must map firm-level activities directly against the classification mechanics of BNM's CCPT framework. The CCPT evaluates corporate operations across five core Guiding Principles: climate change mitigation (GP1), climate change adaptation (GP2), no significant harm to the environment (GP3), remedial measures to transition (GP4), and compliance with national labor and human rights laws (GP5) (Rastam Shahrom & Kunhibava, 2023). Economically, this enables a clear taxonomy alignment classification matrix, separating a firm's business lines into three explicit regulatory categories (Rastam Shahrom & Kunhibava, 2023):

- Climate Supporting (C1): Activities that directly fulfil GP1 or GP2 while avoiding environmental harm.
- Transitioning (C2 and C3): Activities that carry environmental impacts but are actively paired with verified remedial measures under GP4.
- Watchlist (C4 and C5): Activities causing significant environmental harm where the customer lacks concrete, actionable plans to address or reduce the harm.

ESG Disclosure Quality

ESG disclosure quality captures the extent to which a firm's sustainability information is transparent, complete and comparable. Quantity is not the same as quality. The nonfinancial disclosure literature consistently finds that disclosure quality is relevant to capital market outcomes and firm value. Dhaliwal et al. (2011) link initiating CSR disclosure to capital market benefits. Cheng et al. (2014) find that well-communicated CSR performance eases access to finance. Clarkson et al. (2008) find that firms with stronger environmental performance tend to disclose more. Plumlee et al. (2015) show that disclosure quality affects firm value through expected cash flows and the cost of capital. Expanding on these foundational perspectives, Chouaibi et al. (2022) show that environmental disclosure can reduce information asymmetry and improve firm financial performance, reinforcing the argument that credible sustainability disclosure is relevant to market evaluation.

To properly test this framework empirically, future researchers require a reliable measurement index to capture corporate reporting quality. Following localized accounting methodologies, this can be achieved by constructing a Sustainability Disclosure Quality (SDQ) index tailored to the Malaysian reporting landscape. A robust localized SDQ framework utilizes content analysis based on a 52-item scoring sheet that synthesizes Global Reporting Initiative (GRI) standards, Sustainability Accounting Standards Board (SASB) agricultural guidelines, and the Bursa Malaysia Sustainability Guidelines (Abdul Latif et al., 2023). This checklist evaluates 30 environmental items, 5 economic items, and 17 social items, applying a weighted four-point scoring scale (Abdul Latif et al., 2023).

Firm Value

Firm value captures the market's read on a firm's current performance, prospects, risk exposure and intangible worth, commonly proxied by indicators such as Tobin's Q or market to-book ratios. Matsumura et al. (2014) find that markets penalise firms for carbon emissions and penalise them further for failing to disclose emissions data, providing evidence that investors respond to the act of disclosure itself, not just underlying performance. Fatemi et al. (2018) reach a complementary conclusion, finding that ESG strengths and weaknesses are associated with firm value and that disclosure shapes how that performance is valued. This study's position is that firm value is most likely to benefit when ESG disclosure is both credible and taxonomy aligned. Alignment supplies the credibility, and disclosure quality carries it to the market.

The relationship between ESG disclosure quality and firm value may also vary across industries and firm contexts. Chouaibi et al. (2022) suggest that sustainability related disclosure can interact with broader social and ethical practices in shaping financial performance. In carbon-intensive or high-exposure sectors, greater transparency may reveal both sustainability strengths and transition-related risks. Therefore, future research may examine whether industry sensitivity shapes the relationship between taxonomy-aligned disclosure and firm value.

Signalling Theory

Signalling Theory is the paper's central theoretical lens. Spence (1973) first showed how one party can signal quality to another under information asymmetry. A dynamic that maps directly onto sustainability reporting, where firms know far more about their actual practices than investors can observe. Mapped onto a sender-receiver relationship, the firm sends the signal, ESG disclosure quality is the signal and taxonomy alignment strengthens that signal's credibility by tying it to recognised criteria and measurable indicators (Connelly et al., 2011). Taxonomy-aligned disclosure is a structurally stronger signal because it is harder to fake. This is also why greenwashing is conceptually corrosive. When claims outrun the evidence behind them, investors treat the signal as weak or read it with active scepticism.

Development of Propositions

Taxonomy alignment requires firms to classify activities against recognised environmental objectives and provide supporting evidence. This process naturally pushes disclosure toward being more specific, standardized, and measurable (Ehlers et al., 2021; Nipper et al., 2025). This supports the first proposition:

P1: *Green taxonomy alignment positively influences ESG disclosure quality.* High-quality disclosure narrows information asymmetry, giving investors a clearer read on sustainability risk, compliance exposure, and governance quality (Dhaliwal et al., 2011; Cheng et al., 2014; Matsumura et al., 2014). This supports the second proposition:

P2: *ESG disclosure quality positively influences firm value.*

Taxonomy-aligned firms may also be valued more directly by the market, appearing more credible and strategically positioned for the sustainable finance transition (Inderst & Opp, 2025), though this direct effect likely depends heavily on sector visibility and how well alignment is communicated. This supports the third proposition:

P3: *Green taxonomy alignment positively influences firm value.*

Finally, taxonomy alignment provides structural credibility, but ESG disclosure quality is the channel that makes this credibility visible, understandable and useful to investors. Without it, alignment stays internal and invisible to investors. This addresses a real gap in the literature, as prior work has examined ESG disclosure and firm value. While taxonomy-related studies have largely focused on policy and regulatory design. However, limited attention has been given to how taxonomy alignment becomes value-relevant at the firm level, which supports the core mediation proposition:

P4: *ESG disclosure quality mediates the relationship between green taxonomy alignment and firm value.*

Conceptual Framework and Propositions

This study proposes a conceptual framework in which green taxonomy alignment is positioned as the independent variable, ESG disclosure quality serves as the mediating variable and firm value represents the dependent variable. Mapped via Signalling Theory, information becomes value relevant when it reduces market uncertainty and improves the underlying credibility of firm-level claims.

The corporate signalling process unfolds in three distinct sequential stages, illustrated in the framework layout below:

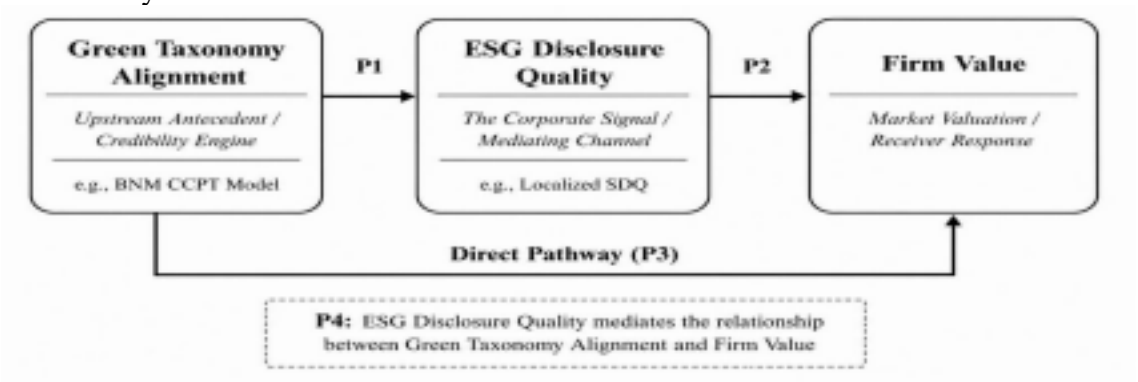

Figure 1: Proposed Conceptual Framework of the Study

The framework follows a three-stage signalling process. First, green taxonomy alignment establishes the structural basis for credible sustainability claims. Second, ESG disclosure quality communicates this credibility to investors. Third, firm value reflects the market response to credible sustainability signals.

The transition from green taxonomy alignment to ESG disclosure quality formalizes P1, which proposes that green taxonomy alignment positively influences ESG disclosure quality. In this framework, taxonomy alignment is not treated as a passive reporting checkbox but as an upstream structure that improves the transparency and comparability of nonfinancial reporting. In the Malaysian context, firms that anchor their environmental strategies within Bank Negara Malaysia's Climate Change and Principle-based Taxonomy (CCPT) are encouraged to move away from vague or symbolic CSR claims toward more measurable and standardized ESG disclosure.

The transition from ESG disclosure quality to firm value establishes P2, which proposes that ESG disclosure quality positively influences firm value. Under Signalling Theory, high-quality disclosure reduces information asymmetry and valuation uncertainty in capital markets. When firms provide clear and transparent ESG information, investors can better assess sustainability performance and long-term climate risk management. This can reduce market scepticism and support a more favourable valuation response.

A direct path from green taxonomy alignment to firm value is also proposed under P3, as taxonomy-aligned firms may be perceived as more credible and lower risk for regulatory and market expectations. However, the indirect path through ESG disclosure quality under P4 provides the more complete explanation. Investors can only respond to taxonomy alignment that they can observe and evaluate. Therefore, ESG disclosure quality acts as the bridge between taxonomy alignment and investor valuation, transforming alignment from a technical classification practice into a credible market signal.

The central proposition of this study is P4 because it explains the mechanism through which taxonomy alignment becomes value relevant. While P1, P2, and P3 establish the individual relationships between the constructs, P4 connects the full logic of the framework. Green taxonomy alignment does not automatically create firm value. Its potential value is realised only when alignment is translated into high-quality ESG disclosure that investors can understand, compare and trust. This mediating argument matters because taxonomy alignment may otherwise remain technical or invisible to the market. A firm may

align its activities with sustainability criteria, but if the disclosure is vague or unverifiable, investors may still be unable to interpret its credibility. ESG disclosure quality therefore acts as the bridge between taxonomy alignment and investor valuation, transforming alignment from a classification practice into a credible market signal.

Discussion and Implications

The main argument of the study is that taxonomy alignment should not be viewed as a regulatory or classification activity alone. It operates as a credibility mechanism that, when properly disclosed, increases the usefulness of ESG information for investors and may ultimately influence firm value (Ehlers et al., 2021; Nipper et al., 2025). The paper's main contribution, and what makes P4 unique, is the explicit claim that taxonomy alignment does not necessarily translate directly into firm value. Instead, it becomes value-relevant when converted into high-quality disclosure that investors can understand, compare and trust (Plumlee et al., 2015; Connelly et al., 2011). This moves the discussion from whether taxonomy alignment matters to how it matters.

Theoretically, this study extends Signalling Theory into the sustainable finance context by distinguishing between general ESG disclosure and taxonomy-aligned ESG disclosure. A taxonomy-aligned ESG signal is harder to imitate because it requires measurable and benchmarked content, making it more credible to investors under conditions of information asymmetry (Connelly et al., 2011). The study also reframes disclosure quality as being shaped not only by firm-level reporting choices, but also by the broader taxonomy and classification structure within which firms operate (Ehlers et al., 2021).

Practically, listed companies should treat sustainability disclosure as a core strategic communication matter rather than a compliance formality. Taxonomy alignment gives firms a structured way to support sustainability claims and reduce greenwashing exposure, because claims backed by measurable evidence are harder to challenge (Yu et al., 2020). For investors, the framework highlights the importance of evaluating ESG disclosure based on quality rather than volume, as higher-quality disclosure provides a more reliable basis for assessing firm value (Plumlee et al., 2015).

For regulators and policymakers, the proposed framework offers useful policy insights within Malaysia's developing sustainable finance ecosystem. To strengthen investor confidence and reduce greenwashing risk, the Securities Commission Malaysia and Bursa Malaysia may encourage firms to report their CCPT alignment more clearly through standardized sustainability disclosure practices. This may include clearer reporting of taxonomy classifications, transition progress and relevant sustainability indicators, particularly for high-exposure sectors (Bank Negara Malaysia, 2021).

From a policy perspective, taxonomy-linked ESG disclosure can also strengthen Malaysia's contribution to the SDG agenda. By encouraging firms to report clearer climate related information, the framework supports SDG 13 on Climate Action. By promoting more responsible business practices and reducing symbolic sustainability claims, it also supports SDG 12 on Responsible Consumption and Production. In addition, the emphasis on transparency, verification and accountability is consistent with SDG 16, which highlights the importance of strong institutions and trustworthy governance (United Nations, 2015). In the Malaysian context, this is consistent with sustainable finance efforts that encourage clearer classification of climate-related and transition activities (Bank Negara Malaysia, 2021; Rastam Shahrom & Kunhibava, 2023).

Conclusion

This study examined the relationship between green taxonomy alignment, ESG disclosure quality and firm value among Malaysian listed companies. The main argument is that ESG disclosure alone is not sufficient unless it is supported by credible classification, measurable evidence and transparent reporting. Green taxonomy alignment provides this structure by helping firms anchor their sustainability claims to recognised criteria. While ESG disclosure quality makes this alignment visible and useful to investors.

ESG disclosure quality is therefore proposed as the mediating mechanism through which taxonomy alignment becomes value relevant. Grounded in Signalling Theory, the framework suggests that taxonomy aligned disclosure can serve as a stronger sustainability signal because it reduces information asymmetry and improves the credibility of firm-level ESG claims.

Overall, this paper contributes by positioning green taxonomy alignment as an antecedent of disclosure quality and by explaining how it may influence firm value through credible and decision useful ESG disclosure. In the Malaysian context, this framework is relevant not only to listed companies and investors, but also to regulators seeking to strengthen sustainable finance, reduce greenwashing and support the broader SDG agenda.

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THE EFFECT OF BOARD GENDER DIVERSITY, FIRM SIZE AND LEVERAGE ON FINANCIAL PERFORMANCE : A MEDIATING EFFECT OF ESG DECOUPLING

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Abstract *: This study develops a Malaysia-focused framework on firm size, leverage and board independence shape the ESG decoupling and focus on examples decoupling mediate the financial performance among Malaysian public listed companies. ESG decoupling refers to the gap between symbolic ESG disclosure and substantive ESG performance. The issue is timely because Malaysia's sustainability reporting environment is moving toward more structured and comparable disclosure under the National Sustainability Reporting Framework, which adopts IFRS S1 and IFRS S2 as baseline standards for sustainability reporting. At the same time, the Malaysian corporate governance environment continues to emphasise board composition, including board gender diversity and independent board oversight. Within this setting, the paper proposes firm size, leverage and board independence as the independent variables, ESG decoupling as the mediating variable, and financial performance as the dependent variable measured exclusively by Tobin's Q. Drawing on legitimacy theory, agency theory, stakeholder theory and signalling theory, the study argues that firm visibility, financial pressure and board monitoring affect the extent to which ESG disclosures correspond with actual ESG performance. ESG decoupling is expected to reduce Tobin's Q because symbolic sustainability disclosure weakens investor trust, increases information risk and exposes firms to reputational and regulatory costs. The study also explains how ESG decoupling can be operationalised using company annual reports by comparing an ESG disclosure score with an ESG performance score. The proposed framework contributes to corporate governance and sustainable finance literature by positioning ESG decoupling as the mechanism through which firm and board and company characteristics influence market-based firm value in Malaysia's emerging market.*

Keywords*: board gender diversity; firm size; leverage; board independence; ESG decoupling; Tobin's Q; Malaysia; annual report; corporate governance; sustainable finance.*

Introduction

Background of the Study

Environmental, social and governance (ESG) considerations have become central to corporate governance and sustainable finance. Investors, regulators, creditors and wider stakeholders increasingly expect firms to explain how sustainability-related risks and opportunities affect business models, risk exposure, capital allocation and long-term resilience. This expectation has intensified with the issuance of IFRS S1 General Requirements for Disclosure of Sustainability-related Financial Information and IFRS S2 Climate-related Disclosures, which position sustainability information as financial material information for investment and risk assessment (IFRS Foundation, 2023).

Malaysia provides a relevant emerging-market context for this conceptual paper. The Securities Commission Malaysia introduced the National Sustainability Reporting Framework (NSRF) to enhance the consistency, comparability and reliability of sustainability disclosures, using IFRS S1 and IFRS S2 as the baseline for companies in Malaysia (Securities Commission Malaysia, 2024). These developments are significant because Malaysian public listed companies are increasingly required to move beyond general sustainability narratives toward more structured and decision-useful ESG information. Malaysia's corporate governance environment also places strong emphasis on board composition and board effectiveness. The Malaysian Code on Corporate Governance recommends that boards comprise at least 30% women directors, while Bursa Malaysia's Listing Requirements require a listed issuer to have at least one-woman director on its board (Securities Commission Malaysia, 2021; Bursa Malaysia, 2023). These requirements demonstrate that board gender diversity remains an important governance issue in Malaysia. However, gender diversity should not be considered in isolation from broader firm and board characteristics. The credibility of ESG reporting may also depend on firm size, leverage and independent board monitoring. Larger firms are usually more visible to investors, regulators, creditors and the public; therefore, they face stronger pressure to disclose ESG information and maintain corporate legitimacy. At the same time, larger firms may have greater resources to implement substantive ESG practices, although their high visibility may also encourage more sophisticated symbolic reporting when disclosure is used mainly to protect reputation. Leverage is also relevant because highly indebted firms are subject to greater scrutiny from creditors and may use ESG disclosure to signal lower risk and stronger responsibility. However, firms with high leverage may face financial constraints that limit their ability to invest in actual ESG improvements, creating a possible gap between ESG disclosure and ESG performance. Therefore, firm size and leverage are important in explaining ESG decoupling because they influence both the motivation and the capacity of firms to align sustainability claims with actual corporate practices (Peng & Xie, 2024).

The central concept in this paper is ESG decoupling. ESG decoupling occurs when a company presents strong ESG commitments, policies, targets or narratives, while its actual ESG practices and outcomes remain weak, inconsistent or selectively implemented. In simple terms, the firm says more than it does. This symbolic-substantive gap is closely related to greenwashing, social-washing and impression management (Marquis, Toffel, & Zhou, 2016; Tashman, Marano, & Kostova, 2019). ESG decoupling is important because investors and stakeholders may rely on annual reports and sustainability statements as evidence of risk management and long-term value creation. If disclosure is not supported by real performance, the market may misprice risk and stakeholders may be misled.

This paper focuses on the relationship between board gender diversity, firm size, leverage on financial performance in Malaysia, while positioning ESG decoupling as the mediator variable. These variables are observable from company annual reports and financial statements, and they represent three important dimensions of firm behaviour: visibility, financial pressure and monitoring quality.

Problem Statement

The main problem addressed in this conceptual paper is the credibility gap in ESG reporting among Malaysian public listed companies. Although sustainability reporting is becoming more structured, a higher volume of ESG disclosure does not automatically indicate stronger ESG practice. Firms may prepare detailed annual report narratives to satisfy investors, regulators and stakeholders, yet their actual environmental, social and governance performance may remain limited. This produces ESG decoupling, which weakens the usefulness of ESG information for investment decision-making and regulatory evaluation. This concern is consistent with the previous study, which argues that decoupling occurs when firms separate symbolic disclosure from substantive practice, thereby creating a gap between what firms report and what they actually implement (Cepêda et al., 2025).

Prior studies have widely examined the direct relationship between corporate governance, ESG disclosure and financial performance. However, many studies implicitly treat ESG disclosure as a reliable proxy for ESG performance. This assumption is problematic because ESG disclosure may be symbolic. A firm may disclose policies, commitments and targets without implementing substantive improvements in emissions management, labour practices, stakeholder engagement, anti-corruption systems or accountability.

From the perspective of legitimacy theory, firms may use ESG reporting to gain social approval and maintain corporate image, especially when they face pressure from regulators, investors and stakeholders. However, such disclosure may become a form of impression management if it is not supported by real operational change. Therefore, the key problem is not only whether firms disclose ESG information, but whether such disclosure is authentic and supported by evidence (Tashman et al., 2019).

In the Malaysian context, this problem is timely for three reasons. First, the National Sustainability Reporting Framework and Bursa Malaysia's sustainability reporting requirements are increasing the importance of reliable, comparable and decision-useful sustainability information. Second, Malaysia's corporate governance reforms continue to emphasize board composition, women directors and independent oversight, suggesting that governance quality should support ESG credibility. Third, the ESG-financial performance relationship remains inconsistent because ESG disclosure may generate short-term legitimacy benefits while exposing firms to long-term reputational and valuation penalties if the disclosure is not matched by real performance. Prior studies show that greenwashing and ESG decoupling can create negative economic effects, including higher financing costs, reduced stakeholder trust and weaker market credibility. Therefore, ESG decoupling is a critical mediating mechanism in explaining how firm size, leverage and board independence may influence financial performance, particularly when financial performance is measured through market-based valuation such as Tobin's Q (Peng & Xie, 2024; Zhan, 2025).

Research Objectives

The general objective of this conceptual paper is to develop a theoretical framework explaining the relationship between firm size, leverage, board independence, ESG decoupling and financial performance in Malaysia's emerging market.
The specific objectives are as follows:

- To examine the conceptual relationship between firm size and ESG decoupling among Malaysian public listed companies.
- To examine the conceptual relationship between leverage and ESG decoupling among Malaysian public listed companies.
- To examine the conceptual relationship between board independence and ESG decoupling among Malaysian public listed companies.
- To explain the direct relationship between ESG decoupling and financial performance measured by Tobin's Q.
- To propose ESG decoupling as a mediating variable linking firm size, leverage and board independence to financial performance.

Literature Review

The study is positioned within the broader literature on board gender diversity, firm characteristics, ESG decoupling and financial performance in Malaysia's emerging market. It is focus on reflects the argument that firm value is not shaped only by direct governance or financial factors, but also by the credibility of ESG disclosure. Board gender diversity provides the governance context of the study because board composition remains central to Malaysia's corporate governance agenda. At the same time, firm size and leverage represent important organizational characteristics that may influence ESG reporting behavior. Larger firms are more visible to stakeholders and may face stronger pressure to disclose ESG information, while highly leveraged firms may use ESG disclosure to signal stability and responsibility to creditors and investors. However, when ESG disclosure is not supported by substantive ESG performance, ESG decoupling may occur. Therefore, this study conceptualizes ESG decoupling as a mediating mechanism that explains how board gender diversity, firm size and leverage may influence market-based financial performance among Malaysian public listed companies.

Board Gender Diversity and Governance Context in Malaysia

Board gender diversity refers to the representation of women on corporate boards. It is commonly measured as the percentage of female directors, the number of women directors or the presence of at least one-woman director. From a governance perspective, gender diversity is important because the board is responsible for monitoring management, approving strategy, overseeing risk and ensuring accountability to shareholders and wider stakeholders. Gender-diverse boards may reduce groupthink and encourage wider stakeholder consideration in strategic decision-making (Adams & Ferreira, 2009; Post & Byron, 2015).

In Malaysia, board gender diversity is supported by both voluntary governance expectations and listing rules. The Malaysian Code on Corporate Governance recommends at least 30% women directors, while Bursa Malaysia's Listing Requirements require listed issuers to have at least one-woman director (Securities Commission Malaysia, 2021, 2026). These policy developments demonstrate that gender diversity remains part of the broader effort to strengthen board effectiveness and public confidence. Nevertheless, the present conceptual framework focuses on firm size, leverage and board independence because these variables represent firm visibility, financial pressure and board monitoring, which are directly linked to the risk of ESG decoupling.

Board gender diversity remains relevant to the paper because it provides the governance setting in which ESG credibility is discussed. However, the framework does not treat gender diversity as the sole explanatory factor. Instead, it recognises that ESG decoupling may arise from a combination of organisational scale, capital structure and board oversight. This broader governance explanation is useful because Malaysian firms differ not only in gender representation, but also in resources, debt pressure and independence of board monitoring.

Firm Size and ESG Decoupling

Firm size is commonly measured using the natural logarithm of total assets. Larger firms are usually more visible to investors, regulators, creditors, media and civil society. Because of this visibility, they face stronger pressure to disclose ESG information and maintain legitimacy. Legitimacy theory suggests that firms disclose social and environmental information to demonstrate that their operations are consistent with societal expectations (Suchman, 1995). Larger firms may therefore produce more comprehensive ESG disclosure to maintain reputation and investor confidence.

The relationship between firm size and ESG decoupling can be argued in two ways. On one hand, larger firms may have more resources, specialist sustainability teams, better internal controls and stronger reporting systems. These resources can reduce ESG decoupling because the firm is more capable of matching disclosure with actual ESG performance. On the other hand, larger firms face stronger legitimacy pressure and may produce more sophisticated disclosure to protect reputation, even when actual implementation is incomplete. In the Malaysian context, where sustainability reporting is becoming more structured, the visibility of large, listed firms may increase pressure to disclose ESG information. However, the availability of resources suggests that larger firms should be better positioned to reduce the disclosure-performance gap when ESG governance is properly implemented.

4

Leverage and ESG Decoupling

Leverage refers to the extent to which a firm relies on debt financing. It is commonly measured as total debt divided by total assets or total debt divided by total equity. Leverage is important because highly indebted firms face stronger monitoring from creditors and greater pressure to demonstrate stability, responsibility and risk management. In ESG reporting, leveraged firms may have incentives to disclose sustainability commitments to signal lower risk to banks, bondholders and investors.

However, leverage may also increase ESG decoupling. Firms with high debt obligations may have limited financial flexibility to invest in substantive ESG improvements, such as cleaner technology, employee welfare programmes, supply-chain monitoring, assurance systems or governance reforms. At the same time, they may still face pressure to disclose positive ESG information to maintain legitimacy and access to financing. This creates a potential gap between ESG disclosure and actual ESG performance. Recent evidence suggests that ESG greenwashing can increase financing costs because creditors and investors perceive symbolic ESG behavior as an information risk (Peng & Xie, 2024). Therefore, leverage is an important determinant of ESG decoupling because it captures the tension between financial pressure and substantive sustainability investment.

ESG Decoupling and Annual-Report Credibility

ESG decoupling is the misalignment between symbolic ESG disclosure and substantive ESG performance. Symbolic ESG includes statements, policies, targets, awards and reporting narratives used to signal sustainability commitment. Substantive ESG refers to actual

operational practices, measurable outcomes and internal control systems that reduce environmental harm, improve social outcomes and strengthen governance quality. Decoupling occurs when symbolic claims are stronger than the actual practices or outcomes reported by the firm. Therefore, ESG decoupling is not simply poor ESG performance; it is the credibility gap between what the firm says and what the firm does.

The concept is important because sustainability reporting can be used as a legitimacy tool. Firms under stakeholder pressure may disclose positive ESG information to appear responsible while avoiding costly operational changes. Marquis et al. (2016) show that firms may disclose selectively under scrutiny and normative pressure, while Tashman et al. (2019) explain that firms may separate symbolic CSR actions from substantive actions. Gull, Hussain, Khan, Khan and Saeed (2022) also show that CSR decoupling captures the misalignment between social responsibility disclosure and performance, where a higher score reflects greater mismatch.
In Malaysia, ESG decoupling is particularly relevant because sustainability information is often communicated through annual reports and sustainability statements. Annual reports are important public documents because they combine financial statements, corporate governance information, sustainability disclosures and management narratives. This paper therefore proposes annual reports as the main source for measuring ESG decoupling. The annual report allows researchers to examine whether ESG disclosure is supported by evidence of actual performance, such as emissions data, waste reduction results, energy use, employee safety statistics, anti-corruption training, board independence, diversity policies and assurance statements.

ESG Decoupling and Financial Performance

Financial performance in this study is measured using Tobin's Q only. Tobin's Q is a market-based measure of firm value that compares the market value of the firm with the replacement or book value of its assets. It is commonly used in corporate governance and sustainability research because it captures investor expectations about future growth, risk and intangible value. A simplified formula is: Tobin's Q equals the market value of equity plus book value of debt divided by total assets (Chung & Pruitt, 1994).

Tobin's Q is suitable for this study because ESG decoupling is closely related to market perception. If investors believe that a firm's ESG disclosure is credible, the firm may enjoy stronger legitimacy, lower information risk and better market valuation. However, if ESG disclosure is perceived as symbolic or misleading, investors may discount the firm's value due to reputational risk, regulatory risk and uncertainty over long-term sustainability performance. ESG decoupling can therefore weaken Tobin's Q because it reduces the credibility of sustainability signals. This argument is supported by signalling theory, which suggests that disclosure affects market valuation only when the signal is credible (Spence, 1973).

The ESG-financial performance relationship remains mixed in the literature because ESG can create both costs and benefits. ESG investments may require immediate expenditure on technology, reporting systems, workforce practices, governance structures and assurance. However, credible ESG performance can also improve stakeholder trust, reduce risk, increase access to capital and strengthen long-term competitiveness (Friede, Busch, & Bassen, 2015; Aydoğmuş, Gülay, & Ergun, 2022). ESG decoupling helps explain this mixed evidence because disclosure without substantive performance may create short-term legitimacy, but it can damage firm value when inconsistencies become visible.

Theoretical Foundation

The proposed study is supported by four complementary theories: legitimacy theory, agency theory, stakeholder theory and signalling theory. Legitimacy theory explains why firms disclose ESG information to demonstrate that their activities are consistent with societal expectations and to maintain acceptance from key stakeholders. This theory is relevant to firm size because larger firms are more visible to investors, regulators, creditors, media and the public, making them more exposed to legitimacy pressure. As a result, larger firms may provide more extensive ESG disclosure to justify their social and environmental impact and protect corporate reputation. However, legitimacy pressure may also encourage symbolic ESG disclosure when firms emphasize positive sustainability narratives without equivalent substantive performance. This creates the possibility of ESG decoupling, where disclosure is used to maintain legitimacy rather than to reflect actual ESG implementation (Tashman et al., 2019).

Agency theory explains the role of board independence in reducing ESG decoupling. The theory argues that agency problems arise when managers pursue self-interest or reputation-enhancing strategies that may not fully align with shareholders' and stakeholders' interests. In the ESG context, managers may have incentives to disclose favorable sustainability information to improve corporate image, attract capital or reduce external scrutiny, even when actual ESG practices are limited. Independent directors can reduce this agency problem by strengthening board monitoring, challenging selective management narratives and requiring evidence-based ESG reporting. Therefore, agency theory supports the expectation that board independence is negatively associated with ESG decoupling because independent oversight can reduce managerial opportunism and improve the credibility of sustainability disclosure (Jensen & Meckling, 1976; Fama & Jensen, 1983; Ma, 2024; Ma, 2025).

Stakeholder theory explains why firms must respond to the expectations of investors, creditors, employees, customers, regulators and communities (Freeman, 1984). ESG disclosure becomes meaningful only when it reflects actual practices that address stakeholder concerns. If ESG decoupling occurs, stakeholders may perceive the firm as opportunistic, which can reduce trust and harm long-term value. Signalling theory further explains why ESG decoupling affects Tobin's Q. ESG disclosure sends signals to the market, but the signal creates value only when it is credible. When disclosure is inconsistent with performance, the signal becomes unreliable and may reduce market valuation.

Conceptual Framework and Proposition Development

Framework Overview

The proposed conceptual framework positions firm size, leverage and board independence as the independent variables, ESG decoupling as the mediating variable and financial performance as the dependent variable. Financial performance is measured using Tobin's Q only. ESG decoupling has a direct relationship with Tobin's Q and mediates the relationship between the three independent variables and Tobin's Q.

Figure 1 presents the proposed conceptual framework. The framework retains the paper's broader concern with board gender diversity and corporate governance in Malaysia, but the formal model focuses on the three independent variables that are most directly linked to ESG disclosure credibility and are measurable using annual reports and financial statements.

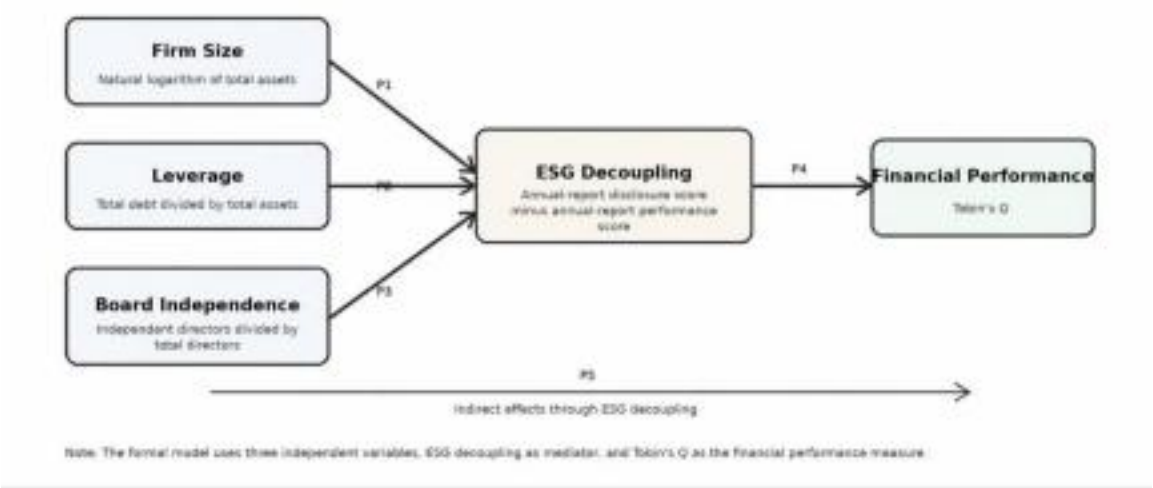

Figure 1. Proposed conceptual framework

Proposition 1: Firm Size and ESG Decoupling

Firm size is expected to influence ESG decoupling because larger firms are more visible and face stronger stakeholder pressure. Large Malaysian listed firms are also more likely to possess the resources needed to build ESG data systems, reporting structures and sustainability governance processes. Therefore, while visibility may increase disclosure pressure, the availability of resources should enable larger firms to align ESG disclosure with actual performance more effectively.

P1: *Firm size is negatively associated with ESG decoupling among Malaysian public listed companies.*

Proposition 2: Leverage and ESG Decoupling

Leverage is expected to increase ESG decoupling because highly indebted firms face pressure to maintain creditor and investor confidence while simultaneously operating under financial constraints. These firms may disclose ESG commitments to signal responsibility and lower risk, yet debt obligations may limit their ability to invest in substantive ESG improvements. This creates a higher risk that ESG disclosure exceeds ESG performance.

P2: *Leverage is positively associated with ESG decoupling among Malaysian public listed companies.*

Proposition 3: Board Independence and ESG Decoupling

Board independence is expected to reduce ESG decoupling because independent directors strengthen monitoring and reduce managerial opportunism. Independent boards can demand clearer ESG evidence, challenge selective disclosure and ensure that annual-report sustainability statements are supported by measurable performance. In Malaysia, board independence is particularly important because corporate governance reforms emphasise board oversight, accountability and transparency.

P3: *Board independence is negatively associated with ESG decoupling among Malaysian public listed companies.*

Proposition 4: ESG Decoupling and Firm Performance

ESG decoupling is expected to reduce Tobin's Q because market valuation depends on investor confidence and credible information. If investors perceive ESG disclosure as symbolic, they may discount the firm due to higher reputational risk, regulatory risk and information asymmetry. Therefore, ESG decoupling weakens the value relevance of ESG reporting and can reduce market-based financial performance.

P4: *ESG decoupling is negatively associated with financial performance measured by Tobin's Q.*

Proposition 5: ESG Decoupling as a Mediating Mechanism

ESG decoupling is proposed as the mechanism mediating because it explains how firm size, leverage and board independence influence Tobin's Q. Firm size, leverage and board independence do not affect market value only through direct financial or governance channels. They also affect the credibility of ESG disclosure. When ESG decoupling is low, sustainability reporting becomes more trustworthy and can support investor confidence. When ESG decoupling is high, the market may penalise the firm for symbolic reporting and hidden sustainability risk.

P5: *ESG decoupling mediates the relationship between firm size, leverage, board independence and financial performance measured by Tobin's Q.*

Methodology

Data Source

Although this paper is conceptual, the proposed framework can guide future empirical testing using Malaysian firm-year longitudinal data. The population may consist of Malaysian public listed companies on Bursa Malaysia. Data may be collected from company annual reports, sustainability statements, corporate governance reports, Bursa Malaysia filings and financial statements. Annual reports are particularly important for this study because they contain both ESG disclosure narratives and evidence of ESG-related performance. They also provide information on firm size, leverage, board independence and financial data needed to compute Tobin's Q.

The use of annual reports is appropriate because Malaysian listed companies are required to disclose corporate governance and sustainability-related information through formal reporting channels. Annual reports also allow researchers to conduct content analysis of ESG disclosure and compare it with actual ESG performance indicators disclosed by the same firm in the same

reporting year. This approach is suitable for measuring ESG decoupling because decoupling is fundamentally a disclosure-performance gap.

Measurement of ESG Decoupling Using Annual Reports

ESG decoupling can be measured by comparing the ESG disclosure score and the ESG performance score derived from the company's annual report. The ESG disclosure score captures the extent to which the firm reports ESG policies, targets, commitments, strategies and narratives. The ESG performance score captures the extent to which the firm reports actual ESG outcomes, implementation evidence and measurable results. The core logic is that a firm has high ESG decoupling when it discloses strong ESG commitments but provides weak evidence of actual ESG performance.

The ESG disclosure score may be developed through content analysis of annual-report sections such as sustainability statements, management discussion and analysis, corporate governance overview, risk management statements and ESG-related notes. Disclosure items may include environmental policy, climate strategy, emissions target, energy management policy, waste management policy, employee welfare statement, diversity policy, occupational safety commitment, anti-corruption policy, supplier code of conduct and sustainability oversight. Each item may be coded using a binary approach, where 1 indicates disclosure and 0 indicates no disclosure, or a weighted scale where more detailed disclosure receives a higher score.

The ESG performance score should be based on evidence of actual implementation and measurable outcomes reported in the annual report. Examples include greenhouse gas emissions data, emissions intensity reduction, renewable energy use, water consumption reduction, waste recycling rate, safety incident rate, employee training hours, gender diversity statistics, anti-corruption training coverage, whistleblowing cases resolved, board independence compliance, sustainability assurance, supplier audits and progress against ESG targets. The performance score should not merely count positive statements; it should capture evidence that ESG practices have been implemented and measured.

The ESG decoupling score can be calculated as follows:

ESG_DECit = Normalised ESG Disclosure Scoreit - Normalised ESG Performance Scoreit

where *ESG_DECit* represents the ESG decoupling score for firm i in year t. A higher positive value indicates a larger symbolic-substantive gap, meaning that ESG disclosure exceeds actual ESG performance. A lower or near-zero value indicates stronger alignment between disclosure and performance. This measurement approach is consistent with the decoupling logic used in prior sustainability and CSR decoupling research, where decoupling is understood as the difference between what firms disclose and what they substantively do (Hawn & Ioannou, 2016; Tashman et al., 2019; Gull et al., 2022).

Measurement of Key Variables

Table 1. Proposed measurement of variables

Variable	Type	Suggested Measurement	Data Source
Firm Size	Independent variable	Natural logarithms of total assets	Annual report / financial statements
Leverage	Independent variable	Total debt divided by total assets	Annual report / financial statements
Board Independence	Independent variable	Independent directors divided by total directors	Corporate governance statement / board profile
ESG Decoupling	Mediating variable	Normally ESG disclosure score minus normalised ESG performance score	Annual report / sustainability statement
Financial Performance	Dependent variable	Tobin's Q: market value of equity plus book value of debt divided by total assets	Annual report / market data

Proposed Empirical Model

Future empirical research may test the framework using longitudinal regression techniques. A longitudinal design is suitable because the relationships involve firm characteristics, governance structures, ESG reporting behaviour and market valuation over time. Lagged independent variables may be used to reduce reverse causality, because firm characteristics and board composition in one year may influence ESG reporting and market valuation in the following year.

Model 1 estimates the relationship between the three independent variables and ESG decoupling: $ESG\_DECit = \alpha 0 + \beta 1SIZEit\text{-}1 + \beta 2LEVit\text{-}1 + \beta 3BINDit\text{-}1 + \mu i + \lambda t + \varepsilon it$

Model 2 estimates the direct relationship between ESG decoupling and Tobin's Q while retaining the independent variables:

$$TOBINQit = \delta 0 + \delta 1SIZEit\text{-}1 + \delta 2LEVit\text{-}1 + \delta 3BINDit\text{-}1 + \delta 4ESG\_DECit + \mu i + \lambda t + vit$$

In these equations, SIZE refers to firm size, LEV refers to leverage, BIND refers to board independence, ESG_DEC refers to ESG decoupling and TOBINQ refers to financial performance. Firm fixed effects may control for unobserved firm-specific characteristics, while year fixed effects may control for macroeconomic shocks or regulatory changes affecting all firms. The mediating role of ESG decoupling may be tested using mediation procedures suitable for longitudinal data.

Conclusion

This study develops a Malaysia-focused framework linking board gender diversity, firm size, leverage, ESG decoupling and financial performance. The study places board gender diversity within the wider corporate governance context and focuses the formal framework on firm size, leverage and board independence as independent variables. ESG decoupling is positioned as the mediating variable, and financial performance is measured using Tobin's Q only.

The core argument is that ESG disclosure becomes valuable only when it is credible and supported by substantive ESG performance. Firm size may reduce ESG decoupling when larger firms possess sufficient resources and reporting systems to align disclosure with action.

Leverage may increase ESG decoupling when financial pressure encourages symbolic disclosure while limiting substantive ESG investment. ESG decoupling, in turn, is expected to reduce Tobin's Q because it weakens investor trust and increases information risk.

The study may contribute to corporate governance and sustainable finance literature in three ways. First, it shifts attention from ESG disclosure quantity to ESG disclosure credibility. Second, it explains ESG decoupling as a mediating mechanism linking firm and board characteristics to market-based financial performance. Third, it offers a practical measurement approach using annual reports, which is appropriate for Malaysian public listed companies because annual reports contain sustainability narratives, governance disclosures and measurable ESG indicators.

For Malaysian public listed companies, the paper suggests that sustainability reporting should not be treated as a communication exercise only. Firms should ensure that ESG claims are supported by reliable data, internal controls, measurable targets and evidence of implementation. For regulators and policymakers, the paper suggests that sustainability reporting reforms should be accompanied by stronger guidance on ESG performance evidence and assurance. For future researchers, the framework provides a basis for empirical testing using Malaysian listed-firm longitudinal data, particularly before and after the implementation of the NSRF. Future studies may also examine whether ESG decoupling differs across environmentally sensitive industries and whether board-level characteristics, including gender diversity and independence, strengthen ESG authenticity.

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GREEN FINANCE AND ESG AS A CATALYST FOR SUSTAINABLE BUSINESS PERFORMANCE: THE MEDIATING ROLE OF GREEN LOGISTIC IN PARCEL INDUSTRY- A CONCEPTUAL FRAMEWORK

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Abstract: *This study proposes a framework explaining on the green finance enables sustainable business performance in the parcel industry. The rapid expansion of e-commerce has significantly increased the environmental footprint of the parcel and logistics industry, resulting in higher carbon emissions, urban congestion, and packaging waste. As governments impose stricter environmental regulations and stakeholders demand more sustainable supply chain practices, parcel operators face increasing pressure to transform their operations toward sustainability. However, the substantial capital investment required for initiatives such as fleet electrification, circular packaging systems, and smart logistics infrastructure often exceeds the capacity of traditional financing mechanisms. Drawing upon literature from green finance, Environmental Social Governance (ESG), green logistic and sustainable business performance, the framework links key green financial instruments, including green bonds, sustainability-linked loans, and blended finance, to critical sustainability initiatives in parcel operations. The paper proposes that green finance facilitates environmental investments and accelerates green logistics, which subsequently enhance sustainability performance and support the transition toward net-zero logistics. By extending the application of green finance into the parcel industry context, this study contributes to the emerging discourse on sustainable business performance and offers a foundation for future empirical research examining the role of financial mechanisms, ESG and green logistic in driving sustainable business performance across logistics networks.*

Keywords: *Green Finance; Parcel Industry; ESG; Green Logistic; Sustainable Business Performance; Logistics*

Introduction

The rapid growth of the global e-commerce sector has intensified pressure on parcel and logistics companies to transition toward green operations to mitigate carbon emissions and meet stringent environmental regulations (Orji et al., 2019; Zahoor et al., 2024). However, executing this sustainable transformation is fundamentally capital-intensive, requiring massive upfront investments in eco-friendly infrastructure, alternative fuel fleets, and smart technological systems (Nguyen et al., 2023). The global green logistics market is projected to surpass $1.85 trillion, driven heavily by the urgent need to decarbonize freight and urban delivery networks. The parcel delivery sector sits at a critical nexus of this pressure; it accounts for a disproportionate share of Scope 1 emissions (via line-haul and last-mile transport) and Scope 3 emissions (via downstream packaging waste and vendor networks, Cervicorn (2025). However, logistics companies face a substantial capital investment barrier in pursuing sustainability transitions (Centobelli et al., 2017). Shifting toward medium- and heavy-duty electric vehicle (EV) fleets requires significant upfront capital outlays for vehicles and infrastructure (Phadke et al., 2021).

This challenge is further intensified by the rapid expansion of global e-commerce, which continues to drive higher parcel delivery volumes. At the same time, freight transport and last-mile delivery operations remain among the largest contributors to carbon emissions within the logistics sector, placing additional pressure on firms to decarbonize while operating under high-cost constraints. According to a global overview by Khayyat et al. (2024), the logistics sector (specifically transport) accounts for 16.2% of global greenhouse gas (GHG) emissions, with road transport alone responsible for 11.9%. As parcel volumes rise due to e-commerce, the heavy reliance on trucks, delivery vans, and planes exacerbates this footprint. Warehouses and distribution centers require massive amounts of energy for lighting, heating, cooling, and automated sorting systems. A comprehensive study by Depret (2024) on decarbonizing logistics emphasizes that the energy performance and carbon footprints of warehouses are critical, often-overlooked components. Building insulation, heavy machinery usage, and 24/7 electrical demands mean storage facilities significantly compound a parcel company's baseline footprint. Packaging affects emissions in two ways: the carbon cost of producing the materials (like corrugated cardboard or plastic mailers) and the physical size of the boxes. Research by Verros (2024) on Sustainable Packaging Logistics highlights that optimized package sizing directly cuts emissions. When packaging is oversized ("shipping air"), it reduces the payload capacity per delivery vehicle, requiring more trips, more fuel, and subsequently generating higher CO2 emissions.

Governments are intensifying regulatory pressure on the logistics industry by shifting sustainability initiatives from voluntary adoption to mandatory compliance. Essa (2023) highlighted that policy instruments such as emission caps, carbon pricing, environmental taxation, clean vehicle incentives, and urban zero-emission zones are increasingly being implemented to accelerate the transition toward green logistics. These initiatives reflect governments' determination to compel logistics companies to adopt environmentally sustainable operations and reduce their carbon footprint.

Despite growing adoption of green initiatives, Malaysia's logistics sector continues to face unsustainable performance issues. Without underlying structural shifts in enterprise production and energy sources, standalone green finance expansion fails to inherently generate green economic growth (Nguyen et al., 2024). Logistics firms face staggering upfront Capital Expenditure (CapEx), such as electric fleet conversion or solar-powered smart warehousing. Meanwhile, financial schemes are plagued by execution barriers, leaving a financial deficit that

stalls economic efficiency, Ezuma and Matthew (2022). Green logistics has been recognized as a key operational approach to improving sustainability outcomes through initiatives such as route optimization, eco-friendly transportation, sustainable packaging, and supply chain efficiency (Khan, 2019; Nicoletti & Appolloni, 2024). However, despite growing implementation of green practices, many parcel delivery firms continue to struggle to convert these initiatives into tangible performance outcomes. This suggests that the effectiveness of sustainability efforts may depend not only on operational implementation but also on the availability of financial support and organizational commitment. In practice, the implementation of green logistics often requires substantial investment in green technologies, infrastructure, and process transformation. However, parcel delivery companies frequently face financial limitations due to narrow profit margins, extended return-on-investment (ROI) periods, and uncertainty associated with adopting emerging green frameworks (Romano & Yang, 2022; Nguyen, 2026). These constraints may limit firms' ability to develop green logistics capability and consequently weaken improvements in sustainable performance. Green finance (GF), as a critical policy tool for supporting green development, plays a pivotal role in directing capital flows toward low-carbon and environmentally friendly industries. This provides essential support for the green transformation (GT) of the logistics industry (LI). However, limited research exists on the regional GT of the LI from the perspective of GF and LI integration. (Dai, L. 2025).

Furthermore, ESG has gained increasing attention as a strategic approach to achieving sustainability objectives. Still, limited empirical evidence exists regarding how ESG practices influence operational capability and contribute to sustainable performance outcomes in supply chain settings. de Souza Barbosa et al. (2023) highlighted the need for further research examining the relationship between ESG and performance outcomes while addressing emerging sustainability challenges within supply chains. Therefore, the motivation of this study is to address the limited understanding on the financial and strategic sustainability mechanisms contribute to sustainable performance in the parcel delivery industry. Specifically, this study examines the influence of green finance and ESG on sustainable business performance through the mediating role of green logistics capability.

Research Objectives

The main objective of this study is to propose a green logistic as a mediator between green finance, ESG and sustainable performance. To achieve the research objective, this study will investigate the following sub-objective:

i) To examine the relationship between green finance and sustainable performance.
ii) To examine the relationship between green finance and green logistic
iii) To examine the relationship between ESG and sustainable performance.
iv) To examine the relationship between ESG and green logistic.
v) To examine the relationship between green logistic towards sustainable performance.
vi) To examine the mediating effect of green logistic towards the relationship between green finance, ESG and sustainable performance.

Literature Review

Green Finance

Green finance serves as a critical driver for the low-carbon transformation of the logistics industry (Pham and Guo 2025). Impact of green finance on low-carbon development is moderated by industrial structure and environmental regulations, necessitating phased and regional implementation strategies to address the complexities of the logistics industry (Guo et al., 2025).

Existing literature provides growing evidence that green finance positively contributes to organizational sustainability outcomes. Zhao (2024) demonstrated that green finance significantly enhances corporate ESG performance among Chinese firms. The study further highlighted that the effectiveness of green finance varies across regions and is strengthened by contextual factors such as marketisation, societal green attention, and technological innovation. These findings suggest that green finance not only provides financial support but also encourages firms to adopt stronger sustainability practices and improve governance quality, (Zhao, 2024). Under green finance, the element that had to highlight to make this green finance successful is green bond, green loan and green investment. Green bonds became an increasingly important innovative debt financing instrument to complement traditional public funding sources. Green bonds basically work like conventional bonds with the difference that their proceeds are allocated to projects that are expected to deliver environmental benefits, according to pre-defined criteria (Oteh et al. 2021). From the above literature review the study propose that green finance reduces barriers to environmental investment. Numerous studies have shown that green financial instruments, such as green credit and green bonds, play a crucial role in supporting the research and application of green technologies (Gilchrist et al., 2021). Therefore, these hypotheses are proposed:

H1- Green finance positively influences sustainable performance

H2 – Green finance positively influences green logistic practice

ESG

Recent empirical research confirms that proactive ESG. strategies serve as a direct catalyst for improving a firm's long-term sustainable performance. For instance, in multinational enterprises (MNEs), the integration of comprehensive ESG strategies significantly enhances sustainable organizational performance by fostering an Internal Market-Oriented Culture (IMOC), which motivates employees to align their daily tasks and behaviors with global sustainability objectives (Chen et al., 2025).

ESG orientation has emerged as a critical mechanism for enhancing the effectiveness of sustainable supply chain practices. Karaman et al. (2024) found that firms implementing sustainable supply chain initiatives experienced lower carbon emissions, and this relationship became stronger when suppliers received ESG-related training. Supplier ESG training improves environmental awareness, encourages responsible business conduct, and facilitates the adoption of sustainability practices throughout the supply chain. Therefore, ESG integration not only supports supply chain sustainability but also contributes to improved environmental performance and carbon reduction outcomes (Karaman et al., 2024). ESG practices have become increasingly important in supporting sustainable logistics by improving operational transparency, ethical compliance, and long-term resilience across supply chain activities. The integration of artificial intelligence (AI) and data analytics enables firms to monitor supplier

compliance with social and environmental standards more effectively, thereby reducing risks associated with unethical practices and strengthening responsible supply chain management (Leogrande, 2024). In addition, governance, as a key pillar of ESG, enhances accountability, regulatory compliance, and risk mitigation through the adoption of smart technologies that improve supply chain visibility and control (Leogrande, 2024). Furthermore, Dai and Tang (2022) argued that the disruptions experienced during the COVID-19 pandemic exposed weaknesses in global supply chains and highlighted the need for organisations to incorporate ESG principles to strengthen supply chain resilience and sustainability. Therefore, ESG integration is increasingly recognised as a strategic approach to support sustainable logistics by promoting environmental responsibility, social accountability, and adaptive supply chain performance (Dai & Tang, 2022). Therefore, these hypotheses are proposed:

H3- ESG positively influences sustainable performance

H4 – ESG positively influences green logistic practice

Green Logistic

The logistics industry, as a vital pillar of economic activity, has significantly contributed to economic growth through its rapid expansion. However, it has also led to excessive resource consumption and environmental degradation (Piecyk and Björklund, 2015). First, the green transformation of the logistic industry has become a key global concern, with its core objective being the realization of low-carbon, efficient, and sustainable logistics services (Karagülle, 2012). African countries face severe constraints on the development of green logistics due to weak infrastructure, lack of funding, and low technological levels Takele and Buvik (2019). Numerous studies have shown that green financial instruments, such as green credit and green bonds, play a crucial role in supporting the research and application of green technologies (Gilchrist et al., 2021). Dai (2025) suggests that green finance plays a significant role in accelerating the green transformation of the logistics industry by providing financial resources that support investments in environmentally sustainable logistics infrastructure and operations. The author highlighted that green financial instrument, including green credit, green bonds, green insurance, green investment, and carbon finance, facilitate the adoption of green technologies, green warehousing, and new energy logistics vehicles, thereby strengthening green logistics implementation. This is parallel with some research that hightlight that the development of green credit, green bonds, and green funds fosters technological innovation and industrial restructuring, further supporting urban low carbon transformation (Xia et al., 2023). Meanwhile the element of ESG also influence the green logistic practice. The research explains that the "Environmental" aspect of ESG forces companies to rethink traditional processes by optimizing transportation routes to reduce emissions, assessing supplier footprints, and enforcing green technological adoption throughout the entire logistics network (Angelo, 2025). Therefore, these hypotheses are proposed:

H5: Green logistic influence sustainable performance

H6: Green logistic mediates green finance to sustainable performance

H7: Green logistic mediates ESG to sustainable performance

Sustainability Business Performance

Sustainable Business Performance (SBP) refers to an organization's ability to achieve long-term business success while balancing economic prosperity, environmental responsibility, and social well-being (Elkington, 1998; Fauzi et al., 2010). It reflects how firms integrate

sustainability principles into business operations while continuously creating value for stakeholders and maintaining competitiveness (Ahmad et al., 2023; Luque-Vílchez et al., 2023). Similarly, Gupta et al. (2021) defined sustainable business performance as the harmonization of social, financial, and environmental objectives through the execution of business activities to create sustainable value.

In today's business environment, organizations are increasingly expected to take responsibility for the environmental and social impacts of their operations. According to Boaventura et al. (2012), achieving sustainable business performance requires firms to recognize and manage the consequences of their decisions on society and the environment. Socially responsible organizations therefore emphasise resource conservation and broader societal welfare through the implementation of sustainability initiatives (Ismail, 2009; Gupta et al., 2021).

The adoption of green and sustainable practices has been recognized as an important driver of sustainable business performance. Organizations that implement green practices may create new market opportunities and strengthen their competitive position by expanding market share (Lin & Ho, 2008). Empirical evidence by Weng et al. (2015) demonstrated that green practices positively influence firm financial performance through increased sales revenue, improved market share, and enhanced corporate image, which subsequently attracts more customers.

Furthermore, green initiatives have been associated with long-term organizational success. Habib et al. (2021) reported that the implementation of green practices in manufacturing contributes positively to long-term firm performance. Supporting this argument, Ameer and Khan (2022) concluded that adopting green practices enhances sustainable business performance by simultaneously generating economic benefits, improving environmental outcomes, and strengthening organizational sustainability.

In addition, access to financial resources plays a crucial role in enabling sustainability initiatives. Green finance provides firms with the necessary capital to invest in environmentally friendly technologies, sustainable operations, and corporate social responsibility (CSR) activities. Green funds also act as an external catalyst that strengthens organizational sustainability by reducing financial constraints, improving managerial efficiency, and promoting green innovation, ultimately contributing to stronger business performance (Wang et al., 2024).

Underpinning Theory-Natural Resource-Based View

This study is theoretically underpinned by the Natural Resource-Based View (NRBV), originally conceptualized by Hart (1995) as an ecological extension of Barney's (1991) traditional Resource-Based View (RBV). While the classical RBV posits that a firm's sustained competitive advantage is derived from resources that are valuable, rare, inimitable, and non-substitutable (VRIN), it has been criticized for omitting the critical constraints and opportunities imposed by the natural environment (Hart & Dowell, 2011). To resolve this limitation, NRBV injects ecological considerations directly into strategic management, arguing that a firm's long-term marketplace advantage is rooted in capabilities that facilitate environmentally sustainable economic activities (Hart, 1995; Schwens & Wagner, 2018). The theory emphasizes that environmental responsibility should not be viewed merely as a compliance requirement but as a strategic capability that contributes to organizational competitiveness and sustainable growth. In the context of the modern logistics and parcel delivery sector, NRBV provides an appropriate theoretical lens to explain how environmental investments and strategic sustainability initiatives can be transformed into superior business

outcomes. Given that logistics operations are typically asset-intensive and carbon-intensive, firms require both strategic resources and organisational capabilities to achieve sustainable business performance.

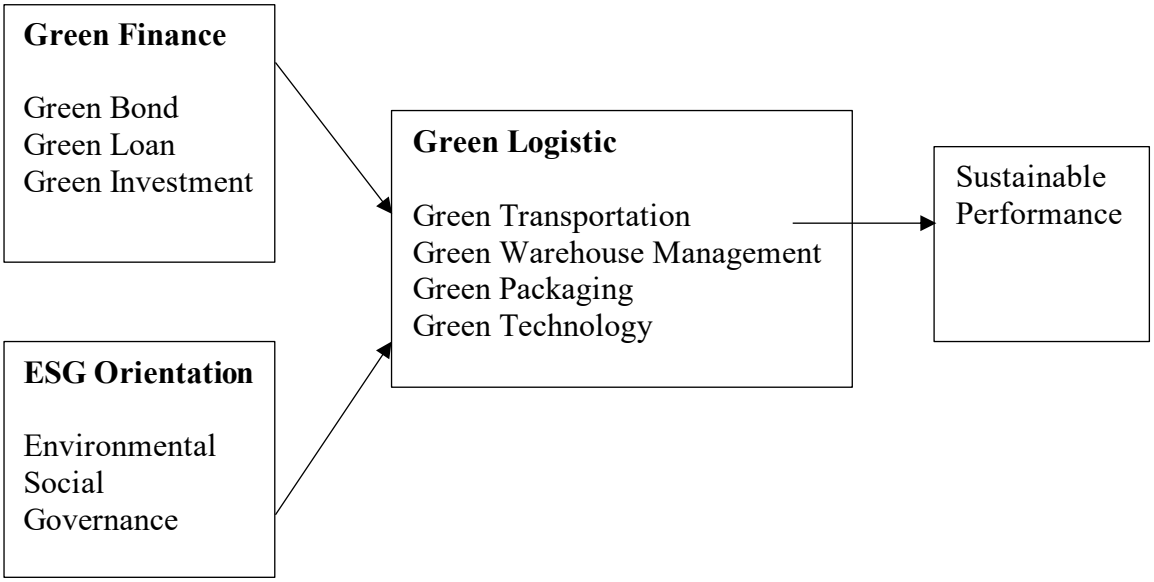
From the NRBV perspective, green finance represents a strategic organisational resource that enables firms to invest in environmentally sustainable initiatives. Green finance provides access to capital required to support eco-friendly transformation, including the adoption of green technologies, investment in electric delivery fleets, implementation of energy-efficient facilities, and optimisation of intelligent routing systems to reduce environmental impact (Zheng, 2025). These investments create opportunities for organisations to develop environmentally sustainable operations while strengthening long-term competitiveness.

Beyond financial resources, NRBV emphasises the importance of organisational capabilities in converting resources into valuable outcomes. In this study, ESG orientation functions as a higher-order organisational capability that reflects a firm's strategic commitment toward integrating environmental, social, and governance considerations into business decisions (Tan et al., 2022). Through ESG orientation, firms are able to translate green investments into operational practices such as sustainable packaging, responsible resource utilisation, transparent governance mechanisms, and lifecycle carbon management (Suroto, 2022).

According to NRBV, sustainable competitive advantage emerges when valuable resources are effectively combined with strategic capabilities. Accordingly, the integration of green finance as a strategic resource and ESG orientation as an organisational capability enables parcel delivery firms to enhance pollution prevention, promote product stewardship, and support sustainable development. This alignment allows firms to move beyond regulatory compliance and generate sustainable business performance through improved economic outcomes, environmental responsibility, and social value creation (Almada & Borges, 2018; Hart & Dowell, 2011).

Therefore, NRBV provides a strong theoretical foundation for explaining how green finance and ESG orientation contribute to sustainable business performance within the parcel industry.

Proposed Conceptual Model



Propose Research Methodology

This study follows a quantitative methodology research process:

Research Design

Stage 1: Preliminary Study and Extensive Literature Review

- Using purposive sampling, interviews will be conducted with 5 to 10 managers of courier services to get preliminary information about implementation of green logistic in their organisation.

Stage 2: Instrument Development and Validation

- The instrument will be developed based on the information from the preliminary interview, extensive literature review and underpinning theory.
- A pre-test will be conducted through online surveys with industry and academic experts in related fields to assess the face and content validity.
- A pilot test will be conducted to refine the questionnaires and check the instrument's reliability and consistency.

Stage 3: Data Collection, Confirmatory Analysis and Hypotheses Testing.

- The primary survey will be conducted, and data will be analysed using IBM Statistical Package from Social Science (SPSS) software version 26.0
- The Pearson Correlation Analysis explores the significant statistical relationships between critical success factors, lean implementation and service quality performance.
- For analysing mediation effects between lean implementation and critical success factors and service quality performance, the PROCESS procedure by Andrew F. Hayes was used for the bootstrapping analysis for mediation in this study.

Sampling Design

The unit analysis for this study is the managers of a courier service company in Malaysia representing their companies. The samples for this study are from the managers of courier service providers in Malaysia.This study will be conducted using the census method since, all over Malaysia, only 122 companies are running their business in Malaysia. For the survey, we use a census method where all managers answer the questionnaires on behalf of their companies.

Conclusion

This paper proposed a conceptual framework to explain how green finance and ESG can act as a strategic enabler of business sustainable transformation in the parcel industry. The rapid expansion of e-commerce and parcel delivery activities has intensified environmental challenges, particularly carbon emissions, energy consumption, and packaging waste, placing increasing pressure on logistics operators to transition toward more sustainable business models. Despite growing awareness of environmental responsibility and stronger regulatory expectations, many parcel firms continue to face substantial financial barriers in implementing green technologies and sustainable infrastructure.

Drawing upon the Natural Resource-Based View (NRBV), this study conceptualizes green finance as a valuable strategic resource that enables organizations to develop environmentally oriented capabilities and achieve long-term sustainability outcomes. Specifically, the framework proposes that financial instruments such as green bonds, sustainability-linked loans, blended finance, and ESG-oriented investments facilitate access to capital required for sustainable operational transformation. These investments support initiatives including fleet electrification, green warehousing, smart route optimization, renewable energy adoption, and sustainable packaging practices.

The proposed framework further suggests that green logistic functions as a mediating mechanism through which green finance translates into improved sustainability performance. Through this pathway, organizations may achieve environmental benefits such as emission reduction and resource efficiency while simultaneously strengthening economic resilience and enhancing corporate reputation. Accordingly, this study contributes to extending sustainable finance literature into the parcel industry context by integrating financial capability with operational sustainability and positioning green finance as more than a funding mechanism, but as a catalyst for strategic environmental change.

From a practical perspective, the framework offers guidance for parcel companies in structuring sustainability investments, supports policymakers in designing targeted financial incentives, and assists investors in evaluating environmental performance and long-term value creation. Future studies are encouraged to empirically validate the proposed relationships, conduct cross-country comparative investigations, and explore the integration of emerging digital technologies and ESG-oriented operational capabilities within sustainable logistics ecosystems.

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DIGITAL LEADERSHIP, DIGITAL SKILLS, AND DIGITAL CULTURE DRIVING GREEN INNOVATION AND COMPANY PERFORMANCE

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Abstract: *The construction industry faces increasing pressure to balance economic performance with environmental sustainability and social responsibility. Digital transformation has emerged as a strategic lever to enhance organizational competitiveness and operational efficiency, but the mechanisms underlying this relationship remain poorly explored in construction organizations. This conceptual study develops a comprehensive framework that examines how digital transformation—operated through digital leadership, digital skills, and digital culture—affects company performance, with green innovation (green process and green product innovation) serving as a mediating mechanism. The proposed model is a synthesis of recent research on the Resource-Based View (RBV), Dynamic Capability Theory (DCT), and Stakeholder Theory. The literature shows that digital transformation has a positive impact on firm performance and that green innovation mediates this relationship. This paper will advance knowledge about sustainable construction by providing a theoretically informed framework for understanding the digital-green performance nexus and providing practical implications for construction firms pursuing digitally enabled performance improvement strategies.*

Keywords: *Digital Transformation, Green Innovation, Company Performance, Construction Organizations, Sustainability*

Introduction

Background

The construction industry plays a critical role in economic development by providing essential infrastructure and supporting national growth (Li et al., 2024; Shen & Wang, 2023). However, the industry is also recognized as one of the largest consumers of natural resources and contributors to environmental degradation, greenhouse gas emissions, and construction waste (Li et al., 2023; Zhang, 2025; Van Tam & Quoc Toan, 2026). Increasing pressure from governments, investors, clients, and society has encouraged construction organizations to improve their Environmental, Social, and Governance (ESG) performance while simultaneously enhancing operational and financial performance (Cui et al., 2026; Wu & Li, 2023; Zhang, 2025).

Simultaneously, digital transformation has become a key strategic priority for organizations seeking to enhance efficiency, innovation, and competitiveness (Li et al., 2024; Zhuo et al., 2024). Emerging technologies such as Building Information Modelling (BIM), Artificial Intelligence (AI), Internet of Things (IoT), cloud computing, and data analytics are reshaping construction processes and project management practices (Li et al., 2023; Shen & Wang, 2023). Despite growing investments in digital technologies, the performance outcomes of digital transformation remain insufficiently understood (ASCE Library, 2025; Zhang, 2025). Existing studies primarily focus on operational performance, productivity improvement, and project efficiency (Li et al., 2024; Zhao et al., 2025). Comparatively less attention has been devoted to understanding how digital transformation contributes to sustainability-oriented innovation and overall company performance (Cui et al., 2026; Van Tam & Quoc Toan, 2026; Wu & Li, 2023). This paper addresses this gap by developing a conceptual framework that explains the relationship between digital transformation, green innovation, and company performance in construction organizations.

Research Problem and Gaps

Although digital transformation has attracted increasing attention in construction management research, several important issues remain unresolved, namely;

i) Digital transformation adoption remains uneven across Malaysian construction organizations, with small- and medium-sized contractors generally lagging behind larger firms due to financial, technological, and organizational constraints (Ismail et al., 2022; Zulkifli et al., 2023).
ii) The relationship between digital transformation and green innovation has received limited empirical attention within the Malaysian construction industry. Existing Malaysian studies primarily examine BIM adoption and digital readiness (Ismail et al., 2022; Zulkifli et al., 2023)
iii) The mediating role of green innovation in improving company performance remains underexplored in construction management literature (Li et al., 2023; Li et al., 2024; Cui et al., 2026; Van Tam & Quoc Toan, 2026).

Objectives of the Paper

i) To provide an overview of the current state of digital transformation adoption in the Malaysian construction industry.
ii) To review and synthesize recent studies on the relationship between digital transformation and green innovation.

iii)To develop an integrated conceptual framework explaining how green innovation mediates the relationship between digital transformation and company performance in construction organizations.

Literature Review

Digital Transformation in Construction Organizations

Digital transformation refers to the comprehensive integration of digital technologies into organizational processes, fundamentally altering how businesses operate and deliver value (Li et al., 2024). In the construction sector, digital transformation encompasses the adoption of BIM, cloud computing, IoT, artificial intelligence, and data analytics to enhance project planning, execution, and management (Zhang, 2025). The construction industry has witnessed increasing digitalization efforts aimed at improving productivity, reducing costs, and enhancing sustainability outcomes (Zafira & Mahanim, 2025). Digital transformation in construction is multidimensional, involving technological infrastructure, organizational capabilities, and cultural change. Key enablers include:

i. **Digital Leadership**—the capacity of senior managers to champion and guide digital initiatives (Cui et al., 2026). Digital leadership refers to the ability of organizational leaders to formulate and execute digital strategies that support innovation and organizational transformation (Cui et al., 2026; Li et al., 2024). Effective digital leadership provides vision, direction, and resource allocation for digital initiatives (Li et al., 2023; Shen & Wang, 2023; Zhuo et al., 2024).

ii. **Digital Skills**—the workforce competencies required to leverage digital technologies (UN Thailand, 2024). Digital skills represent employees' capabilities to utilize digital technologies effectively (Li et al., 2024; UN Thailand, 2024; Zhao et al., 2025). Organizations possessing strong digital competencies are better positioned to adopt innovative technologies and improve organizational performance (Cui et al., 2026; Li et al., 2023; Zhuo et al., 2024).

iii. **Digital Culture**—the organizational values and norms that support digital innovation (Li et al., 2024). Digital culture reflects shared values, beliefs, and behaviours that support digital adoption and innovation (Li et al., 2023; Shen & Wang, 2023; UN Thailand, 2024). A supportive digital culture encourages experimentation, collaboration, and continuous learning (Li et al., 2024; Wu & Li, 2023; Zhang, 2025).

Company Performance in Construction Organizations

Company performance in construction organizations encompasses multiple dimensions including operational efficiency, financial performance, project outcomes, and sustainability performance (Li et al., 2024; Zhao et al., 2025). Research indicates that construction firms face significant challenges in improving overall performance due to the industry's inherent project based nature, fragmented supply chains, and resistance to technological change (Li et al., 2023; ASCE Library, 2025).

Environmental, Social, and Governance (ESG) performance has emerged as a critical component of company performance, evaluating organizations across three pillars: environmental stewardship (resource efficiency, emissions reduction, pollution control), social responsibility (employee welfare, community engagement, stakeholder relations), and governance (transparency, accountability, ethical decision-making) (Zhang,

2025; Cui et al., 2026). For construction firms, ESG performance is increasingly critical for accessing capital, securing projects, and maintaining legitimacy with stakeholders (Shen & Wang, 2023; Van Tam & Quoc Toan, 2026).

Stakeholder Theory emphasizes the responsibility of organizations to create value for various stakeholder groups (Cui et al., 2026; Wu & Li, 2023). Construction organizations face increasing expectations regarding environmental protection, employee welfare, community development, and corporate governance (Li et al., 2024; Shen & Wang, 2023; Zhang, 2025). Company performance represents the organization's ability to satisfy these expectations (Van Tam & Quoc Toan, 2026; Wu & Li, 2023).

Green Innovation as a Strategic Capability

Green innovation refers to the development and implementation of environmentally beneficial technologies, processes, and products (Li et al., 2024). In the construction context, green innovation encompasses green process innovation—improvements in construction methods, resource efficiency, and waste reduction (Li et al., 2023; Zhuo et al., 2024)—and green product innovation—the development of sustainable building materials, energy-efficient designs, and eco-friendly infrastructure (Shen & Wang, 2023; Van Tam & Quoc Toan, 2026).

Development of environmentally friendly construction products and materials represents a critical component of green product innovation in the construction industry (Li et al., 2024; Van Tam & Quoc Toan, 2026). Research indicates that construction organizations are increasingly developing sustainable building materials, energy-efficient designs, and eco friendly infrastructure solutions to address environmental challenges and meet stakeholder expectations (Cui et al., 2026; Shen & Wang, 2023).

Green innovation is increasingly recognized as a strategic capability that enables construction firms to achieve competitive advantage while addressing environmental and social imperatives (Cui et al., 2026). Research indicates that green innovation mediates the relationship between digital transformation and company performance, suggesting that digital capabilities translate into performance outcomes through innovation processes (Zhang, 2025; Cui et al., 2026). Digital technologies facilitate green innovation by enhancing knowledge sharing, reducing experimentation costs, and enabling rapid prototyping of sustainable solutions (Li et al., 2024; Zhuo et al., 2024).

Environmental Regulation Intensity as a Moderator

According to Memon et al. (2019), a moderating variable refers to a variable that "influences the nature (e.g., magnitude and/or direction) of the effect of an antecedent on an outcome" (Aguinis et al., 2017). Environmental regulation intensity represents the degree to which environmental policies, laws, and regulations impose constraints and requirements on organizational activities (Li et al., 2024; Shen & Wang, 2023). Environmental regulation intensity can be categorized based on:

a) Command-and-Control Regulations: Legal requirements, standards, and enforcement mechanisms (Zhang, 2025)
b) Market-Based Instruments: Taxes, subsidies, emissions trading schemes (Zhao et al., 2025)
c) Information-Based Instruments: Disclosure requirements, labelling, reporting mandates (Li et al., 2024)

Research demonstrates that environmental regulation intensity significantly influences organizational behaviour and performance outcomes (Cui et al., 2026; Van Tam & Quoc Toan, 2026). Stringent environmental regulations create pressure for construction organizations to adopt cleaner production methods, reduce emissions, and improve resource efficiency (Li et al., 2024; Zhang, 2025). This regulatory pressure may amplify the benefits of digital transformation for company performance (ASCE Library, 2025; Zhao et al., 2025).

Theoretical Foundations and Theoretical Propositions Development

Theoretical Foundations

This study synthesizes three complementary theoretical perspectives to explain the relationships among digital transformation, green innovation, environmental regulation intensity, and company performance in construction organizations.

a. **Resource-Based View (RBV)** argues that organizations achieve competitive advantage through valuable, rare, inimitable, and non-substitutable resources (Li et al., 2024; Shen & Wang, 2023). Digital leadership, digital skills, and digital culture represent strategic organizational resources that facilitate digital transformation and innovation (Cui et al., 2026; Li et al., 2023; UN Thailand, 2024). Research demonstrates that these digital capabilities enable construction firms to reconfigure their resource portfolios and develop distinctive competencies that support sustainable development and green innovation (Li et al., 2024; Zhuo et al., 2024; Van Tam & Quoc Toan, 2026). Furthermore, digital capabilities serve as valuable intangible assets that contribute to competitive differentiation and improved company performance in construction organizations (Cui et al., 2026; Zhang, 2025; Zhao et al., 2025).

b. **Dynamic Capability Theory (DCT)** suggests that organizations must continuously integrate, build, and reconfigure resources to respond to changing business environments (Li et al., 2023; Shen & Wang, 2023). Within the construction industry, green innovation represents a dynamic capability that enables organizations to transform digital resources into sustainable outcomes (Li et al., 2024; Zhang, 2025; Zhuo et al., 2024). Research demonstrates that construction firms leverage digital transformation to develop sensing, seizing, and reconfiguring capabilities that facilitate green innovation and improve company performance (Cui et al., 2026; Li et al., 2023; Van Tam & Quoc Toan, 2026).

c. **Stakeholder Theory** emphasizes the responsibility of organizations to create value for various stakeholder groups (Cui et al., 2026; Wu & Li, 2023). Construction organizations face increasing expectations regarding environmental protection, employee welfare, community development, and corporate governance (Li et al., 2024; Shen & Wang, 2023; Zhang, 2025). Company performance represents the organization's ability to satisfy these expectations (Van Tam & Quoc Toan, 2026; Wu & Li, 2023). Research demonstrates that construction firms with strong ESG performance are better positioned to meet stakeholder demands, enhance their reputation, and secure long-term competitive advantage (Cui et al., 2026; Li et al., 2024; Zhao et al., 2025).

Conceptual Framework Development

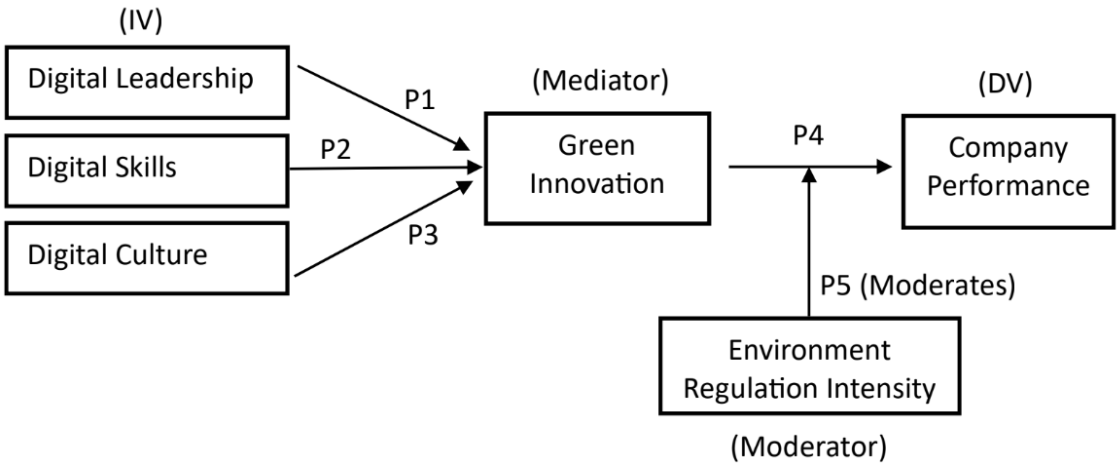
This conceptual framework is developed through a synthesis of existing literature and comprises three complementary theories: the Resource-Based View (RBV), Dynamic Capability Theory (DCT), and Stakeholder Theory (Li et al., 2024; Shen & Wang, 2023; Wu & Li, 2023). The literature was reviewed to identify key constructs and establish

theoretical relationships between digital transformation, green innovation, environmental regulation intensity, and company performance in construction organizations (Cui et al., 2026; Li et al., 2023; Zhang, 2025). From the Resource-Based View (RBV), digital leadership, digital skills, and digital culture are conceptualized as valuable strategic resources that enable construction organizations to develop unique digital capabilities, foster green innovation and achieve sustainable competitive advantage (Li et al., 2024; Shen & Wang, 2023; Cui et al., 2026; Li et al., 2023; PBB Thailand, 2024; Zhuo et al., 2024; Van Tam & Quoc Toan, 2026). Meanwhile, Dynamic Capability Theory (DCT) further explains how organizations constantly integrate, build, and reconfigure these digital resources to adapt to a rapidly changing business environment, with green innovation serving as a dynamic capability that transforms digital capabilities into improved organizational performance (Li et al., 2023; Shen & Wang, 2023; Li et al., 2024; Zhang, 2025; Zhuo et al., 2024; Cui et al., 2026; Van Tam & Quoc Toan, 2026). Complementing this perspective, Stakeholder Theory emphasizes that construction organizations must create value for multiple stakeholders by addressing increasing expectations related to environmental sustainability, social responsibility, and governance (Cui et al., 2026; Wu & Li, 2023; Li et al., 2024; Shen & Wang, 2023; Zhang, 2025). In this context, digital transformation enhances stakeholder engagement, organizational transparency, and sustainable business practices, while the intensity of environmental regulations strengthens the adoption of green innovation and supports the improvement of company performance (Zhang, 2025; Zhuo et al., 2024; Van Tam & Quoc Toan, 2026; Wu & Li, 2023). Therefore, these three theoretical perspectives provide a comprehensive foundation for explaining how digital transformation contributes to green innovation and ultimately improves company performance in construction organizations.

Based on the literature, digital transformation is conceptualized through three dimensions: digital leadership, digital skills, and digital culture. Digital leadership refers to the ability of organizational leaders to design and implement digital strategies by providing vision, direction and resource allocation for digital initiatives, thus driving innovation, improving energy efficiency and improving organizational performance (Cui et al., 2026; Li et al., 2023; Li et al., 2024; Shen & Wang, 2023; Van Tam & Quoc Toan, 2026; Zhang, 2025; Zhao et al., 2025; Zhuo et al., 2024). Digital skills represent the ability of employees to effectively use digital technologies and integrate new technologies such as Building Information Modeling (BIM), Artificial Intelligence (AI) and Internet of Things (IoT), which enables better resource allocation, knowledge integration, technology adoption and organizational performance (Cui et al., 2026; Li et al., 2023; Li et al., 2024; Shen & Wang, 2023; PBB Thailand, 2024; Van Tam & Quoc, 2025; Zhao et al., 2024). Digital culture reflects shared values, beliefs, and behaviors that encourage experimentation, collaboration, continuous learning, and knowledge sharing, enabling organizations to effectively integrate digital technologies and foster sustainable development through green innovation (ASCE Library, 2025; Cui et al., 2026; Li et al., 2023; Li et al., 2024; Shen & Wang, 2023; UN Thailand, 2024; Van Tam & Quoc, 2026; Zhang, 2025; Zhuo et al., 2024). These three dimensions represent strategic organizational capabilities that support the adoption of digital technologies and promote green innovation. Green innovation, comprising green process and green product innovation, is proposed as a mechanism through which digital transformation improves company performance. It refers to the development and implementation of environmentally beneficial technologies, processes and products that facilitate knowledge sharing, reduce the cost of experimentation, enable rapid prototyping of sustainable solutions, improve operational efficiency, strengthen stakeholder engagement and reduce environmental impact, which ultimately contributes to superior company performance in construction organizations (Cui et

al., 2026; Li et al., 2024; Shen & Wang, 2023; Van Tam & Quoc Toan, 2026; Zhuo et al., 2024).

The framework further proposes environmental regulation intensity as a moderating variable. Stronger environmental regulations are expected to reinforce the positive effect of green innovation on company performance by encouraging organizations to adopt more sustainable practices.



Theoretical Propositions Development

P1: Digital leadership positively affects green innovation.

Digital leadership refers to the ability of organizational leaders to formulate and execute digital strategies that support innovation (Cui et al., 2026; Li et al., 2024). Effective leaders provide vision, direction, and resources for digital initiatives (Li et al., 2023; Shen & Wang, 2023). Based on Resource-Based View (RBV), digital leadership is a valuable organizational resource that enables green innovation (Li et al., 2024; Shen & Wang, 2023). Leaders with strong digital orientation guide their organizations toward sustainability objectives (Wu & Li, 2023; Zhao et al., 2025).

P2: Digital skills positively affect green innovation.

Digital skills represent employees' capabilities to utilize digital technologies effectively (Li et al., 2024; UN Thailand, 2024). Organizations with strong digital competencies adopt innovative technologies more effectively (Cui et al., 2026; Zhuo et al., 2024). Drawing on Dynamic Capability Theory (DCT), digital skills enable organizations to sense opportunities and implement sustainable solutions (Li et al., 2024; Shen & Wang, 2023).
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P3: Digital culture positively affects green innovation

Digital culture reflects shared values and behaviours that support digital adoption and innovation (Li et al., 2023; Shen & Wang, 2023). A supportive digital culture encourages experimentation, collaboration, and continuous learning (Li et al., 2024; Wu & Li, 2023). Drawing on RBV, digital culture is an intangible resource that provides competitive advantage (Li et al., 2024; Shen & Wang, 2023). Organizations with strong digital cultures are better equipped for sustainable development (Cui et al., 2026; Van Tam & Quoc Toan, 2026).

P4: Green innovation positively affects company performance

Green innovation encompasses process improvements and product developments that reduce environmental impact (Li et al., 2024). It includes green process innovation (resource efficiency, waste reduction) and green product innovation (sustainable materials, eco-friendly designs) (Shen & Wang, 2023; Van Tam & Quoc Toan, 2026). Drawing on DCT, green innovation is a capability that enables firms to sense opportunities and reconfigure resources for improved performance (Li et al., 2024; Zhang, 2025). Research shows green innovation improves environmental, social, governance, and operational performance (Cui et al., 2026; Emerald, 2026).

P5: Environmental regulation intensity moderates the relationship between green innovation and company performance.

A moderator influences the strength or direction of a relationship (Memon et al., 2019). Environmental regulation intensity represents external pressure from policies and laws (Li et al., 2024; Zhang, 2025). Based on Stakeholder Theory, strict regulations create pressures that amplify the benefits of green innovation for company performance (Wu & Li, 2023; Zhao et al., 2025). When regulations are stringent, the positive relationship between green innovation and company performance is stronger (Li et al., 2024; Zhang, 2025).

Summary of Propositions (P)

Propositions	Relationship	Theoretical Basis
P1	Digital Leadership → Green Innovation (+)	RBV, DCT
P2	Digital Skills → Green Innovation (+)	DCT, RBV
P3	Digital Culture → Green Innovation (+)	RBV, Stakeholder Theory
P4	Green Innovation →Company Performance (+)	DCT, Stakeholder Theory
P5	Environmental Regulation Intensity Moderates Green Innovation → Company Performance (Strengthens +)	Stakeholder Theory, DCT

This conceptual paper has developed a comprehensive framework examining the impact of digital transformation on company performance in construction organizations, with green innovation as a mediating mechanism and environmental regulation intensity as a moderating variable. Drawing on RBV, Dynamic Capability Theory, and Stakeholder Theory, the proposed model specifies digital transformation through digital leadership, digital skills, and digital culture, green innovation through process and product innovation, and environmental regulation intensity as a contextual boundary condition. Five theoretical propositions were developed: digital leadership positively affects green innovation (P1), digital skills positively affect green innovation (P2), digital culture positively affects green innovation (P3), green innovation positively affects company performance (P4), and environmental regulation intensity moderates the relationship between green innovation and company performance (P5).

The framework contributes to theoretical understanding of how construction firms can leverage digital capabilities for performance enhancement and provides practical guidance for managers and policymakers. As the construction industry faces intensifying pressures for environmental stewardship, social responsibility, and operational excellence, digital transformation offers a strategic pathway to enhanced company performance through innovation. Future empirical research should validate the proposed relationships and explore additional contextual contingencies, thereby advancing knowledge on sustainable construction in the digital age.

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DEVELOPING A FRAMEWORK ON SUSTAINABLE WATER RESILIENCE IN WATER SUPPLY: A MEDIATING EFFECT ON ESG FACTOR.

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Abstract: *The increasing frequency of global challenges, including climate change, supply chain disruptions, inflation, material price escalation, water scarcity, and labour shortages, has intensified the need for resilient and sustainable water supply infrastructure. Traditional project management approaches that primarily focus on cost, quality, and schedule are no longer sufficient to ensure long-term infrastructure performance. Consequently, Environmental, Social, and Governance (ESG) principles have emerged as a strategic framework for enhancing sustainability and resilience in construction projects. This conceptual paper examines on contractor strategies—namely risk management, supply chain management, and innovation and technology adoption—contribute to building* ***Water Supply Infrastructure Resilience****, with ESG acting as a mediating factor that strengthens these relationships under global challenges. The study is grounded in the Resource-Based View (RBV), which explains how contractors' internal capabilities and ESG-oriented resources create sustainable competitive advantages and improve infrastructure resilience. Drawing upon recent literature, the proposed conceptual framework suggests that ESG-driven contractor strategies enhance infrastructure resilience by improving adaptive capacity, operational continuity, governance effectiveness, and long-term sustainability. The study also provides practical implications for contractors, policymakers, water utility operators, and regulatory agencies in developing resilient and sustainable water infrastructure capable of withstanding future global disruptions. Future empirical research is recommended to validate the proposed framework within Malaysia's water supply construction sector.*

Keywords: *Environmental, Social and Governance (ESG); Water Supply Infrastructure Resilience; Risk Management; Supply Chain Management; Innovation and Technology Adoption; Global Challenges; Resource-Based View (RBV); Sustainable Infrastructure*

Background of the Study

Water supply infrastructure is a critical foundation for economic development, public health, and social well-being. However, these systems are increasingly exposed to global challenges such as climate change, resource scarcity, supply chain disruptions, and economic uncertainty. Climate change, in particular, poses a major threat to water security through extreme events like droughts, floods, and shifting rainfall patterns. At the same time, rising construction costs, material shortages, and global supply chain disruptions add further pressure to infrastructure projects. Therefore, technical efficiency alone is insufficient—water supply infrastructure requires resilience and long-term sustainability to ensure continuous service delivery under uncertain conditions.

In response, ESG principles have gained prominence as a framework for promoting sustainable and responsible project delivery. ESG emphasizes environmental stewardship, social responsibility, and effective governance in decision-making. Within the construction sector, ESG is increasingly recognized as a mechanism to improve project performance, manage risks, and create long-term value. Contractors now play a broader role beyond managing cost, quality, and schedule. They are expected to adopt sustainable construction practices, strengthen stakeholder engagement, enhance governance mechanisms, and improve risk management capabilities—strategic responses that are vital for ensuring the resilience of water supply systems.

The concept of sustainable resilience has become central in infrastructure management, referring to the ability of systems and organizations to anticipate, adapt, respond, and recover from disruptions while maintaining long-term sustainability. Although previous studies have examined ESG practices, infrastructure resilience, and sustainable construction separately, limited attention has been given to how ESG-driven contractor strategies contribute to resilience in water supply projects. Moreover, there is a lack of conceptual frameworks that integrate ESG factors, contractor strategies, and sustainable resilience within the context of water supply infrastructure. This study seeks to address this gap by proposing a conceptual framework that explains the relationships among these constructs under the influence of global challenges.

Literature Review

Review on Related Theory -Resource-Based View (RBV)

The Resource-Based View (RBV) is suitable for your framework because it emphasizes that contractors' long-term resilience depends on how they develop and deploy their internal resources, not just how they react to external crises. In this study on ESG-Driven Contractor Strategies for Building Sustainable Resilience in Water Supply Infrastructure, RBV provides the theoretical lens to explain why certain contractor capabilities — such as advanced project management systems, sustainable procurement practices, green construction expertise, and strong stakeholder relationships — become the foundation of resilience. These resources are valuable (they reduce risks and improve efficiency), rare (not every contractor has ESG-aligned expertise), and inimitable (trust, reputation, and integrated supply chains are hard to copy). By linking RBV with ESG, the framework shows that sustainable resilience is not accidental but built on strategic use of internal strengths, enabling contractors to withstand global challenges like climate change, supply chain disruptions, and financial volatility.

Climate Change

Climate change is widely recognized as the most critical environmental challenge to water infrastructure resilience. It alters rainfall patterns, increases drought frequency, and exacerbates flooding, thereby reducing both the quality and reliability of water supply systems. Preventive strategies such as proactive maintenance and flood risk mapping, alongside corrective measures like rapid recovery planning, are essential to mitigate these impacts (Pamidimukkala et al., 2021).

Beyond water systems, weather and climate conditions are also frequently ranked as one of the most prevalent and detrimental causes of schedule delays in construction projects. Ballesteros-Pérez et al. (2018) highlight that weather-related uncertainties significantly disrupt project timelines, underscoring the interconnectedness between climate challenges and the delivery of resilient water infrastructure.

The construction industry itself has been identified as one of the most environmentally damaging sectors. Murtagh et al. (2020) argue that substantial improvements in sustainability and resilience to climate change are urgently needed, particularly since infrastructure development is both a contributor to environmental stress and a potential solution for adaptation. This dual role emphasizes the importance of embedding sustainability principles into water infrastructure planning and construction.

In practice, contractors often adjust installation schedules to account for weather-related uncertainties. Wang et al. (2021) note that the complex nature of construction projects makes them vulnerable to disputes and high costs, which are exacerbated by climate variability. Clear and balanced definitions of responsibilities among stakeholders are therefore essential to ensure that climate-related risks do not escalate into financial and operational conflicts.

Risk Management Strategy

Iqbal et al. (2015) highlight that contractors bear primary responsibility for managing risks during project implementation, particularly those related to subcontractors, labour, machinery, material availability, and quality. Their study identifies preventive strategies such as proper scheduling and reliance on updated project data, alongside remedial strategies including close supervision and coordination, as critical for effective risk management. These findings resonate strongly with the ESG-driven agenda, as proactive scheduling and transparent coordination not only mitigate operational risks but also enhance accountability and stakeholder trust. Moreover, the emphasis on managing financial risks, defective design, and regulatory changes reflects the broader global crises contractors face, including economic volatility and evolving sustainability regulations. Integrating such contractor strategies within an ESG framework ensures that resilience in water supply infrastructure is not limited to technical efficiency but extends to social responsibility and governance compliance, thereby strengthening sustainable resilience under global challenges.

Innovation and Technology Adoption

Innovation and technology practices are increasingly recognized as critical enablers of contractor strategies in risk management under global crises. Censi et al. (2025) demonstrate that AI-driven process mining and robotic process automation can dynamically identify and classify ESG-related risks, thereby supporting contractors in transitioning toward sustainability-first management. Similarly, Mohamed et al. (2026) highlight the potential of GenAI frameworks to simulate risk scenarios and optimize project leadership in

sustainable development projects, reinforcing the role of digital innovation in resilience building. Complementing these perspectives, Industry 4.0 applications such as IoT, blockchain, and BIM have been shown to integrate ethical engineering and sustainable development principles into construction contract management, ensuring transparency, efficiency, and ESG compliance (ScienceDirect, 2025). Collectively, these studies underscore that innovation and technology practices are not only operational tools but also strategic mechanisms for contractors to embed ESG principles into risk management, thereby strengthening sustainable resilience in water supply infrastructure during global challenges.

Supply Chain Management

Halicki and Uphaus (2025) underscore the pivotal role of general contractors (GCs) in Project Supply Chain Risk Management (PSCRM), highlighting their responsibility to orchestrate a structured five-stage process encompassing risk management planning, identification of risk factors and opportunities, project feasibility analysis, response planning, and continuous monitoring.

Their study further stresses that digitalization and the deployment of advanced IT systems are indispensable strategies for mitigating risks and enhancing resilience within complex project supply chains. Complementing this perspective, Liu and Chiu (2021, 2022) demonstrate that the evolution of Supply Chain 4.0 and the integration of digital technologies significantly improve organizational performance and resilience. Their findings reveal that supply chain digitalization and integration exert a positive influence across both large enterprises and SMEs, thereby reinforcing contractors' capacity to withstand disruptions and sustain competitiveness in the construction sector.

Extending this argument, Zhao et al. (2023) provide empirical evidence that digitalization enhances supply chain resilience and overall performance, underscoring its role as a critical enabler of sustainable risk management practices. Taken together, these studies suggest that digitalization-driven strategies are central to strengthening contractor resilience, particularly in navigating global crises and aligning with ESG imperatives in infrastructure projects.

Water Supply Infrastructure Resilience

Water supply infrastructure resilience has emerged as a critical concept in ensuring the continuity, reliability, and sustainability of water supply services amidst increasing global challenges such as climate change, natural disasters, aging infrastructure, and rapid urbanisation. Water supply infrastructure resilience refers to the ability of water systems and related infrastructure to anticipate, withstand, adapt to, recover from, and continuously improve following disruptions while maintaining essential water services. This concept extends beyond the physical robustness of infrastructure by incorporating operational capability, adaptive management, and long-term sustainability.

According to Maziotis and Molinos-Senante (2025), operational resilience is defined as the capability of water utilities' infrastructure, together with the operational skills and organisational processes, to prevent, withstand, and recover from disruptions while maintaining service continuity. Furthermore, resilience also includes the long-term ability to adapt to environmental pressures, demographic changes, customer expectations, and climate change. This broader perspective positions resilience as a dynamic process rather than merely an engineering characteristic.

The importance of resilient water supply infrastructure has significantly increased due to the growing frequency of climate-related hazards. Water utilities are increasingly exposed to floods, droughts, earthquakes, contamination events, infrastructure deterioration, and other natural or human-induced disruptions that threaten the reliability of water services. Consequently, strengthening infrastructure resilience has become a strategic priority for ensuring public health, environmental sustainability, and uninterrupted water supply services.

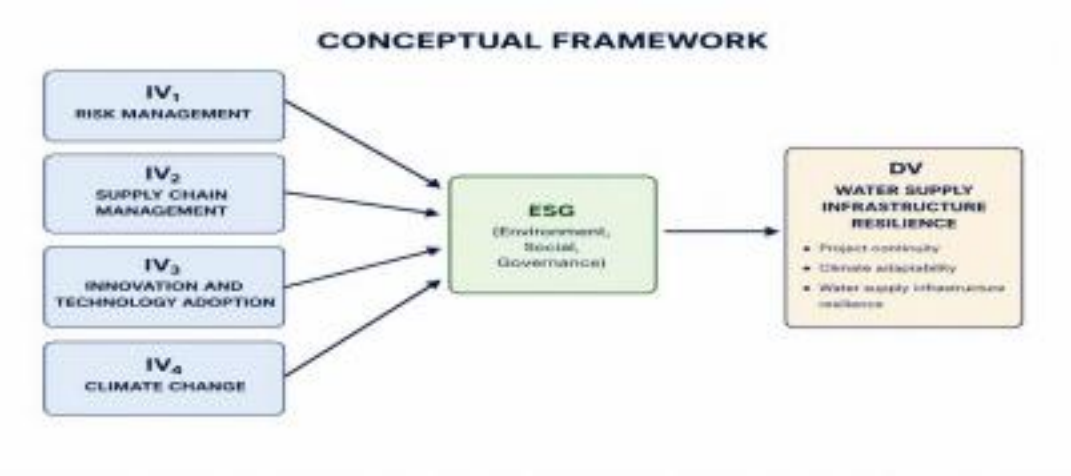
Maziotis and Molinos-Senante (2025) further argue that Water Supply Infrastructure Resilience can be evaluated through three interrelated dimensions, namely service performance, asset management, and water security. Service performance reflects the continuity and quality of water supply during disruptions. Asset management represents the capability to maintain, renew, and improve infrastructure assets to ensure long-term operational reliability. Meanwhile, water security refers to the availability and protection of raw water resources to sustain water supply under changing environmental conditions. Collectively, these dimensions provide a comprehensive assessment of infrastructure resilience from both operational and strategic perspectives.

In the context of this study, water supply infrastructure resilience is regarded as the desired outcome of effective ESG-driven contractor strategies. Contractors who integrate environmental sustainability, social responsibility, and sound governance practices into project planning, construction, and infrastructure maintenance are expected to improve the resilience of water supply systems. Such strategies enhance infrastructure durability, operational continuity, adaptive capacity, and long-term sustainability, thereby strengthening the resilience of water supply infrastructure during global challenges.

ESG as Mediator

Environmental, Social, and Governance (ESG) practices have evolved beyond sustainability reporting to become strategic organisational capabilities that influence operational performance and long-term resilience. ESG enables organisations to transform internal strategies into sustainable outcomes by strengthening environmental stewardship, stakeholder engagement, governance transparency, and risk management. Within the construction sector, contractors implementing effective risk management, sustainable supply chain management, and digital innovation are more capable of embedding ESG practices throughout project delivery. Consequently, ESG serves as the mechanism through which contractor strategies contribute to resilient and sustainable water supply infrastructure. Based on the Resource Based View (RBV), ESG represents a valuable organisational capability that converts strategic resources into sustainable competitive advantage and infrastructure resilience

Conceptual Framework



Discussion and Practical Implication

The proposed framework offers significant practical implications for stakeholders involved in the planning, construction, and management of water supply infrastructure. By integrating contractor strategies with ESG principles to enhance sustainable resilience, the framework provides a strategic reference for contractors in strengthening their capability to manage risks associated with climate change, supply chain disruptions, rising construction costs, and increasing project complexity. Furthermore, the framework may assist government agencies, regulators, and water utility operators in developing policies, procurement guidelines, and project evaluation criteria that incorporate ESG considerations into infrastructure development. It also provides valuable insights for organizations responsible for water supply management in improving project resilience, operational continuity, and long-term sustainability. From a broader perspective, the proposed framework supports the implementation of sustainable infrastructure practices that contribute to reliable water services, enhanced public well-being, and the achievement of the Sustainable Development Goals (SDGs), particularly SDG 6 (Clean Water and Sanitation), SDG 9 (Industry, Innovation and Infrastructure), and SDG 13 (Climate Action). Consequently, this model serves as a practical decision-making tool for industry practitioners, policymakers, and infrastructure agencies seeking to build more resilient and sustainable water supply systems under increasingly uncertain global conditions.

Conclusion of the Conceptual Model

This study proposes a conceptual framework that integrates contractor strategies, ESG principles, and Water Supply Infrastructure Resilience under global challenges. The study argues that contractor strategies enhance Water Supply Infrastructure Resilience through ESG, with ESG serving as a mediating mechanism that explains how contractor strategies are translated into resilient and sustainable infrastructure outcomes. By integrating these constructs, the proposed model provides a more holistic understanding than previous studies, which have examined contractor strategies, ESG, and infrastructure resilience as separate constructs.

From a theoretical perspective, the proposed framework extends the Resource-Based View (RBV) by demonstrating how ESG functions as a strategic mediating capability that transforms contractor strategies into sustainable resilience outcomes. It contributes to the literature by explaining the mechanism through which contractor strategies enhance Water Supply Infrastructure Resilience under global challenges. Practically, the framework provides guidance for contractors, policymakers, regulators, and water utility agencies in

designing and implementing projects that are more resilient, adaptable, and sustainable. It also supports the integration of ESG principles into decision-making processes to strengthen long-term infrastructure performance and resilience. As this study is conceptual in nature, future research should empirically validate the proposed framework within Malaysia's water supply sector to examine the mediating role of ESG and provide robust evidence for both academic research and industry practice.

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THE EFFECT OF SRI SUKUK AND ESG PRACTICES ON ORGANIZATIONAL PERFORMANCE: A MODERATING OF GREEN INNOVATION

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Abstract: *Sustainable and Responsible Investment (SRI) Sukuk has emerged as a significant Islamic financial instrument that supports sustainable development while adhering to Shariah principles. As part of the broader green finance movement, SRI Sukuk is designed to finance projects that generate positive environmental and social impacts, such as renewable energy, sustainable infrastructure, and energy-efficient developments. This study examines the impact of SRI Sukuk on the performance of Bank Rakyat, focusing on both financial and non-financial dimensions. The analysis explores how participation in SRI Sukuk initiatives contributes to revenue growth, portfolio diversification, risk management, corporate reputation, and alignment with Environmental, Social, and Governance (ESG) objectives. The study also highlights the challenges associated with implementing SRI Sukuk, including regulatory compliance, reporting requirements, and limited investor awareness. Drawing upon Stakeholder Theory and the Triple Bottom Line framework, the study suggest that SRI Sukuk can enhance Bank Rakyat's long-term sustainability and competitiveness by promoting responsible financing practices and supporting national sustainable development goals. The framework is proposing green finance through SRI Sukuk not only strengthens financial performance but also improves stakeholder trust and institutional resilience. Therefore, SRI Sukuk represents a strategic opportunity for Bank Rakyat to create a large scale of impact to environmental and social well-being.*

Keywords: *Sustainable and Responsible Investment (SRI) Sukuk, Green Finance, Bank Rakyat, ESG, Sustainable Development, Islamic Finance, Financial Performance.*

Introduction

The increasing concern over climate change, environmental degradation, and social inequality has accelerated the demand for sustainable finance worldwide (United Nations, 2015). As a result, the SRI has gained significant attention by integrating Environmental, Social, and Governance (ESG) considerations into investment decisions to achieve long-term financial returns while creating positive environmental and social impacts. Within the Islamic finance industry, Sustainable and Responsible Investment (SRI) Sukuk has emerged as an innovative Shariah-compliant financing instrument that supports sustainable development through investments in renewable energy, green infrastructure, and social impact projects (Bhattacharyya, 2022; Securities Commission Malaysia, 2023).

Malaysia has positioned itself as a global leader in Islamic sustainable finance through the introduction of the Securities Commission Malaysia's Sustainable and Responsible Investment Sukuk Framework. As one of the country's leading Islamic financial institutions, Bank Rakyat has strengthened its commitment to sustainable finance by promoting responsible banking practices, ESG implementation, and innovation. These initiatives are expected to enhance financial performance, strengthen stakeholder trust, improve corporate reputation, and support long-term organizational sustainability.

Green innovation has become a critical organizational capability that enables firms to transform sustainability initiatives into sustainable competitive advantages. It involves the development and adoption of environmentally friendly technologies, green products and services, sustainable business processes, and innovative solutions that reduce environmental impacts while enhancing organizational performance (Barney, 1991; Fu et al., 2023). Through the adoption of green technologies, eco-friendly financial products, sustainable business processes, and digital solutions, organizations can improve operational efficiency while achieving both environmental and business objectives (Fu et al., 2023; Bhattacharyya, 2022). However, despite growing interest in sustainable finance, limited studies have examined the combined effects of SRI Sukuk and ESG practices on organizational performance through the mediating role of green innovation, particularly within the context of Bank Rakyat.

Bank Rakyat strengthened its commitment to sustainable finance through the issuance of its first RM500 million ASEAN Sustainability SRI Sukuk under the RM10 billion Sukuk Wakalah Programme in 2024. The Sukuk finances projects aligned with environmental and social sustainability objectives, including affordable housing, renewable energy, green buildings, and clean transportation. As of December 2024, 100% of the Sukuk proceeds had been allocated**,** with 36.17% invested in affordable housing, 26.03% in renewable energy, 12.52% in socioeconomic development, and the remaining funds supporting green buildings, financial inclusion, clean transportation, waste management, and education (Bank Rakyat, 2024).

Therefore, this conceptual paper proposes a framework to examine the relationships among SRI Sukuk, ESG Practices, Green Innovation, and Organizational Performance. Drawing upon Stakeholder Theory and Resource-Based View (RBV) theory, the study seeks to provide a better understanding sustainable finance and innovation contribute to enhancing organizational performance in Islamic financial institutions.

Research Contribution

The findings are expected to offer valuable theoretical, empirical, methodological, and practical insights for researchers, practitioners, and policymakers in the fields of Islamic finance and sustainable development.

Research Objective

The objective of this study are as follows:

i) To determine the influence of SRI Sukuk on organizational performance.
ii) To determine the influence of ESG Practices on organizational performance.
iii) To assess the influence of SRI Sukuk on Green Innovation.
iv) To assess the influence of ESG Practices on Green Innovation.
v) To evaluate the influence of Green Innovation on Organizational Performance.
vi) To investigate whether Green Innovation mediates the relationship between SRI Sukuk and Organizational Performance.
vii) To investigate whether Green Innovation mediates the relationship between ESG Practices and Organizational Performance.

Literature Review

Sustainable and Responsible Investment (SRI) Sukuk

SRI Sukuk is a sustainable financial instrument developed to finance projects that generate positive environmental and social outcomes while complying with Islamic financial principles. According to Bhattacharyya (2022), sustainable investment instruments such as green bonds and green Sukuk have become increasingly important in supporting climate action, renewable energy development, and sustainable economic growth. These instruments facilitate capital mobilization toward environmentally responsible projects while providing investors with opportunities to contribute to sustainability objectives.

Fu et al. (2023) describe green finance as a financial system that integrates environmental protection and sustainable development into investment and financing decisions. Within this framework, SRI Sukuk serves as a mechanism for funding renewable energy projects, green infrastructure developments, social impact programs, and sustainable investment initiatives. The authors argue that sustainable financing instruments not only support environmental objectives but also contribute to economic stability and long-term value creation.

The key indicators of SRI Sukuk in this study include renewable energy financing, green project financing, social impact financing, and sustainable investment initiatives. Renewable energy financing supports the transition from fossil fuels to cleaner energy sources, while green project financing promotes environmentally sustainable infrastructure development. Social impact financing addresses social challenges such as healthcare, education, and community development. Sustainable investment initiatives encourage responsible investment practices that generate both financial and social returns (Bhattacharyya, 2022; Desalegn & Tangl, 2022; Fu et al., 2023).

Previous studies suggest that sustainable financing improves institutional competitiveness, enhances stakeholder trust, and creates opportunities for long-term growth. Therefore, SRI Sukuk is expected to contribute positively to organizational performance.

ESG Practices

Environmental, Social, and Governance (ESG) practices have become central to sustainable finance and responsible investment strategies. Fu et al. (2023) highlight ESG as one of the most important pillars of green finance because it enables organizations to integrate sustainability considerations into strategic decision-making and operational activities.

Environmental responsibility refers to organizational efforts to minimize environmental impacts through resource efficiency, carbon reduction, and environmental conservation initiatives. Social responsibility focuses on employee welfare, customer satisfaction, community engagement, and ethical business conduct. Governance encompasses transparency, accountability, ethical leadership, and effective oversight mechanisms. Sustainability reporting provides stakeholders with information regarding an organization's environmental, social, and governance performance (Friede et al., 2015; Bhattacharyya, 2022; Fu et al., 2023).

Bhattacharyya (2022) emphasizes that ESG practices have become essential for financial institutions seeking to enhance resilience and manage sustainability-related risks. Organizations that successfully implement ESG strategies are more likely to attract investors, improve stakeholder confidence, and achieve sustainable growth. Furthermore, ESG performance has increasingly become an important criterion for evaluating organizational effectiveness and long-term value creation.
As a result, ESG practices are expected to positively influence both green innovation and organizational performance.

Green Innovation

Green innovation refers to the development and implementation of environmentally sustainable technologies, products, services, and processes. According to Desalegn and Tangl (2022), green innovation plays a critical role in achieving sustainable development because it enables organizations to improve environmental performance while maintaining economic competitiveness.

Bhattacharyya (2022) argues that green finance provides the financial resources required to support innovation activities that promote environmental sustainability and facilitate the transition toward a greener economy. Similarly, Fu et al. (2023) emphasize that green finance plays a crucial role in encouraging sustainable innovation by directing investments toward environmentally responsible projects and technologies. According to Chen (2008), green innovation can be reflected through the adoption of green technologies, the development of eco-friendly financial products, sustainable process innovation, and digital green solutions, all of which enhance organizational efficiency while contributing to environmental sustainability.

Green technology adoption involves implementing environmentally friendly technologies that reduce energy consumption and environmental impacts. Eco-friendly financial products include sustainable investment products, green financing solutions, and environmentally responsible banking services. Sustainable process innovation focuses on improving operational efficiency through environmentally conscious business processes. Digital green solutions involve the application of digital technologies to support sustainability objectives and reduce resource consumption (Chen, 2008; Bhattacharyya, 2022; Fu et al., 2023).

Fu et al. (2023) note that innovation serves as a key mechanism through which green finance generates positive environmental and economic outcomes. Organizations that embrace green innovation are better positioned to achieve sustainability goals, improve operational efficiency, and strengthen competitive advantages. Therefore, green innovation is expected to mediate the relationship between sustainability-oriented financial practices and organizational performance.

Organizational Performance

Organizational performance represents the extent to which an organization achieves its strategic objectives and creates value for stakeholders. Modern approaches to performance measurement recognize both financial and non-financial dimensions of organizational success Kaplan & Norton, 1996; Richard et al., 2009).The present study measures organizational performance using four indicators: financial performance, customer satisfaction, corporate reputation, and sustainability performance. Financial performance reflects profitability, revenue growth, and operational efficiency. Customer satisfaction represents customers' perceptions of service quality and value. Corporate reputation reflects stakeholder trust and confidence in the organization. Sustainability performance measures the organization's success in achieving environmental and social objectives (Kaplan & Norton, 1996; Richard et al., 2009; Friede et al., 2015).

According to Fu et al. (2023), organizations that integrate green finance principles into their operations often achieve superior long-term performance because sustainable practices reduce risks, improve efficiency, and strengthen stakeholder relationships. Similarly, Desalegn and Tangl (2022) found that organizations implementing sustainable finance initiatives experience improvements in both economic and environmental performance. Therefore, organizational performance is expected to be positively influenced by SRI Sukuk, ESG practices, and green innovation.

Relationship Between SRI Sukuk and Green Innovation

Green finance literature suggests that sustainable financing mechanisms provide critical support for innovation activities. Bhattacharyya (2022) argues that green financial instruments facilitate investments in environmentally sustainable technologies and innovative business models. Through renewable energy financing, green project financing, and sustainable investment initiatives, SRI Sukuk provides organizations with resources to develop green technologies and sustainable financial products.

Fu et al. (2023) further explain that sustainable finance promotes innovation by encouraging investments in projects that support environmental sustainability and climate resilience. Consequently, organizations involved in SRI Sukuk activities are more likely to adopt green innovations.

Relationship Between ESG Practices and Green Innovation

ESG practices create organizational incentives for innovation by encouraging companies to improve environmental and social performance. According to Fu et al. (2023), ESG integration promotes strategic decision-making that supports sustainable technologies and innovative solutions.

Organizations with strong ESG commitments often invest in green technologies, sustainable business processes, and environmentally friendly products to meet stakeholder expectations and regulatory requirements. Desalegn and Tangl (2022) also emphasize that

ESG-oriented organizations are more likely to pursue innovation strategies that contribute to long-term sustainability. Therefore, ESG practices are expected to positively influence green innovation.

Green Innovation and Organizational Performance

Green innovation has been widely recognized as an important driver of organizational success. Desalegn and Tangl (2022) argue that organizations implementing green innovations often experience improvements in operational efficiency, customer satisfaction, environmental performance, and competitive advantage.

Similarly, Fu et al. (2023) suggest that innovation enhances the effectiveness of green finance initiatives by transforming sustainability investments into tangible organizational outcomes. Green innovation enables organizations to respond to environmental challenges while improving financial and non-financial performance. Therefore, green innovation is expected to positively influence organizational performance.

Theoretical Framework

This study is underpinned by stakeholder theory and RBV Theory. These theories explain on SRI Sukuk and ESG Practices influence organizational performance through the mediating role of Green Innovation. Stakeholder Theory, developed by Freeman (1984), suggests that organizations create long-term value by meeting the expectations of stakeholders, including customers, investors, employees, regulators, and society. Accordingly, the adoption of SRI Sukuk and ESG practices is expected to enhance stakeholder trust and organizational performance.

The RBV theory, introduced by Barney (1991), argues that sustainable competitive advantage is achieved through valuable organizational resources and capabilities. In this study, green innovation is viewed as a strategic capability that enables Bank Rakyat to transform sustainability initiatives into improved organizational performance. Together, these theories provide a strong foundation for explaining the proposed relationships among SRI sukuk, ESG practices, green innovation, and organizational performance.

Theory Integration in the Study

Theory	Role in the Study	Supported Relationships
Stakeholder Theory (Freeman, 1984)	Explains stakeholder driven sustainability initiatives	SRI Sukuk → Organizational Performance; ESG Practices → Organizational Performance
Resource-Based View Theory (Barney, 1991)	Explains capability development through innovation	SRI Sukuk → Green Innovation; ESG Practices → Green Innovation; Green Innovation → Organizational Performance
Combined Theories	Explain mediation mechanism	SRI Sukuk → Green Innovation → Organizational Performance; ESG Practices → Green Innovation → Organizational Performanc

Research design

This study adopts a quantitative, cross-sectional survey design to examine the relationships among SRI sukuk, ESG practices, green innovation, and organizational performance at Bank Rakyat. A quantitative approach is appropriate for testing the proposed hypotheses and analysing the relationships among the study variables using statistical techniques.

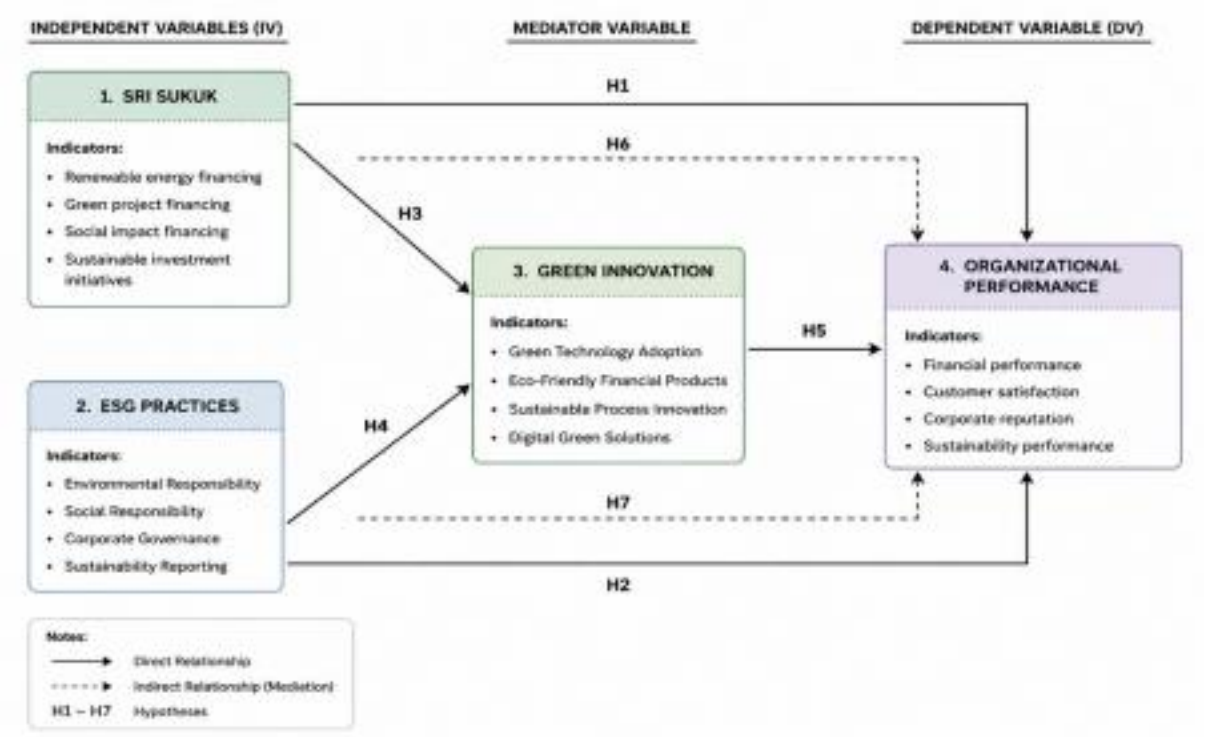

Figure 1: The Conceptual Framework

Conclusion

The study proposes that SRI sukuk and ESG practices positively influence organizational performance. Meanwhile, green innovation is expected to mediate this relationship by transforming sustainability initiatives into improved competitiveness, operational efficiency, and long-term organizational performance.

The growing emphasis on sustainability has transformed financial institutions from solely generating financial returns to creating long-term economic, environmental, and social value. In the Islamic banking sector, SRI sukuk and Environmental, Social, and Governance (ESG) practices are important strategic mechanisms for promoting responsible finance while supporting sustainable development. This conceptual study proposes a comprehensive framework to examine the influence of SRI sukuk and ESG practices on organizational performance, with green innovation serving as a mediating variable in the context of Bank Rakyat.

Drawing on stakeholder theory and the RBV theory, the study suggests that SRI Sukuk and ESG practices can enhance organizational performance, both directly and indirectly, through Green Innovation. By investing in renewable energy financing, sustainable investment initiatives, environmental responsibility, social accountability, and good corporate governance, Bank Rakyat can strengthen stakeholder trust, improve corporate reputation, enhance operational efficiency, and achieve superior financial and sustainability performance. Green Innovation, through the adoption of green technology, eco-friendly financial products, sustainable process improvements, and digital green solutions, represents the strategic capability that transforms sustainability initiatives into long-term organizational value and competitive advantage.
page. 7
The proposed framework contributes to the existing literature by integrating Islamic sustainable finance, ESG practices, green innovation, and organizational performance into a single model. It also addresses the limited research examining these relationships within Islamic financial institutions, particularly Bank Rakyat. From a practical perspective, the study provides valuable guidance for financial institutions, policymakers, and regulators to strengthen sustainable finance initiatives, enhance ESG implementation, and promote innovation-driven organizational performance. The findings further suggest that sustainability should be regarded as a strategic business imperative rather than merely a regulatory or ethical obligation.

As this study is conceptual in nature, future research is recommended to empirically validate the proposed framework using quantitative approaches such as Structural Equation Modelling (SEM) or Partial Least Squares Structural Equation Modelling (PLS-SEM). Future studies may also extend the research by including other Islamic financial institutions, examining additional mediating and moderating variables, employing longitudinal or mixed-method research designs, and investigating the role of emerging technologies such as artificial intelligence, fintech, blockchain, and digital banking in advancing Green Innovation and sustainable finance. Overall, the successful integration of SRI Sukuk, ESG practices, and Green Innovation has the potential to become a strategic pathway for Bank Rakyat and other Islamic financial institutions to achieve sustainable organizational performance, strengthen competitiveness, and contribute to Malaysia's sustainable development agenda.

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SUSTAINABLE FINANCE AND CORPORATE ESG INTEGRATION FOR DECENT WORK AND ECONOMIC GROWTH: THE MEDIATING ROLE OF HUMAN CAPITAL INVESTMENT

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Abstract: *The increasing emphasis on sustainability has transformed the role of finance and corporate governance in promoting inclusive economic development. Sustainable finance and Environmental, Social, and Governance (ESG) integration have emerged as important mechanisms for supporting Sustainable Development Goals (SDG), particularly Sustainable Development Goal 8, which focuses on decent work and economic growth. Despite growing academic attention to sustainable finance and ESG practices, limited studies have explored the pathways through which these initiatives contribute to workforce development and economic outcomes. This study proposes a framework that examines the influence of sustainable finance and corporate ESG integration on decent work and economic growth through human capital investment. Specifically, sustainable finance is represented by social bonds and sustainability loans, while human capital investment encompasses reskilling, upskilling and Technical and Vocational Education and Training (TVET) programmes. Portraying upon Human Capital Theory, this study argues that sustainable finance and ESG integration facilitate workforce development, which subsequently enhances productivity, employability and sustainable economic growth. The study also contributes to the literature by integrating sustainable finance, ESG practices and human capital development into a unified framework for achieving higher productivity and economic growth.*

Keywords: *Sustainable Finance, ESG Integration, Human Capital Investment, Decent Work and Economic Growth, SDG 8*

Introduction

Sustainable development has become a central priority for governments, businesses, and financial institutions worldwide (Dhaigude et al., 2025). The growing awareness of environmental challenges, social inequalities, and economic uncertainties has led stakeholders to seek innovative approaches that balance economic growth with social and environmental responsibility. In response, sustainable finance and Environmental, Social, and Governance (ESG) integration have emerged as critical mechanisms for advancing sustainable development objectives. Sustainable finance refers to financial activities that incorporate environmental, social, and governance considerations into investment and financing decisions. Financial instruments such as social bonds and sustainability loans have gained prominence as tools for mobilizing capital toward projects that generate positive social and economic outcomes (European Parliamentary Research Service, 2024).

At the same time, corporations increasingly integrate ESG principles into their strategic and operational decisions to improve long-term sustainability and stakeholder value. The relevance of sustainable finance and ESG practices is closely linked to the achievement of the Sustainable Development Goals (SDGs), particularly SDG 8, which promotes sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all (United Nations, 2015). While previous studies have largely focused on the environmental and financial implications of sustainable finance and ESG adoption, limited attention has been given to their role in developing human capital as a pathway toward achieving decent work and economic growth (Abdalla et al., 2026; Jorgji et al., 2024). Human capital investment, including reskilling, upskilling and vocational education programmes plays a critical role in enhancing workforce productivity and employability (Hasan et al., 2024). As economies undergo rapid technological transformation, organizations must continuously invest in workforce development to address skill gaps and maintain competitiveness.

Consequently, understanding how sustainable finance and ESG integration contribute to human capital investment can provide valuable insights into achieving sustainable economic development. While previous studies have laid the groundwork, there remains a critical need to formalize these relationships into a cohesive academic inquiry (Kurniawan et al., 2025; Wijayanti et al., 2026). To address this gap, this study proposes a conceptual framework that links sustainable finance and corporate ESG integration with decent work and economic growth through the mediating role of human capital investment. By mapping this mechanism, this study aims to provide a theoretical explanation on green capital and corporate sustainability strategies translate into workforce development, aggregate productivity, and the ultimate achievement of SDG 8.

Literature Review

Sustainable Finance

Sustainable finance encompasses financial activities that integrate environmental, social, and governance considerations into investment and lending decisions (European Parliamentary Research Service, 2024). It aims to support projects and initiatives that generate long-term sustainable outcomes while maintaining economic capability. In recent years, sustainable finance has evolved beyond environmental concerns to include social and developmental objectives. Among the most widely adopted sustainable finance instruments are social bonds and sustainability loans (Machado et al., 2025; Mishra et al., 2023). Social bonds are debt instruments designed to finance projects that address social challenges such as

education, healthcare, employment generation and community development (International Finance Corporation, 2024).

Sustainability loans, on the other hand, provide financing to organizations that demonstrate measurable sustainability performance and commitment to ESG objectives. The increasing adoption of these instruments reflects the growing recognition that financial capital can serve as a catalyst for social development. By directing funds toward workforce development initiatives, sustainable finance can contribute significantly to improving labour market outcomes and economic productivity (Finch & Dowse, 2023).

Corporate ESG Integration

ESG integration refers to the incorporation of environmental, social, and governance considerations into organizational strategies, operations, and decision-making processes (Seow et al., 2025). The concept has gained considerable importance as stakeholders increasingly expect corporations to demonstrate responsible business conduct and sustainable value creation. The social dimension of ESG is particularly relevant to workforce development. Organizations that prioritize ESG integration often invest in employee well-being, diversity and inclusion, workplace safety and professional development (Podungge & Monoarfa, 2025).

Such investments reflect a commitment to building a resilient and skilled workforce capable of adapting to changing economic conditions. Corporate ESG integration also encourages organizations to establish workforce-related key performance indicators and report their progress transparently (Khamisu & Paluri, 2024). As a result, ESG-oriented organizations are more likely to allocate resources toward training, reskilling and employee development initiatives that enhance human capital.

Human Capital Investment

Human Capital Theory that introduces by Becker (1964), suggests that investments in education, training and skills development enhance individual productivity and contribute to economic growth. Human capital represents the knowledge, competencies and capabilities that individuals acquire through learning and experience. In the contemporary economy, human capital investment extends beyond traditional education to include reskilling, upskilling and Technical and Vocational Education and Training (TVET) programmes (Festus et al., 2025; Paramasivam et al., 2025).

Reskilling involves training individuals to acquire new competencies for different job roles, while upskilling focuses on enhancing existing skills to meet evolving workplace demands. TVET programmes provide practical and technical training aligned with industry requirements. The integration of ESG principles is increasingly operationalized through Human Resource Analytics (HRA) and digital transformation (Putriani et al., 2025).

Enterprises utilizing data-driven HR practices achieve higher workforce productivity, lower turnover and stronger ESG performance directly supporting SDG 8 objectives. Furthermore, the transition from voluntary ESG initiatives to mandatory reporting frameworks demands rigorous, measurable metrics for human capital investments (Putriani et al., 2025). These forms of human capital investment are increasingly important in addressing technological disruption, automation and labour market transformation. Organizations and governments that invest in workforce development are better positioned to improve

productivity, reduce skill mismatches and lastly enhance employability (Kholifah et al., 2025; Sundaram, 2025).

Decent Work and Economic Growth

Decent work and economic growth constitute the focus of SDG 8. The goal emphasizes productive employment, fair income, workplace security, equal opportunities and sustainable economic growth (United Nations, 2015; Sagandykova & Tayauova, 2026). Achieving SDG 8 requires a workforce equipped with relevant skills and competencies to participate effectively in the labour market. Human capital development plays a fundamental role in promoting decent work and economic growth.

A skilled workforce contributes to higher productivity, innovation and competitiveness thereby supporting economic expansion. Furthermore, investments in training and education improve employment opportunities and facilitate labour market mobility. Consequently, workforce development serves as a critical mechanism through which sustainable finance and ESG initiatives can generate broader economic and social benefits (Sagandykova & Tayauova, 2026).

Development of Conceptual Framework

The proposed framework suggests that sustainable finance and corporate ESG integration influence human capital investment, which subsequently contributes to decent work and economic growth.

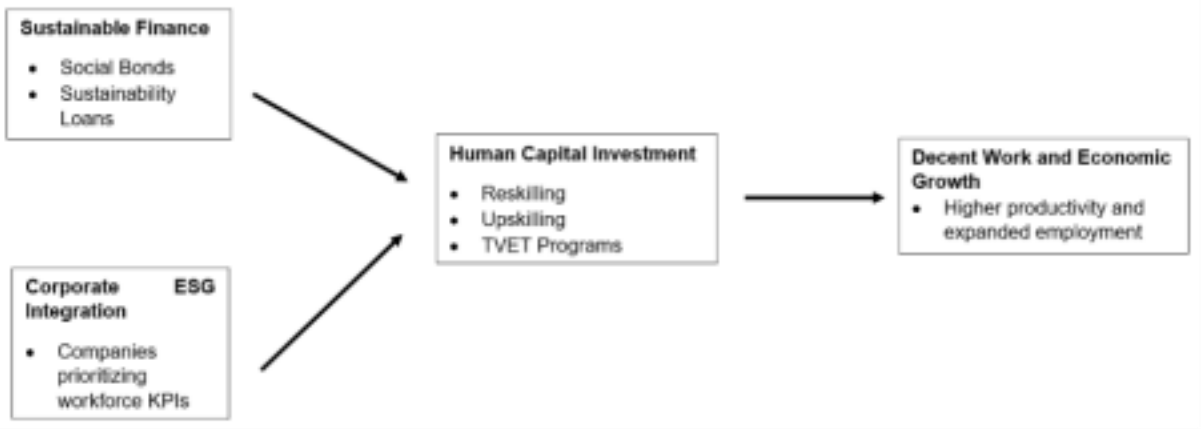

Figure 1: Conceptual Framework

Figure 1 illustrates the proposed relationships among the study variables. Sustainable finance and corporate ESG integration are proposed as antecedents of human capital investment, while human capital investment functions as the mediating mechanism linking sustainability initiatives with decent work and economic growth (SDG 8).

Sustainable Finance and Human Capital Investment

Sustainable Finance provides organizations with access to capital that can be allocated toward workforce development initiatives. Social bonds and sustainability loans can finance educational programmes, vocational training, employee development initiatives and workforce inclusion projects. These investments enhance employees' capabilities and support organizational competitiveness (World Bank, 2025).

Proposition 1: Sustainable finance positively influences human capital investment (Sun et al., 2025).

Corporate ESG Integration and Human Capital Investment

Organizations that integrate ESG principles recognize employees as critical stakeholders and strategic assets. Consequently, ESG-oriented organizations are more likely to invest in reskilling, upskilling and professional development programmes to improve workforce performance and sustainability (Jorgji et al., 2024).

Proposition 2: Corporate ESG integration positively influences human capital investment (Jorgji et al., 2024).

Human Capital Investment and Decent Work and Economic Growth

Human capital investment improves workforce productivity, employability and adaptability. Employees who possess relevant skills are more likely to secure quality employment and contribute effectively to organizational performance. At the macroeconomic level, these improvements support sustainable economic growth and labour market resilience (Užule et al., 2024).

Proposition 3: Human capital investment positively influences decent work and economic growth (Sagandykova & Tayauova, 2026; Putriani et al., 2025).

Mediating Role of Human Capital Investment

The framework further proposes that human capital investment serves as a mediating mechanism linking sustainable finance and ESG integration to SDG 8 outcomes. Sustainable finance provides financial resources, while ESG integration creates organizational commitment toward workforce development. These factors stimulate investments in human capital, which subsequently generate improvements in employment quality and economic productivity (Kushwaha et al., 2026).

Proposition 4: Human capital investment mediates the relationship between sustainable finance and decent work and economic growth.

Proposition 5: Human capital investment mediates the relationship between corporate ESG integration and decent work and economic growth.

Discussion

The proposed framework contributes to the growing body of literature on sustainable finance and ESG by positioning human capital development as a critical macroeconomic bridge while emphasizing its strategic importance at the firm level. While previous studies have primarily examined isolated financial performance and environmental outcomes, this framework highlights workforce development as the primary transmission mechanism through which sustainability initiatives create both social and aggregate economic value. By anchoring this model in Becker's (1964) Human Capital Theory, the framework demonstrates that investments in employee skills and competencies are not merely operational expenses but vital economic investments that generate long-term productivity dividends for organizations and national economies.

From an economic perspective, the framework illustrates a more efficient allocation of capital. Sustainable finance instruments such as social bonds and sustainability loans, provide

the necessary financial resources and effectively lower the cost of capital for firms that commit to workforce development (de Mariz, 2024; Flammer, 2021). Simultaneously, rigorous ESG integration supported by transparent human capital disclosures and data-driven HR analytics (Jorgji et al., 2024) ensures these funds are deployed efficiently and encourages organizations to prioritize workforce development as part of their core sustainability strategy. This market mechanism incentivizes organizations to address structural labour market frictions, utilizing reskilling and TVET programmes to transition workers smoothly through periods of technological disruption.

Furthermore, the framework offers vital practical insights for policymakers and corporate leaders striving to achieve SDG 8, decent work and economic growth. By fostering a regulatory environment that promotes sustainable finance instruments tied to workforce KPIs, governments can induce a multiplier effect (Fauzi & Zahrolazizah, 2025; United Nations Inter Agency Task Force on Financing for Development, 2024). Corporate investments in education and workforce development aggregate into broader macroeconomic benefits, including enhanced labour market resilience, higher aggregate productivity, economic competitiveness and corporate transparency (Sagandykova & Tayauova, 2026). Similarly, corporations can leverage these ESG strategies to foster continuous learning and workforce adaptability. Ultimately, aligning corporate ESG strategies with human capital investment ensures that the financial sector actively mitigates structural unemployment while driving sustained and inclusive economic growth.

Conclusion

This study proposes a framework linking sustainable finance and corporate ESG integration to decent work and economic growth through human capital investment. Based on Human Capital Theory, this study argues that social bonds and sustainability loans provide financial resources for workforce development, while ESG integration encourages organizations to prioritize employee learning and development. Human capital investment, represented by reskilling, upskilling, and TVET programmes, serves as the key mechanism through which these sustainability initiatives contribute to improved employment outcomes and economic productivity.

The framework advances the literature by integrating sustainable finance, ESG practices, and human capital development into a unified explanation of how organizations can contribute to SDG 8, decent work and economic growth. Future research should empirically test the proposed relationships using quantitative methods such as structural equation modelling, panel data analysis, or predictive algorithms (Putriani et al., 2025). Such investigations would provide valuable evidence regarding the effectiveness of sustainable finance and ESG integration in promoting workforce development and sustainable economic growth.

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GREEN FINANCE ACCESSIBILITY AND AWARENESS TOWARD SUSTAINABLE OPERATIONAL PERFORMANCE: THE MEDIATING ROLE OF GREEN OPERATIONS PRACTICES

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Abstract: *This study examines how two green finance dimensions, namely accessibility and awareness, may influence sustainable operational performance through the mediating role of green operations practices. Although green finance has become an important mechanism for supporting low-carbon and sustainability-oriented business transformation, firms may not obtain real operational benefits when financing is difficult to access or poorly understood. Guided by the resource-based view and the natural-resource-based view, this study argues that green finance dimensions represent enabling resources, while green operations practices represent operational capabilities that convert financial support into sustainable performance outcomes. The study develops a conceptual framework and five propositions to explain the direct relationships between green finance dimensions and green operations practices, the relationship between green operations practices and sustainable operational performance, and the mediating role of green operations practices. The study contributes to operations management literature by explaining that green finance should not be treated only as a financial instrument, but also as an operational enabler that supports cleaner production, energy efficiency, waste reduction, green procurement, green logistics and carbon reduction. Practical implications are offered for managers, financial institutions and policymakers seeking to connect green financing schemes with real operational transformation.*

Keywords: *green finance accessibility; green finance awareness; green operations practices; sustainable operational performance; operations management*

Introduction

Sustainability is an important strategic consideration in modern operations management, as companies are now responsible for reducing emissions and waste, and for using resources responsibly, and adopting energy efficiency. Expectations for these are no longer limited to large companies, but extend to small and medium businesses, manufacturers, service providers and supply chain partners, all of whom must undergo sustainability transformation. There are, however, many improvements to the environment that do need capital investment. Firms may find it difficult to invest due to the costs involved and the timeframe required to see a return on the investment for cleaner production systems, energy-efficient equipment, digital monitoring tools, installation of renewable energy and green logistics systems and sustainable procurement programmes (El Mokadem & Khalaf, 2024; Hsu et al., 2023; Yu & Ramanathan, 2015).

The pressure on companies to show responsible and sustainable business practices has been further intensified by environmental, social and governance (ESG) factors. In addition to keeping sustainability targets and commitments public, companies must now make actual improvements to their operations to meet expectations raised by regulators, investors, customers and supply chain partners (Gao et al., 2024; Gillan et al., 2021; Han et al., 2024). In this context, sustainable operational performance becomes important as it measures how firms translate ESG related expectations into practical operational outcome, which includes reducing energy usage, waste, carbon, resources, and improving environmental compliance (Gao et al., 2024; Yu & Ramanathan, 2015).

Green finance has thus emerged as a key tool for sustainable transformation, and research interest in this field has increased significantly in the last decade (Zhang et al., 2019). Green finance includes green loans, green credit, green bonds, sustainability-linked financing, public incentives and other financial instruments that direct capital towards environmentally responsible activities. Studies have demonstrated that green finance can reduce financing constraints and motivate companies to enhance their environmental, social and governance (ESG) efforts (Gao et al., 2024; Gao & Liu, 2023; Han et al., 2024). Green bonds can also offer a viable financing pathway for environmental initiatives and can help companies meet their sustainability goals (Flammer, 2021). However, financial resources are not enough to achieve sustainable operational results.

This study proposes that green finance should be interpreted in two key aspects, which are accessibility and awareness. Accessibility refers to the ability of firms to acquire green financial resources through suitable financing channels, reasonable conditions and available financial instruments (Gao et al., 2024; Kumar et al., 2022). Awareness is defined as managers' knowledge of available green finance schemes, eligibility criteria, documentation procedures and sustainability criteria (Molina-García et al., 2025). These two dimensions are significant because firms may be unable to use green finance effectively if financing channels are restricted or if managers are not knowledgeable about green finance opportunities.

Operations management provides the practical pathway through which green finance becomes meaningful. Financial resources have to be applied to operational areas like energy efficiency, cleaner production, waste reduction, green procurement, green logistics, recycling, water conservation or carbon reduction. These are referred to as green operations practices. Previous research indicates that green operations and green supply chain practices can positively contribute to the environmental, operational and sustainability performance (El Mokadem & Khalaf, 2024; Hsu et al., 2023; Yu & Ramanathan, 2015; Yildiz Cankaya &

Sezen, 2019). Therefore, this study suggests the mediation effect of green operations practices between the dimensions of green finance and sustainable operational performance.

Problem Statement

The main problem addressed in this study is the gap between green finance availability and actual operational implementation. Many studies discuss green finance from the perspective of financial markets, green credit policy, green bonds, ESG outcomes, green innovation or corporate sustainability performance (Flammer, 2021; Gao & Liu, 2023; Han et al., 2024; Zhang et al., 2019). However, less attention has been given to the operational pathway through which green finance is translated into green operations practices inside the firm (Gao et al., 2024; Hsu et al., 2023; Yu & Ramanathan, 2015). This creates an important gap for operations management research because sustainable performance is achieved not only by obtaining finance, but by using finance to change operational processes.

In practice, firms may face two related challenges. First, green finance accessibility may be limited because not all firms have the same ability to obtain green loans, green credit, sustainability-linked financing or government incentives (Gao et al., 2024; Kumar et al., 2022). Accessibility may also be affected by financing constraints such as collateral requirements, documentation burden and repayment terms (Gao et al., 2024). Second, green finance awareness may be low because managers may not understand the available schemes, eligibility criteria, ESG requirements or environmental data needed to apply for green finance (Kumar et al., 2022; Molina-García et al., 2025). These challenges are particularly important for SMEs, which often have fewer resources, weaker sustainability systems and limited technical expertise (Kumar et al., 2022; Molina-García et al., 2025).

Previous literature supports the need to examine these issues. Gao et al. (2024) showed that green finance policies influence corporate ESG performance through supply chain-related mechanisms, suggesting that the impact of green finance is connected to internal and external operational processes. Kumar et al. (2022) highlighted the importance of fostering green finance for SMEs, while Molina-García et al. (2025) showed that financial literacy can support environmental sustainability through process innovation. These studies suggest that finance, knowledge and operational capability must work together to produce sustainability outcomes (Gao et al., 2024; Hsu et al., 2023; Kumar et al., 2022; Molina-García et al., 2025). However, the conceptual relationship among green finance accessibility, awareness, green operations practices and sustainable operational performance remains underdeveloped. Based on this gap, this study addresses how green finance accessibility and awareness contribute to sustainable operational performance through green operations practices.

Main Objective

The main objective of this study is to develop a conceptual framework that explains green operations practices as the mediating mechanism between green finance dimensions and sustainable operational performance. The sub objectives are follows:

i) To explain the relationship between green finance accessibility and green operations practices.
ii) To explain the relationship between green finance awareness and green operations practices.
iii) To explain the relationship between green operations practices and sustainable operational performance.

iv) To conceptualise the mediating role of green operations practices in the relationship between green finance accessibility and sustainable operational performance.
v) To conceptualise the mediating role of green operations practices in the relationship between green finance awareness and sustainable operational performance.

Literature Review

Green Finance Accessibility

Green finance accessibility refers to the ability of firms to obtain financial resources that support environmental and sustainability-oriented projects. This includes access to green loans, green credit, green bonds, sustainability-linked financing, grants, tax incentives and other financing schemes. Accessibility is important because firms cannot implement sustainability transformation when suitable funding is unavailable or difficult to obtain (Gao et al., 2024; Kumar et al., 2022). Green finance accessibility is therefore an enabling condition that allows firms to invest in cleaner technology, renewable energy, environmental monitoring systems and low-carbon logistics (Kumar et al., 2022; Flammer, 2021).

Recent studies show that green finance can support corporate sustainability outcomes. Gao and Liu (2023) found that green credit improves corporate ESG performance, while Han et al. (2024) reported that green credit policies can encourage ESG improvement. Gao et al. (2024) further demonstrated that green finance policies affect ESG performance through supply chain finance, supply chain transparency and internal supply chain efficiency. These findings support the view that access to green finance can influence sustainability behaviour, but the actual impact depends on how firms use the financial resource in their operations.

Green Finance Awareness

Green finance awareness refers to the firm's knowledge and understanding of green finance opportunities, eligibility criteria, application procedures and sustainability documentation (Kumar et al., 2022; Molina-García et al., 2025). A firm may have potential access to green finance but may not benefit from it if managers are unaware of available schemes or do not understand how to prepare environmental data and sustainability proposals (Kumar et al., 2022). Awareness is closely related to financial literacy, managerial capability and sustainability knowledge because financially literate managers are better able to identify sustainable investment opportunities, interpret environmental information and support environmental sustainability practices (Molina-García et al., 2025).

Molina-Garcia et al. (2025) found that financial literacy is an important driver of environmental sustainability among SMEs and that process innovation explains how financial literacy contributes to environmental outcomes. This evidence supports the argument that knowledge related capability can influence whether firms are able to convert financial resources into operational sustainability initiatives. Green finance awareness is therefore important because it helps managers identify suitable financing instruments and align them with operational improvement projects.

Green Operations Practices

Green operations practices refer to operational actions that reduce the environmental impact of business processes while improving efficiency and resource utilisation (Hsu et al., 2023; Yu & Ramanathan, 2015). These practices include energy efficiency, cleaner production,

waste reduction, recycling, water conservation, green procurement, eco-design, green logistics, carbon reduction and supplier environmental collaboration (El Mokadem & Khalaf, 2024; Yildiz Cankaya & Sezen, 2019). In operations management, these practices are important because they directly influence how inputs are transformed into outputs and how firms achieve environmental and operational performance improvement (Hsu et al., 2023; Yu et al., 2014).

The literature provides strong support for green operations practices as performance-enhancing capabilities. Yu and Ramanathan (2015) found that stakeholder pressures encourage green operations practices and improve environmental performance. Hsu et al. (2023) showed that green operations practices contribute to firm performance, while Yildiz Cankaya and Sezen (2019) demonstrated that green supply chain management practices are related to sustainability performance. More recently, El Mokadem and Khalaf (2024) found that green supply chain management builds environmental, social and operational performance, a finding echoed by Khan et al. (2024) in their study of construction organizations. These studies indicate that green operations practices can serve as the operational mechanism that transforms green finance into sustainable outcomes.

Sustainable Operational Performance.

Sustainable operational performance refers to the ability of a firm to achieve efficient operational outcomes while reducing negative environmental impact (El Mokadem & Khalaf, 2024; Yu et al., 2014). It includes lower energy consumption, reduced waste, lower emissions, improved process efficiency, better resource utilisation, cost savings, stronger compliance and improved supply chain reliability (Green et al., 2012; Hsu et al., 2023; Yildiz Cankaya & Sezen, 2019). Unlike general financial performance, sustainable operational performance focuses on the quality and sustainability of operational processes, where firms seek to improve efficiency while reducing environmental harm (El Mokadem & Khalaf, 2024; Khan et al., 2024; Zhu et al., 2012).

Green operations and green supply chain studies show that sustainability practices can generate both environmental and operational benefits. Yu et al. (2014) found that integrated green supply chain management is related to operational performance, while Green et al. (2012) argued that green supply chain management practices improve competitiveness and environmental outcomes. Zhu et al. (2012) also showed that green supply chain practices produce performance improvement through internal and external greening. Therefore, sustainable operational performance can be viewed as the outcome of effective green operational capability.

Theoretical Underpinning

This study is mainly supported by the resource-based view (RBV) and the natural-resource based view (NRBV). The RBV explains that firms can achieve superior performance when they possess valuable, rare, inimitable and non-substitutable resources and capabilities (Barney, 1991). In this study, green finance accessibility and awareness are treated as enabling resources because they provide firms with the financial capacity and knowledge needed to support green operational transformation.

The NRBV extends the RBV by placing the natural environment at the centre of strategic management. Hart (1995) argued that pollution prevention, product stewardship and sustainable development can become sources of competitive advantage. Hart and Dowell (2011) further explained that environmental capabilities remain strategically important

as firms respond to sustainability challenges. Based on the NRBV, green operations practices can be viewed as environmental-operational capabilities that help firms reduce environmental impact while improving operational performance.

Together, RBV and NRBV provide a strong theoretical foundation for the proposed framework. Green finance accessibility and awareness are important resources, but resources alone do not automatically create performance outcomes. Firms must deploy these resources through capabilities. Green operations practices represent the capability that converts green finance dimensions into sustainable operational performance. This resource-capability performance logic justifies the mediating role of green operations practices.

Proposed Conceptual Framework and Propositions

The proposed conceptual framework consists of two independent variables, one mediating variable and one dependent variable. The independent variables are green finance accessibility and green finance awareness. Green operations practices are proposed as the mediating variable, while sustainable operational performance is the dependent variable. The framework argues that each green finance dimension positively influences green operations practices, which then improve sustainable operational performance.

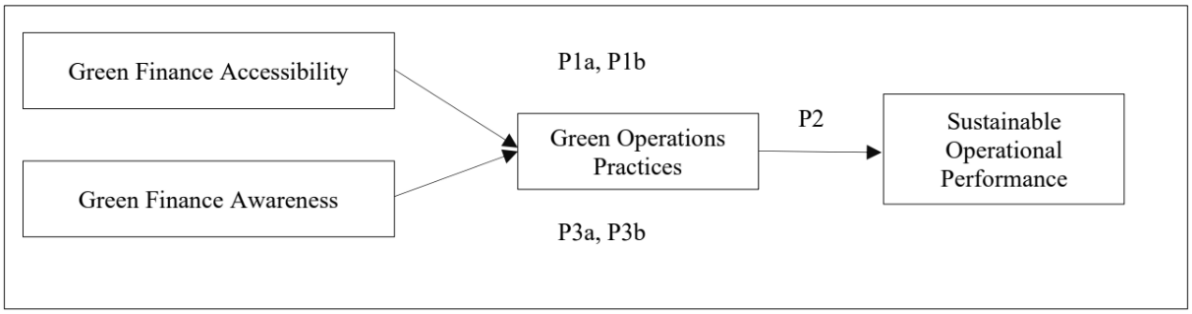

Figure 1: Proposed Conceptual Framework

Table 1: Summary of Constructs in the Conceptual Framework

Construct	Role	Meaning	Examples of Indicators
Green Finance Accessibility	Independent variable 1	Ability to obtain green finance for sustainability projects.	Green loans; green credit; green bonds; incentives; grants.
Green Finance Awareness	Independent variable 2	Knowledge of green finance schemes and application requirements.	Scheme awareness; ESG criteria; documentation readiness; financial literacy.
Green Operations Practices	Mediating variable	Operational actions that translate green finance into sustainability improvements.	Energy efficiency; cleaner production; green procurement; green logistics; waste reduction.
Sustainable Operational Performance	Dependent variable	Operational outcomes achieved in an efficient and environmentally responsible way.	Lower emissions; lower energy use; cost savings; process efficiency; compliance.

Proposition 1a: Green finance accessibility positively influences green operations practices. Firms with better access to green finance are more likely to invest in energy-efficient machinery, cleaner technology, waste management systems and green logistics. This is consistent with studies showing that green finance reduces financial constraints and encourages sustainability-related initiatives (Gao et al., 2024; Gao & Liu, 2023).

Proposition 1b: Green finance awareness positively influences green operations practices. Firms that understand green finance schemes, sustainability criteria and application requirements are better able to match financial opportunities with operational improvement projects. This is aligned with evidence that financial literacy supports environmental sustainability through process innovation (Molina-Garcia et al., 2025).

Proposition 2: Green operations practices positively influence sustainable operational performance. Firms that implement green procurement, energy efficiency, cleaner production and waste reduction are more likely to reduce emissions, lower operating costs, improve efficiency and strengthen environmental compliance (El Mokadem & Khalaf, 2024; Hsu et al., 2023; Yu & Ramanathan, 2015).

Proposition 3a: Green operations practices mediate the relationship between green finance accessibility and sustainable operational performance.

Proposition 3b: Green operations practices mediate the relationship between green finance awareness and sustainable operational performance.

6

Discussion and Implications

The proposed framework contributes to the literature by connecting green finance and operations management more directly. Green finance literature often focuses on financial instruments, policy effects, ESG performance and green innovation. Operations management literature often focuses on process improvement, green supply chain management and sustainability performance. This study integrates both areas by explaining that green finance dimensions become meaningful when they are translated into green operations practices.

For future research, the proposed framework can be tested empirically using survey data from manufacturing firms, service firms or SMEs. Researchers may examine whether the strength of the relationships differs across industries, firm sizes or countries. Future studies may also add moderating variables such as top management commitment, regulatory pressure

or digital ESG capability. However, the current framework intentionally remains focused on the mediating role of green operations practices to maintain conceptual clarity.

Conclusion

This study proposed a framework linking green finance accessibility, green finance awareness, green operations practices and sustainable operational performance. The main argument is that green finance can support sustainable operational performance, but the relationship is not automatic. Firms must be able to access green finance and understand how to apply it before they can translate it into green operations practices.

Guided by the RBV and NRBV, the study argues that green finance dimensions are enabling resources, while green operations practices are environmental-operational capabilities. Sustainable operational performance is achieved when firms convert green finance into real operational improvements such as energy efficiency, cleaner production, waste reduction, green procurement, green logistics and carbon reduction.

Overall, the study contributes to operations management by showing that the success of green finance depends not only on the availability of financial products, but also on awareness and operational implementation. The proposed framework offers a foundation for future empirical research and provides practical guidance for managers, policymakers and financial institutions seeking to strengthen sustainability through operational transformation.

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DECODING THE GREEN TRILEMMA IN CONSUMER CREDIT: HOW RETAIL BANK ESG PERFORMANCE MITIGATES HOUSEHOLD MORTGAGE DEFAULT RISKS AMID ACCELERATING CLIMATE AND INTEREST RATE SHOCKS

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Abstract: *This study investigates the interplay between retail banks' Environmental, Social, and Governance (ESG) performance, localized climate shocks, and residential mortgage credit risk. The "Green Trilemma" in consumer credit highlights the conflict banks face between expanding credit access (Social), maintaining financial stability (Governance), and managing climate exposure (Environmental). By introducing a dual-shock framework, this study evaluates both acute physical climate shocks and sudden monetary tightening specifically interest rate shocks on adjustable-rate mortgages (ARMs) as primary catalysts for household financial distress. Using a proposed panel dataset of retail bank mortgage portfolios matched with high-resolution geospatial climate risk data and macro-financial interest rate indices, this study examines whether high-ESG retail banks experience lower mortgage default rates when households face these compounded stressors. This study hypothesizes that superior bank ESG performance mitigates consumer default through two channels: first, pre-emptive screening (the "Green Underwriting" effect), and second, proactive post-shock borrower relief (the "Social Nudge" effect). The expected findings should provide micro-level empirical evidence on how integrating ESG into retail credit frameworks acts as a universal risk-mitigation mechanism against both physical and macroeconomic shocks, supporting multiple Sustainable Development Goals; SDG 1 (No Poverty), SDG 11 (Sustainable Cities), and SDG 13 (Climate Action).*

Keywords: *Green Trilemma, Household Mortgage Default Rates, Physical Climate Shocks, Interest Rate Shocks, ESG*

Introduction and Background of Study

Residential mortgages represent the most significant asset class on the balance sheets of global retail banks, characterized by extended amortization schedules that routinely span up to three decades (Basel Committee on Banking Supervision [BCBS], 2021). Consequently, these prolonged maturity profiles generate a structural duration mismatch that deeply exposes mortgage portfolios to the accelerating frequency of acute physical climate shocks, such as severe flooding, cyclonic activity, and wildfires, as well as the insidious financial drain of chronic climate risks, including the escalating energy burdens associated with thermally inefficient residential collateral (Bolton et al., 2020). Simultaneously, these portfolios face acute macro-financial vulnerabilities, most notably the threat of sudden interest rate shocks on adjustable-rate mortgages (ARMs), which immediately strain household debt-servicing capacity.

As climate-induced collateral degradation and monetary tightening threaten to inflate loan-to value (LTV) ratios and constrain household liquidity, financial institutions are increasingly caught in what can be conceptualized as the "Green Trilemma" of consumer credit. This multidimensional conflict requires banking institutions to simultaneously manage three competing strategic vectors.

This multidimensional conflict requires banking institutions to simultaneously manage three competing strategic vectors. First, from an Environmental (*E*) perspective, banks face mounting regulatory and market pressures to incentivize energy-efficient housing transitions while systematically mitigating exposure to high-risk geographies, a practice increasingly termed "climate redlining" (Kling et al., 2021). Second, navigating the Social (*S*) dimension necessitates avoiding exclusionary lending practices; specifically, institutions must mitigate the systemic risk of "climate gentrification," a phenomenon wherein capital flight from ecologically vulnerable geographies systematically locks low-income and marginalized demographics out of safer, resilient housing markets (Keenan et al., 2018). Finally, the Governance and economic (*G*) mandate require institutions to strictly safeguard prudential capital buffers, satisfy fiduciary duties, and minimize the accumulation of non-performing loans (NPLs) amidst rising physical risks (Campiglio et al., 2018). Against this complex theoretical backdrop, this study explores the hypothesis that a retail bank's endogenous ESG framework functions not merely as a normative reporting mechanism, but as a robust operational buffer that directly mitigates household credit vulnerability and structural default risk when acute physical climate shocks materialize.

Literature Review

Physical Climate Shocks and Mortgage Portfolio Vulnerability

The intersection of climate science and financial economics has increasingly highlighted the vulnerability of real estate markets to physical climate risks. Real estate collateral anchors the retail banking system, yet it is inherently immobile and structurally exposed to accelerating weather anomalies such as cyclonic storms, extreme flooding, and wildfires. Giglio et al. (2021) systematically document how localized physical climate shocks trigger abrupt downward revisions in property valuations, effectively destroying household wealth and eroding the collateral base that secures residential mortgages. When acute climate events occur, households simultaneously experience asset depreciation and severe liquidity constraints due to localized economic paralysis, out-of-pocket repair costs, and rising insurance premiums (Boustan et al., 2020). Consequently, this dual shock impairs a borrower's debt-servicing capacity, driving up both loan-to-value (LTV) and debt-to-income (DTI) ratios.

Nguyen et al. (2022) provide empirical evidence that banks inherently recognize this risk, often preemptively increasing the cost of mortgage credit in geographies historically prone to severe weather. However, when unanticipated physical shocks materialize, the subsequent wave of household insolvency presents a direct transmission channel for systemic risk, manifesting as sudden spikes in non-performing loans (NPLs) on bank balance sheets (Ouazad & Kahn, 2022).

Monetary Shocks and ARM Vulnerability

Parallel to the structural risks posed by physical climate anomalies, household mortgage portfolios are acutely sensitive to monetary policy frictions, most notably rapid interest rate hikes. Mortgages act as a primary transmission mechanism for translating nominal monetary shocks into real economic distress, largely because they convert inflation shocks directly into shocks against real disposable income (Garriga et al., 2015). For borrowers holding adjustable rate mortgages (ARMs), sudden upward revisions in central bank baseline rates directly and immediately translate into skyrocketing monthly payment obligations. This creates a potent "cash-flow channel" effect, wherein the sharply increased debt-servicing costs reduce households' disposable income, forcing them to constrict consumption or face delinquency if they lack access to external financial buffers (Flodén et al., 2020).

This dynamic creates a severe, macro-financial liquidity squeeze that inflates a borrower's debt to-income (DTI) ratio, a distress mechanism that occurs entirely independent of localized physical property damage. The macroeconomic impact of this liquidity squeeze is highly heterogeneous; markets with a higher concentration of ARMs and high homeownership rates interact to significantly amplify the economic drag of monetary tightening, as a massive fraction of borrowers faces synchronized payment shocks (Pica, 2021). Furthermore, consumer responses to these rate resets are notably asymmetric. While rate declines generally prompt borrowers to deleverage and increase durable spending, upward rate resets do not trigger equivalent reductions in spending, leaving borrowers uniquely exposed to simultaneous delinquencies on both their mortgages and revolving debt (Kartashova & Zhou, 2025). Consequently, while an increasing share of ARMs might temporarily boost lenders' interest income during a tightening cycle, it paradoxically elevates the underlying portfolio credit risk and can ultimately weaken long-term monetary policy transmission if borrower defaults surge (Altunok et al., 2024).

When viewed through a dual-shock framework, this monetary tightening acts as a primary catalyst for household financial distress, compounding the vulnerabilities already generated by climate-induced collateral degradation. As these sudden ARM payment shocks constrain household liquidity, they pose a systemic threat to the stability of residential mortgage portfolios. Consequently, without the deployment of flexible, stakeholder-centric forbearance mechanisms such as the proactive liquidity relief prioritized by high-ESG banks functioning under the Social (S) pillar distressed but fundamentally solvent households risk transitioning from temporary rate-induced liquidity crises into permanent default.

The Green Trilemma: Balancing Climate Risk and Social Equity

As financial institutions attempt to navigate the accelerating reality of climate-induced credit risk, they inevitably confront what the literature frames as the structural "trilemma" of sustainable retail lending. From an environmental and prudential governance perspective, banks are incentivized to aggressively decarbonize their portfolios and shed exposure to high risk flood zones or wildfire-prone regions. However, this risk-avoidance strategy frequently conflicts with the social pillar of sustainable finance. Keenan et al. (2018)

identify the phenomenon of "climate gentrification," wherein the reallocation of capital away from ecologically vulnerable areas systematically locks low-income and minority households into depreciating, high-risk housing markets. Consequently, retail banks face a complex optimization problem: they must insulate their governance structures and capital buffers against physical climate risks (*G* and *E*) without engaging in exclusionary lending practices that generate severe negative social externalities (*S*).

Institutional ESG Performance as a Risk-Mitigating Buffer

To resolve these competing pressures, recent corporate finance literature suggests that superior ESG frameworks can function as an endogenous shock absorber during periods of systemic distress. Broadstock et al. (2021) demonstrate that high-ESG institutions exhibit greater financial resilience during macroeconomic shocks, as their pre-existing sustainability protocols act as operational hedges against uncertainty. In the context of retail lending, the Environmental (*E*) pillar facilitates proactive risk mitigation. Banks with high *E* scores are more likely to have integrated forward-looking climate risk models into their underwriting processes and incentivized the adoption of energy-efficient, resilient housing modifications prior to a disaster (Pástor et al., 2021). These preemptive structural adaptations reduce the ultimate severity of collateral damage when a physical shock occurs.

Social Forbearance vs. Aggressive Foreclosure

Equally critical to the mitigation of default risk is the role of the Social (S) pillar during the post-disaster recovery phase. Traditional credit risk models generally dictate aggressive foreclosure proceedings when households default; however, high-ESG banks increasingly favor stakeholder-centric debt resolution strategies. By proactively aligning their lending practices with ESG principles, these institutions actively support borrowers in their efforts to mitigate and adapt to unexpected climate shocks (Beltran et al., 2023, as cited in Alsagr & Apergis, 2025). Furthermore, this stakeholder-centric approach mirrors the social mandates observed in mission-driven financial institutions, which prioritize providing sustained financial access to vulnerable populations for climate change adaptation rather than withdrawing capital from at-risk regions (Ahmed et al., 2026). By offering temporary liquidity relief, these institutions essentially function as an institutional extension of social capital, acting as a crucial safety net that prevents distressed, yet fundamentally solvent, households from transitioning into permanent default (Rajab-Kalantarzadeh & Savari, 2025). While the literature extensively covers the impacts of climate change on macro-financial stability (Campiglio et al., 2018) and the role of corporate green bonds, a significant empirical gap remains. Specifically, there is limited micro-level evidence demonstrating how a retail bank's endogenous ESG framework structurally moderates the ex-post realization of household mortgage defaults following acute physical climate shocks, which this study directly addresses.

Conceptual Framework and Hypotheses

The conceptual framework of this study is grounded at the intersection of climate finance, consumer credit risk, and monetary policy. Drawing upon established methodological conventions for business research, the model systematically maps the relationships among two independent variables, a dependent variable, and a critical moderating variable.

The baseline mechanism posits direct, positive causal relationships between the independent variables (acute physical climate shocks and interest rate shocks) and the dependent variable (household mortgage default risk). Climate shocks trigger sudden asset

depreciation and liquidity constraints (Ling et al., 2024). Concurrently, interest rate shocks on ARMs create direct payment shocks (Di Maggio et al., 2017; Byrne et al., 2021). Both inevitably drive a deterioration in LTV and DTI ratios, precipitating a measurable spike in non-performing loans (NPLs).

However, the central theoretical novelty of this framework lies in the introduction of a retail bank's ESG performance as a critical moderating variable. Within this structural model, the ESG framework is theorized to alter the magnitude of the baseline relationship between the climate shock and sudden interest rate shock thus resulting credit default. Specifically, the framework hypothesizes that high institutional ESG performance exerts a negative moderating effect; it acts as a structural shock absorber that demonstrably weakens the positive correlation between localized climate disasters and adjustable- rate mortgages and subsequent mortgage defaults (Birindelli et al., 2022). This hypothesized mitigation is not uniform but operates systematically through two distinct, yet complementary, institutional pathways: the Environmental (*E*) channel and the Social (*S*) channel

The framework introduces a retail bank's ESG performance as a critical moderating variable. It hypothesizes that high institutional ESG performance exerts a negative moderating effect, acting as a structural shock absorber that weakens the positive correlation between the dual shocks and subsequent mortgage defaults (Birindelli et al., 2022).

The first pathway, the Environmental (*E*) channel, operates as a mechanism of pre-emptive risk mitigation. The framework theorizes that banks with robust environmental governance systematically integrate physical and transition climate risks into their origination and underwriting standards (Lefevre & Tourin, 2023). By dynamically pricing climate risk and incentivizing the financing of energy-efficient, structurally resilient, and optimally located properties, the baseline physical damage and subsequent collateral devaluation that experienced by these specific portfolios during a climate shock is intrinsically lower (Bell et al., 2023).

The second pathway, the Social (*S*) channel, functions as a mechanism of proactive post-shock relief. Institutions exhibiting superior performance in the social pillar of ESG are theoretically predisposed to prioritize stakeholder well-being over aggressive, immediate loan recovery (Korzeb et al., 2025). Consequently, when a physical climate shock impairs household liquidity, high-ESG banks are more likely to deploy flexible credit relief mechanisms, such as loan forbearance, maturity extensions, and debt restructuring, rather than initiating immediate foreclosure proceedings (Demir & Danisman, 2021). By avoiding predatory default penalization, these institutions artificially suppress immediate default realizations and provide distressed households with a crucial temporal buffer to secure insurance payouts and recover financial solvency. Ultimately, this conceptual framework operationalizes the "Green Trilemma" (Arnone & Leogrande, 2024) by mathematically mapping how an integrated ESG strategy functions not merely as an external reporting standard, but as an endogenous risk

management apparatus capable of insulating consumer credit portfolios from accelerating climate volatility (Korzeb et al., 2025).

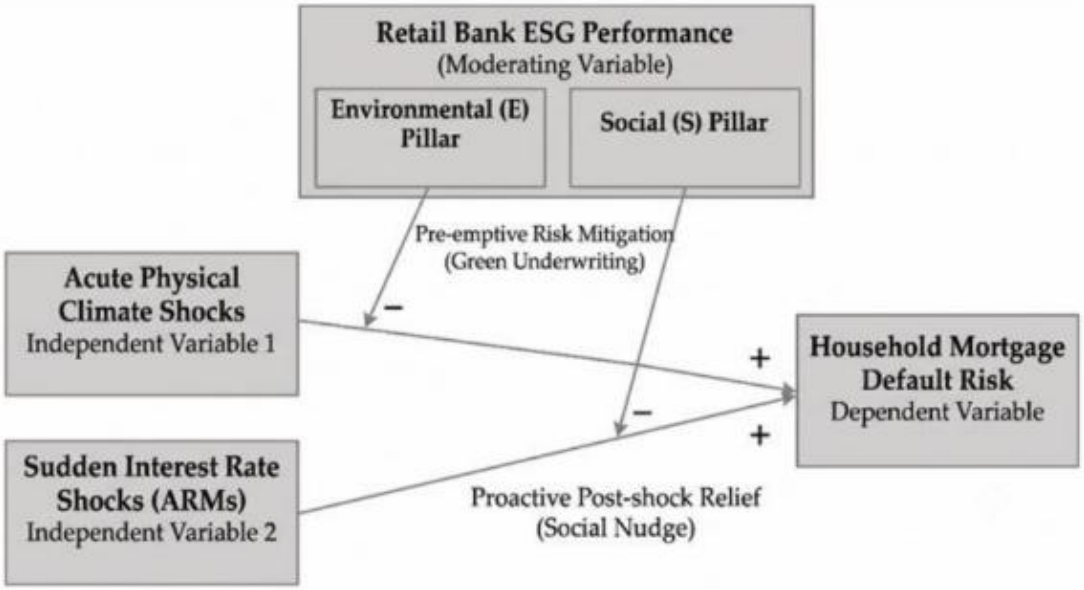

Figure 1: Conceptual Model

Based on Figure 1, this conceptual model illustrates factors that drive household mortgage defaults and demonstrates how a retail bank's commitment to ESG practices can help cushion borrowers against these external financial shocks. The dependent variable (DV) is Household Mortgage Default Rate which is the main outcome of the model is measuring and representing the likelihood that borrowers will fail to repay their mortgage loans. Also, this model integrates with two (2) independents variables (IV) consist of Acute Physical Climate Shocks and Sudden Interest Rate Shocks (ARMs) which act as factors that drive household mortgage defaults. Both IV indicate a positive relationship, meaning that as physical climate shocks increase, mortgage default risk also increases besides, that sudden interest rate spikes also lead to higher mortgage default risk. Moreover, the model shows that a Retail Bank ESG Performance (Moderating Variable) can intervene and weaken the impact of the independent variables on the dependent variable. This moderation is split into two (2) pillars; firstly, Environmental (E) pillar moderates the relationship between acute physical climate shocks and default risk. Through Pre-emptive Risk Mitigation (Green Underwriting), a bank can reduce (-) the likelihood that a climate shock will lead to a default. Secondly, Social (S) pillar moderates the relationship between sudden interest rate shocks and default risk. Through Proactive Post-shock Relief (Social Nudge), a bank can reduce (-) the likelihood that an interest rate spike will cause a default. Therefore, the hypotheses of study are developed as follow:

• **Hypothesis 1a:** *Acute climate shocks positively and significantly increase household mortgage default rates.*
• **Hypothesis 1b:** *Sudden interest rate shocks on adjustable-rate mortgages (ARMs) positively and significantly increase household mortgage default rates.* • **Hypothesis 2:** *Superior retail bank ESG performance negatively moderates the impact of both climate shocks and interest rate shocks on mortgage defaults.*

• **Hypothesis 3:** *The mitigation effect of the Environmental pillar is driven by lower LTV deterioration due to energy-efficient premiums, while the Social pillar operates via increased loan modifications and forbearance regardless of the shock's origin.*

Methodology and Econometric Model

Data Sources and Sample Construction

To empirically test the moderating effect of institutional sustainability frameworks on consumer credit risk, this study constructs a comprehensive, multi-source panel dataset that integrates high-frequency financial indicators, institutional sustainability metrics, and localized geospatial climate records. The fundamental dependent variables and financial controls are operationalized using granular, quarterly financial and mortgage performance data extracted at the bank-portfolio or individual loan level. To accurately capture household financial distress and collateral degradation, the dataset incorporates dynamic non-performing loan (NPL) ratios, loan-to-value (LTV) ratios, and borrower debt-to-income (DTI) metrics. These financial indicators serve as the quantitative baseline for measuring retail credit risk, allowing the model to track the precise trajectory of portfolio vulnerability prior to, during, and following a systemic localized disruption.

To operationalize the moderating variable, the study utilizes disaggregated institutional Environmental, Social, and Governance (ESG) scores procured from premier financial databases such as MSCI, Refinitiv Eikon, or Bloomberg. Rather than relying on aggregate, top-line corporate ESG ratings which often heavily weight internal operational efficiencies or generic corporate philanthropy which this methodology specifically extracts the disaggregated 'E' and 'S' pillar metrics directly pertinent to retail lending strategies. This targeted extraction ensures the independent variable accurately reflects the bank's external market behaviors, specifically capturing its proactive environmental underwriting standards (e.g., green mortgage penetration, climate-adjusted risk pricing) and its social consumer protection policies (e.g., fair lending practices, financial inclusion mandates, and distressed borrower relief frameworks).

Finally, to introduce the exogenous independent variable, the financial and ESG panel data are temporally and spatially merged with high-resolution geospatial climate indices. This data relies on meteorological databases and geographic information systems (GIS) to pinpoint the exact timing, geographic boundaries, and severity of acute physical climate shocks, such as severe flood inundations, cyclonic events, or regional wildfires. By matching the geographic footprint of these climate anomalies with the corresponding ZIP codes or census tracts of the banks' residential mortgage portfolios, the methodology establishes a rigorous quasi experimental framework. This spatial-temporal integration allows the econometric model to isolate the precise juncture at which the climate shock structurally impairs the localized economy, thereby providing the empirical foundation necessary to evaluate the shock absorbing capacity of the lending institution's ESG apparatus.

The Econometric Model

To test the hypotheses, the research proposes a multi-variable panel regression model with fixed effects:

$$\Delta Y_{i,t} = \alpha + \beta_1 ClimateShock_{r,t} + \beta_2 \Delta Rate_t + \beta_3 ESG_{i,t-1} + \beta_4 (ClimateShock_{r,t} \times ESG_{i,t-1}) + \beta_5 (\Delta Rate_t \times ESG_{i,t-1}) + \gamma X_{i,t} + \theta_i + \varepsilon_{i,t}$$

Where:

- $\Delta Y_{i,t}$ represents the change in the mortgage default rate or non-performing loan (NPL) ratio for bank i at time t.
- α is the regression constant.
- $\Delta Rate_t$ The change in the central bank benchmark interest rate (or average mortgage rate) at time t, capturing the direct macroeconomic shock to a household's debt-servicing capacity.
- $(\text{ClimateShock}_{r,t})$ estimates the direct impact of the climate shock in region r on credit performance.
- $(\text{ESG}_{i,t-1})$ captures the lagged effect of the bank's ESG performance on default risk.
- $(\text{ClimateShock}_{r,t} \times \text{ESG}_{i,t-1})$ is the coefficient of the interaction term, which serves as the primary parameter of interest for testing the moderating role of ESG in mitigating climate-induced default risks.
- $(\Delta Rate_t \times ESG_{i,t-1})$ Tests whether the bank's ESG framework also functions as a shock absorber against macroeconomic tightening. This builds theoretically on the corporate finance literature, suggesting high-ESG institutions exhibit greater financial resilience during macroeconomic shocks.
- $\gamma \mathbf{X}_{i,t}$ represents a vector of bank-specific and macroeconomic control variables, such as bank size, capital adequacy, and regional unemployment rates.
- θ_i denotes bank-level fixed effects to account for unobserved, time-invariant bank characteristics.
- $\varepsilon_{i,t}$ is the idiosyncratic error term.

Expected Contributions and Policy Implications

This study advances the theoretical discourse within sustainable finance by deliberately shifting the analytical focal point away from institutional green bonds and corporate climate disclosures toward the critical, yet underexplored, domain of retail banking and consumer credit. While existing literature has extensively documented how physical climate risks manifest in higher mortgage spreads and localized credit rationing (Nguyen et al., 2022), there remains a pronounced empirical gap regarding how endogenous bank characteristics moderate this relationship. By integrating geospatial disaster metrics with disaggregated institutional sustainability scores, this research contributes a novel micro-level perspective to the literature. It empirically demonstrates that a bank's ESG framework is not merely a mechanism for managing reputational risk or attracting socially responsible investment (Krueger et al., 2020), but rather an active, structural determinant of portfolio resilience. Consequently, the findings expand the conventional limits of financial intermediation theory, proving that socially and environmentally embedded lending practices directly alter the default trajectory of household assets under acute physical distress.

From a regulatory perspective, the findings offer immediate, data-driven implications for central banks and macro-prudential supervisors seeking to integrate climate-related

financial risks into global banking frameworks. Currently, institutions such as the Basel Committee on Banking Supervision (BCBS) acknowledge that climate change translates into traditional financial risks, yet debates persist over the mathematical justification for adjusting capital requirements based on sustainability metrics (BCBS, 2021). If the empirical results validate that superior ESG integration effectively dampens non-performing loan (NPL) spikes during climate shocks, it provides supervisors with the necessary econometric foundation to implement a "green supporting factor" or "social mitigating factor" in capital adequacy calculations. Such a policy shift would justify lowering Tier 1 capital requirements for highly rated ESG retail banks, aligning systemic financial stability mandates with the broader macro economic objectives of the Sustainable Development Goals (Dikau & Volz, 2021).

Managerial Implications for Financial Institutions

For retail bank executives and risk managers, this research fundamentally recharacterizes the financial utility of ESG expenditures. Historically, corporate sustainability initiatives within retail banking have frequently been compartmentalized as compliance costs or marketing exercises rather than core drivers of asset quality. However, as contemporary evidence indicates, banks must prioritize educating board members and senior managers about the tangible impacts of climate risks on loan portfolios to effectively establish strategic emission reduction goals and reevaluate their overarching credit business strategies (Alsagr & Apergis, 2025). By decoding the "Green Trilemma," this study supplies empirical proof that rigorous environmental underwriting (e.g., steering capital toward climate-resilient housing) and flexible social forbearance policies function cooperatively as an operational hedge against physical climate volatility. Furthermore, integrating a forward-looking portfolio risk

assessment approach, such as mandating stress testing for climate-exposed loan portfolios, is crucial for identifying underlying vulnerabilities and strengthening financial decision-making in high-risk areas (Ahmed et al., 2026). In an era marked by accelerating weather anomalies, the evidence suggests that proactive ESG integration is a fiduciary imperative that actively stabilizes cash flows, preserves loan-to-value (LTV) ratios, and minimizes costly foreclosure proceedings. Ultimately, by implementing effective climate risk management practices and expanding green lendingwhich inherently reduces credit risks associated with heavily exposed polluting industries (Al-Qudah et al., 2023, as cited in Alsagr & Apergis, 2025), banks can directly protect shareholder value from unpredictable ecological disruptions while contributing to a more resilient and sustainable real economy.

Conclusion

The accelerating frequency of acute physical climate shocks, compounded by volatile macroeconomic interest rate cycles, poses a systemic threat to the stability of retail banking and residential mortgage portfolios. This study sought to decode the "Green Trilemma" by investigating whether a retail bank's endogenous ESG framework serves as a structural mitigant against household default risk in the aftermath of localized climate disasters and ARM payment shocks, fundamentally jeopardizing the long-term viability of residential mortgage portfolios. This study sought to decode the "Green Trilemma" in consumer credit by investigating whether a retail bank's endogenous Environmental, Social, and Governance (ESG) framework serves as a structural mitigant against household mortgage default risk in the aftermath of localized climate disasters. By shifting the analytical focus from corporate green bonds to the micro level dynamics of retail lending, this research establishes that institutional sustainability is not merely a mechanism for reputation management or regulatory compliance, but rather a robust, operational shock absorber. The proposed theoretical and

econometric frameworks hypothesize that superior ESG performance fundamentally alters the default trajectory of distressed households through two interconnected pathways: pre-emptive collateral protection via the Environmental (*E*) channel, and proactive liquidity relief via the Social (*S*) channel.

Crucially, the integration of these dual channels demonstrates that banks can resolve the competing pressures of the Green Trilemma. By proactively pricing physical climate risks and incentivizing resilient housing without resorting to exclusionary "climate redlining" high-ESG institutions structurally insulate their balance sheets from severe loan-to-value (LTV) deterioration. Furthermore, the deployment of stakeholder-centric forbearance policies prevents temporary, disaster-induced liquidity crises from crystallizing into permanent non performing loans (NPLs). Consequently, this research theoretically redefines ESG integration within consumer credit markets as a fiduciary imperative that actively preserves shareholder value amidst ecological volatility. For macro-prudential regulators, the substantiation of this moderating effect provides the empirical foundation necessary to refine global capital adequacy frameworks, potentially justifying the implementation of "green supporting factors" for institutions that demonstrably align their credit operations with planetary boundaries.

While this study provides a novel quantitative blueprint for evaluating climate-credit intersections, it is subject to certain limitations that offer fertile ground for future inquiry. The reliance on third-party aggregated ESG metrics inherently introduces elements of subjectivity, and the precise quantification of localized physical damages often remains constrained by the resolution capabilities of existing geospatial databases. Future research should seek to augment this framework by incorporating alternative, high-frequency datasets, such as satellite-derived collateral damage assessments and real-time consumer transaction data, to capture the immediate micro-economic fallout of climate shocks. Additionally, extending this model to encompass comparative analyses between developed and emerging economies will be vital for understanding how regulatory environments shape ESG efficacy. Ultimately, as climate induced disruptions increasingly destabilize global real estate markets, harmonizing retail credit risk management with the Sustainable Development Goals will remain a paramount determinant of systemic financial stability.

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INTERNAL GOVERNANCE, STATE OWNERSHIP, AND FINANCIAL CAPACITY AS DRIVERS OF ENVIRONMENTAL, SOCIAL AND GOVERNANCE PERFORMANCE AMONG FBM KLCI CONSTITUENTS

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Abstract: *This conceptual paper proposes an empirical framework to investigate the structural determinants of Environmental, Social, and Governance (ESG) performance among the blue chip companies listed on the FTSE Bursa Malaysia Kuala Lumpur Composite Index (FBM KLCI). Mirroring the regulatory transition toward the National Sustainability Reporting Framework (NSRF) and mandatory IFRS S1 and S2 climate-first disclosures, this study propose the composite ESG Score as the Dependent Variable (DV). Drawing upon stakeholder, legitimacy, and agency theories, the study models internal corporate governance metrics (board size, independence, gender diversity) and corporate financial capacity (firm size, profitability, financial leverage) as Independent Variables (IVs). Crucially, given the unique socio-economic landscape of the Malaysian capital market, State Ownership is positioned as a moderating variable influencing the governance-ESG nexus. This study proposed methodology utilizes an archival, secondary-data panel approach across a multi-year period, matching institutional ESG ratings (e.g., FTSE Russell, Refinitiv) with audited corporate financials. This proposed framework contributes to the sustainable finance literature in emerging economies by shifting the focus from the profit outcomes to ESG performance.*

Keywords: *Internal Governance, State Ownership, Financial Capacity, ESG Performance*

Background of the Study

The global landscape of corporate finance has shifted from a single-bottom-line focus on profit maximization toward a multi-stakeholder paradigm emphasizing Environmental, Social, and Governance (ESG) criteria. Historically, sustainable investing was a voluntary practice driven by corporate goodwill or niche ethical funds. However, institutional asset allocation globally is increasingly benchmarked against explicit ESG scores (Tang et al., 2026). In emerging markets, robust ESG performance acts as an indicator of managerial quality, structural resilience, and risk mitigation against negative environmental and operational externalities. In Malaysia, this evolution is deeply institutionalized. Bursa Malaysia has been a regional pioneer in sustainable finance, notably through the introduction of the FTSE4Good Bursa Malaysia (F4GBM) Index. The regulatory landscape has shifted towards strict enforcement. Large-cap public listed companies (PLCs) with market capitalizations above RM2 billion are mandated to execute comprehensive, climate-first disclosures aligned with the International Sustainability Standards Board (ISSB) frameworks, specifically IFRS S1 and IFRS S2. Concurrently, the implementation of a national carbon tax introduces a direct financial cost to carbon intensity, transforming sustainability from a public relations exercise into a core strategic variable.

The FTSE Bursa Malaysia Kuala Lumpur Composite Index (FBM KLCI) represents the top 30 largest companies on the exchange by market capitalization. These entities serve as the primary destination for foreign direct investment (FDI) and institutional capital in Malaysia. Consequently, understanding what factors determine the ESG scores of these elite corporations is of vital importance. While extensive historical research has evaluated the consequences of ESG scores on financial performance (Demiraj et al., 2023; Moolkham, 2025), a persistent empirical gap remains regarding the antecedents of the internal corporate ecosystems and structural factors that drive a firm to achieve a high or low ESG rating in the first place. This study establishes a pure secondary data framework to examine these determinants within the Malaysian context.

Problem Statement

Despite the implementation of rigorous disclosure mandates by Bursa Malaysia, unexplained variance and divergence persist in the ESG scores of FBM KLCI companies. Some blue-chip entities consistently outperform their peers across the environment, social, and governance pillars, while others struggle with compliance deficiencies, data omissions, and lower composite ratings (Birindelli, et.al., 2018). This variance highlights a core issue that some of the companies do not fully understand the internal structural mechanisms and financial constraints that dictate a company's capacity to build an effective ESG framework. Prior research on ESG determinants often suffers from a lack of generalizability due to mixed geographical scopes, or relies heavily on perceptual primary questionnaires, which fail to map against institutional rating metrics. Furthermore, existing models fail to account for the unique market architecture of Malaysia, which is characterized by a high concentration of Government-Linked Investment Companies (GLICs) and State-Owned Enterprises (SOEs).

As shown in broader regional studies, state ownership can heavily moderate corporate strategies, acting either as an accelerator of national sustainability agendas or as a bureaucratic constraint (Al-tahat et al., 2025). Without an empirical framework that maps objective corporate governance structures and financial capacity metrics against external ESG ratings, regulators cannot optimize compliance policies, and investors cannot accurately project the ESG risk trajectories of their portfolios.

The research objectives of the study are:

a) To investigate the relationship between internal governance characteristics (board independence, and board gender diversity) and the ESG performance of FBM KLCI listed companies.
b) To evaluate the impact of financial capacity (firm size, profitability, and financial leverage) on the ESG performance among FBM KLCI listed companies. iii. To examine the moderating effect of state ownership on the relationship between internal governance characteristics and ESG performance within the Malaysian capital market.

Literature Review

Theoretical Foundations of ESG Determinants

The academic exploration of corporate environmental, social, and governance (ESG) performance has evolved from a marginal branch of ethical management into a core tenant of modern financial economics. Studies must move beyond a singular theoretical window to understand the underlying mechanisms that drive or constrain a firm's capacity to achieve premium institutional ESG ratings. The unique capital market structure of Malaysia, particularly within the blue-chip FBM KLCI environment, requires a theoretical triangulation combining Institutional Theory, Legitimacy Theory, Resource Dependency Theory (RDT), and Agency Theory.

Institutional Theory

Institutional theory serves as the dominant lens for explaining corporate behavior in emerging markets where regulatory environments are in a state of rapid transformation. Organizations are not merely profit-maximizing engines operating in a vacuum; instead, they alter their internal structures to conform to the prevailing norms, rules, and expectations of their institutional framework to ensure social survival and long-term legitimacy (Yaakub, 2025).

DiMaggio & Powell (1983) identify three distinct institutional forces that dictate this structural adaptation: coercive, mimetic, and normative pressures, which are Coercive Pressures, Mimetic Pressures and Normative Pressures. In Malaysia, coercive pressures are highly visible, driven by strict top-down regulatory actions by the Securities Commission Malaysia and Bursa Malaysia. Milestones like the 2015 Sustainability Reporting Framework, the updated Malaysian Code on Corporate Governance (MCCG) 2021, and the rollout of the Bursa ESG Reporting Platform (BERP) represent coercive mechanisms that legally mandate or strongly push listed firms to align with international disclosure benchmarks. Mimetic pressures occur when firms operate in environments marked by high uncertainty or structural transition. FBM KLCI firms systematically mirror the successful ESG compliance strategies of their elite sector peers, standardizing reporting across the index to protect their market share and capture foreign direct investment. On the other hand, normative pressures are driven by professional networks, industry associations, and evolving business expectations. As sustainable investing becomes institutionalized, asset managers and accounting professionals naturally infuse ESG oversight into standard board-level operating procedures (Lei & Yu, 2024; Pinheiro et.al., 2024; Wang et.al., 2023).

Legitimacy Theory & Resource Dependency Theory (RDT)

Legitimacy theory argues that corporations operate under an implicit social contract with the broader community (Del Gesso, & Lodhi, 2025). When public awareness of climate intensity and governance shortfalls increases, firms expand their sustainability commitments as an active reputation management mechanism to maintain their social license to operate (Li, et.al., 2026). This is especially crucial for highly visible, large-cap companies that face intense regulatory and public oversight (Siyahhan, & Loucou, 2026).

Concurrently, Resource Dependency Theory positions the corporate board as a strategic bridge designed to secure critical external resources and manage environmental uncertainties (Quan, et.al., 2025; Lewellyn & Muller-Kahle, 2024). In emerging markets where the state retains significant economic control, building political or institutional linkages through board appointments or state equity stakes is an adaptive strategy (Yaakub, 2025). Politically connected or state-influenced firms improve their ESG disclosures to align with the government's socioeconomic mandates, thereby securing favorable access to capital, low interest state financing, and essential regulatory approvals.

Agency Theory

From an internal monitoring perspective, according to Salman (2024), Agency Theory addresses the inherent conflicts of interest between corporate managers (agents) and fragmented shareholders (principals). Traditional agency models argue that managers may engage in short-term profit extraction or display resistance to long-term, capital-intensive projects like green retrofitting (Mao, et.al., 2024; Liu, et.al., 2025). The firm controls managerial self-interest by deploying robust governance mechanisms such as independent oversight committees, highly transparent reporting, and cognitive board diversity. This structural alignment ensures that corporate leaders direct organizational resources toward long term value creation, reducing compliance risks and structurally lifting the composite ESG score (Mao, et.al., 2024).

Internal Governance Characteristics

Corporate governance forms one of the pillars of ESG, but literature increasingly establishes that robust internal governance acts as the foundational driver for the environmental and social pillars as well (Menicucci & Paolucci, 2026). Under Agency Theory, effective board oversight reduces managerial short-termism, encouraging long-term investments in carbon mitigation and human capital development.

Board Independence

Board independence refers to independent directors facing fewer conflicts of interest and being highly sensitive to regulatory compliance and public legitimacy (Shi, et.al., 2024). Boards with higher percentages of independent directors are better positioned to enforce transparency and allocate capital toward sustainable investments (Pinheiro et.al., 2024; Birindelli, et.al., 2018). The presence of a formal, dedicated sustainability committee is one of the most explicit indicators of an institutionalized ESG strategy (Shu, et. al., 2024). When sustainability oversight is fragmented across general operations or bundled broadly into an overextended audit committee, ESG strategies tend to become reactive compliance exercises (Lin & Guan, 2024).

Empirical evidence from Malaysian public listed firms demonstrates that a dedicated sustainability committee exerts a consistently strong and statistically significant positive effect on official ESG scores (Mahyuddin & Azmeen, 2025). This committee acts as a localized node of specialized governance, establishing formal accountability pipelines,

monitoring environmental compliance, and translating abstract regulatory frameworks (such as IFRS S1 and S2) into concrete asset-allocation decisions.

H1: Board independence has a significant positive relationship with the ESG performance.

Board Gender Diversity

Board gender diversity is discussed as diverse boards bring broader stakeholder perspectives to executive discussions. Empirical literature suggests that gender-diverse boards exhibit greater empathy toward corporate social responsibility, resulting in superior ESG risk management and disclosure quality (Al-Shaer, et.al., 2026; Romano, et.al., 2020). Board gender diversity has evolved from an indicator of social equity into a proven determinant of corporate disclosure quality and operational oversight (Menicucci & Paolucci, 2024). From an upper-tier perspective, female directors bring distinct ethical frameworks, risk sensitivities, and collaborative communication styles to boardroom deliberations (Zhu & Chen, 2025).

Panel regression analyses tracking Malaysian firms over multi-year horizons confirm that board gender diversity is significantly and positively associated with higher ESG scores (Mahyuddin & Azmeen, 2025). The strength of this relationship increases when analyzing comprehensive, market-wide samples. Female directors are empirically shown to display higher sensitivity toward broader stakeholder commitments, active community engagement, and environmental conservation, directly elevating the firm's external scores on the social and environmental fronts (Odriozola, et.al., 2024).

H2: Gender diversity has a significant positive relationship with the ESG performance.

Financial Capacity Determinants

According to Legitimacy Theory, larger and highly visible companies face intense public and regulatory scrutiny, prompting them to invest heavily in ESG initiatives to maintain their social license to operate (Sharma & Panday, 2020; Joshi & Joshi, 2024).

Firm Size

Firm size refers to large-cap corporations that possess economies of scale and specialized sustainability teams capable of navigating complex data frameworks like the Centralised Sustainability Intelligence (CSI) platform (Sharma & Panday, 2020). Navigating modern digital reporting ecosystems such as Bursa Malaysia's Centralised Sustainability Intelligence (CSI) platform requires deep technical capacity and advanced data metrics. Larger firms can easily absorb these high operational overheads, establishing dedicated ESG departments and securing independent, external data assurance to lock in premium ratings (Yaakub, 2025).

H3: Firm size has a significant positive relationship with the ESG performance.

Profitability as an Institutional Compliance Driver

Profitability (ROA/ROE) indicates that implementing advanced green technologies and achieving comprehensive compliance requires substantial capital. Highly profitable firms have the surplus cash flow to absorb these structural costs without compromising shareholder returns (Chen et al., 2024). The relationship between a firm's profitability (proxied via Return on Assets or ROA) and its sustainability performance presents a unique paradigm in emerging markets. Implementing carbon mitigation technologies, redesigning supply chains, and executing fair-wage structural transformations are capital-intensive strategies. Profit-

rich organizations possess the cash flow buffers needed to invest in these long-term green initiatives (D'Amato, et. al., 2024; Brogi, & Lagasio, 2019).
However, Mansor et al. (2025) stated that comprehensive fixed-effects panel data modeling within Malaysia reveals that ESG scores do not demonstrate a statistically significant relationship with subsequent financial performance indicators (such as Tobin's Q, market value, or short-term ROA). This key finding indicates that ESG integration among elite Malaysian firms is currently driven primarily by institutional alignment, coercive regulatory pressures, and legitimacy seeking, rather than by direct, short-term financial motivations (Mahyuddin & Azmeen, 2025). Companies invest in ESG because compliance secures their institutional survival and preserves investor relations, not because it yields immediate cash profits (Joshi & Joshi, 2024).

H4: Profitability has a significant positive relationship with the ESG performance.

Financial Leverage Constraints

Capital structure acts as a primary constraint on a firm's sustainability agenda. Under finance theory, a highly leveraged firm faces intense monitoring from debt covenants and must prioritize short-term cash flow preservation to service interest obligations (Sharma & Panday, 2020). ESG investments typically feature extended payback periods, and highly leveraged managers are structurally discouraged from allocating limited capital to non-financial initiatives. High debt ratios compress a firm's strategic flexibility, directly undercutting its capacity to execute comprehensive ESG programs (Li & Wang, 2026). Conversely, highly indebted firms face structural constraints, which refer to financial leverage. High interest obligations restrict capital expenditure, forcing managers to prioritize short-term debt servicing over long-term ESG performance (Detthamrong, et.al., 2026).

H5: Financial leverage has a negative relationship with the ESG performance.

The Moderating Role of State Ownership

The corporate landscape in Malaysia, cannot be accurately modelled without accounting for government-linked equity structures. According to Al-tahat et al. (2025), state ownership significantly alters the dynamics between board composition and sustainability outcomes. In political cost and institutional theories, state-owned enterprises are expected to serve as exemplars of national policy.

In Malaysia's unique corporate ecosystem, substantial direct and indirect government equity significantly reshapes standard internal oversight mechanisms across the market. While traditional governance attributes like board independence function to limit self-interest, this relationship is heavily amplified by political linkages (Yaakub, 2025). Grounded in institutional and legitimacy frameworks, state ownership serves as a powerful regulatory catalyst. This pressures independent directors to proactively translate compliance mandates into measurable, benchmarked ESG scores rather than passive text disclosures to safeguard public trust (Qian, & Yang, 2023).

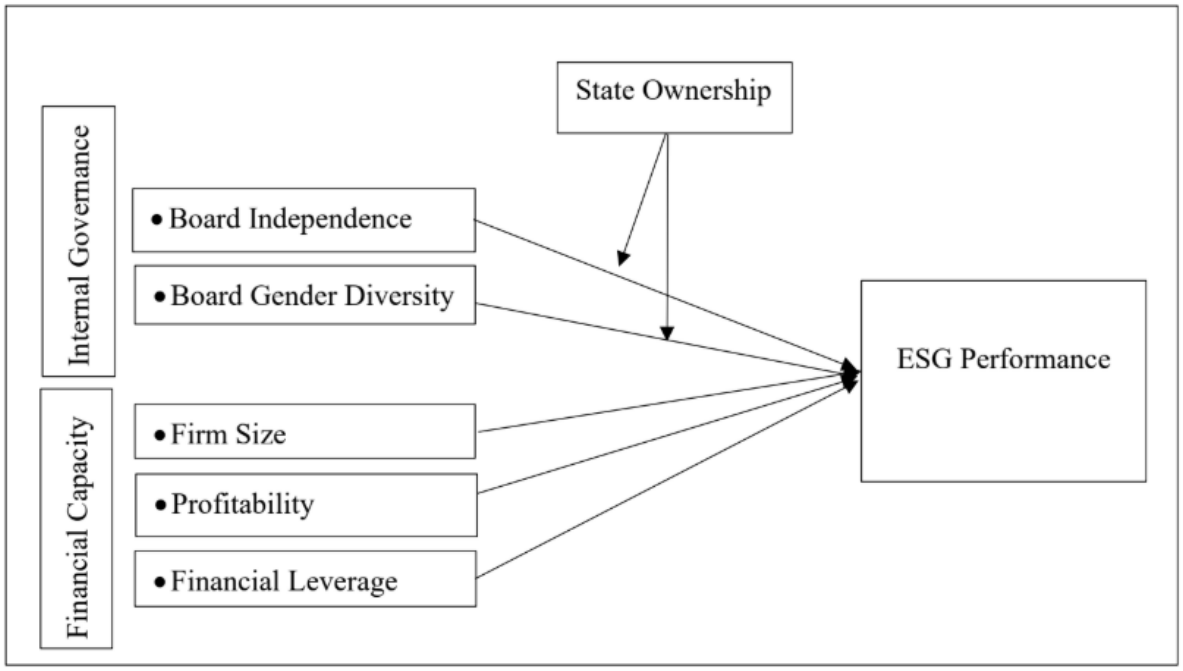
H6: State ownership significantly moderates the relationship between board independence and ESG performance among FBM KLCI companies.

Hassani & Bahini (2022) indicate that corporate board gender diversity significantly drives superior ESG performance scores across Malaysian public-listed firms. However, within the highly concentrated institutional landscape of the FBM KLCI, this relationship is

heavily moderated by direct or indirect state equity. This state influence empowers female directors to champion concrete, measurable sustainability outcomes over symbolic, boilerplate disclosures, structurally lifting composite ESG scores (Hu, et.al., 2025).
6

H7: State ownership significantly moderates the relationship between board gender diversity and ESG performance among FBM KLCI companies.

Conceptual Framework
Below is the proposed conceptual framework for this study.



Model Specification
To test this conceptual framework, the study will execute a fixed-effects or random-effects panel regression model, structured as follows:

$$\begin{aligned}\text{ESG\_Score}_{it} = {} & \beta_0 + \beta_1(\text{BI}_{it}) + \beta_2(\text{BGD}_{it}) + \beta_3(\text{Size}_{it}) + \beta_4(\text{Prof}_{it}) + \beta_5(\text{Lev}_{it}) \\ & + \beta_6(\text{SO}_{it}) + \beta_7(\text{BI}_{it} \times \text{SO}_{it}) + \beta_8(\text{BGD}_{it} \times \text{SO}_{it}) + \mu_i + \delta_t + \varepsilon_{it}\end{aligned}$$

Where:

- BI_{it} **(Board Independence):** The proportion or percentage of independent directors on the board.
- BGD_{it} **(Board Gender Diversity):** The percentage of female directors on the board.
- $Size_{it}$ **(Firm Size):** Firm size, measured as the natural logarithm of total assets.
- $Prof_{it}$ **(Profitability):** Firm profitability, proxied by Return on Assets (ROA).
- Lev_{it} **(Financial Leverage):** The capital structure risk, measured as the ratio of total debt to total assets (or total equity).
- SO_{it} **(State Ownership):** The percentage of equity shareholdings held directly or indirectly by the government, GLICs, or state-backed institutional funds.
- $BI_{it} \times SO_{it}$**:** The first interaction term used to evaluate whether state ownership moderates the relationship between board independence and ESG scores.
- $BGD_{it} \times SO_{it}$**:** The second interaction term used to evaluate whether state ownership moderates the relationship between board gender diversity and ESG scores.
- μ_i **(Firm Fixed Effects):** Captures unobserved, time-invariant firm-level heterogeneity (unique company characteristics that do not change over time).
- δ_t **(Time Fixed Effects):** Controls for macroeconomic shocks or annual regulatory changes that affect all listed firms equally across a specific year (such as the rolling out of the NSRF).
- ε_{it}**:** The stochastic error term.

Conclusion

This study establishes a rigorous framework to investigate the internal and external determinants of ESG performance within the elite corporate tier of Malaysia (the FBM KLCI). The model offers a clear look at corporate sustainability through a financial lens by discarding subjective survey methodologies in favor of objective, institutional panel metrics. This framework demonstrates that an elite ESG rating is not an accidental byproduct, but rather the structural outcome of robust internal governance oversight, adequate financial flexibility, and strategic alignment with state institutional ownership. This study bridges a key gap in emerging-market sustainable finance literature, Tang et al. (2026) and Joshi & Joshi (2024) to track empirical drivers of rating trends rather than focusing solely on downstream financial consequences.

The study will have several significant implications for various capital market stakeholders such as regulators, capital investors, corporate managers and boards and researchers. The study provides objective empirical data that allow regulatory bodies, such as the Securities Commission Malaysia and Bursa Malaysia, to optimize compliance policies and refine frameworks such as the National Sustainability Reporting Framework (NSRF). It enables institutional investors and asset managers to accurately project the ESG risk trajectories of their portfolios by identifying which corporate ecosystems naturally foster superior sustainability performance. It also offers blue-chip corporate leaders a clear understanding of the internal structural mechanisms (such as board independence and gender diversity) and financial constraints (such as leverage) that dictate a firm's capacity to build an effective ESG framework. Other than that, it sets a methodological benchmark for analyzing ESG scores across unique market designs by utilizing an objective, archival secondary-data panel approach rather than subjective primary questionnaires.

This study introduces a distinct departure from traditional sustainable finance literature in which shifting from outcomes to antecedents and disconnecting profit motivations from

ESG integration. Extensive previous research within sustainable finance has concentrated heavily on evaluating the downstream consequences of ESG scores on subsequent financial performance indicators, such as Tobin's Q, market value, or short-term Return on Assets (Pinheiro et.al., 2024). On the other hand, this framework shifts the focus entirely toward the antecedents, examining the internal corporate ecosystems and structural factors that drive a firm to achieve a high or low ESG rating in the first place (D'Amato, et. al., 2024). Instead, traditional sustainable finance models often operate under the assumption that corporations integrate ESG initiatives primarily to produce direct, short-term cash profits or immediate financial returns. This study contrasts with that paradigm by highlighting that ESG integration among elite Malaysian firms is driven by institutional alignment, legitimacy seeking, and coercive regulatory pressures such as mandatory IFRS S1 and S2 climate-first disclosures rather than immediate financial outcomes.

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THE MACROECONOMIC IMPACT OF PANDEMIC SHOCKS ON THE LABOR MARKET AND INFLATION DYNAMICS: EVIDENCE FROM MALAYSIA (2019–2024)

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Abstract: *This study investigates the profound structural and cyclical disruptions experienced by the Malaysian labor market and structural price dynamics induced by the COVID-19 pandemic and its subsequent recovery period spanning 2019 to 2024. Drawing upon Empirical macroeconomic indicators extracted from the Department of Statistics Malaysia (DOSM), this paper analyzes the intricate linkages between workforce participation rates, fluctuating unemployment dynamics, wage compression patterns, and inflationary trajectories. The structural paradigm is contextualized through classic macroeconomic doctrines, specifically the Phillips Curve framework and the Non-Accelerating Inflation Rate of Unemployment (NAIRU). The analytical synthesis reveals that while the labor force participation rate experienced a transitory contraction from 68.7% in 2019 to 68.4% in 2020 before recovering to 68.9% in late 2021, unemployment surged to unprecedented heights of 4.5% in 2020. This economic slack subsequently translated into temporary deflationary cycles (-1.1% in 2020) before giving way to wage-push inflation cycles across 2022–2024. The empirical insights argue for structured statutory interventions, localized social safety nets, and counter-cyclical monetary policy frameworks to insulate vulnerable macroeconomic segments from future external supply-side and demand-side systemic shocks.*

Keywords: *Labor Market Dynamics, Unemployment, Inflation Elasticity, Phillips Curve, NAIRU, Macroeconomic Policy, Malaysia.*

Introduction

The emergence of the COVID-19 pandemic precipitated unprecedented systemic shocks across global economic ecosystems, severely destabilizing both aggregate supply and demand mechanisms. Within emerging market economies, particularly Malaysia, these shocks manifested profoundly across structural labor configurations and domestic price stability indicators (Department of Statistics Malaysia [DOSM], 2021a). Prior to the onset of the pandemic in late 2019, the Malaysian macroeconomic environment exhibited robust parameters characterized by an optimized labor force participation rate of 68.7%, price stability, and structural equilibrium in employment (DOSM, 2020). However, the subsequent execution of mandatory Movement Control Orders (MCOs) and severe cross-border mobility restrictions imposed to check transmission vectors radically altered industrial operational continuity.

As detailed in empirical literature, pandemic-driven economic shocks introduce unique analytical anomalies that challenge conventional business cycle models (Friedman, 1968; Gordon, 1997). The immediate fallout of firm closures and compressed consumer demand was an immediate spike in structural and cyclical unemployment. This dislocation exposed deep-seated vulnerabilities within the domestic workforce, particularly among lower-income strata, fresh graduates, and informal sector participants. Concurrently, price levels demonstrated complex volatility, swinging from sharp deflationary patterns in 2020 due to demand-side destruction to pronounced inflationary spikes between 2021 and 2024 driven by supply chain backlogs and wage adjustments (Corporate Finance Institute, 2024; Ministry of Human Resources Malaysia, 2022).

This research paper seeks to map out the explicit structural timeline of the Malaysian labor market and inflationary cycles between 2019 and 2024, analyzing the visual empirical data presented in image.png. By assessing how policy dynamics such as minimum wage revisions integrated with exogenous supply shocks, this paper evaluates the explanatory validity of traditional models like the Phillips Curve and NAIRU in contemporary crisis environments.

Literature Review & Theoretical Framework

The interaction between labor market slackness and price adjustments has long been anchored around the Phillips Curve theory. Originally postulated to identify an inverse correlation between unemployment and wage inflation, the modernized framework incorporates adaptive expectations and supply-side variables (Friedman, 1968). The structural equation governing short-run macroeconomic adjustments can be formulated as follows:

$$\pi_t = \pi_e - \beta(u_t - u^*) + \varepsilon_t$$

where π_t represents the actual inflation rate at period t, π_e signifies expected inflation, u_t is the prevailing unemployment rate, u^* represents the Non-Accelerating Inflation Rate of Unemployment (NAIRU), β is the parameter measuring the responsiveness of inflation to economic slack, and ε_t constitutes exogenous supply-side shocks.

Under standard macroeconomic conditions, when $u_t > u^*$, a negative output gap occurs, leading to downward pressure on wages and prices due to excess capacity. Conversely, a tightening labor market where $u_t < u^*$ accelerates wage-push inflation as firms compete for scarce labor components (Gordon, 1997).

However, exogenous shocks such as a global pandemic introduce structural break points where supply-chain disruptions and structural shifts cause a concurrent rise in both frictional unemployment and living costs, temporary blurring traditional trade-offs.

Recent empirical explorations within ASEAN economies emphasize that labor flexibility dictates the velocity of post-crisis recovery. Studies focused on emerging market vulnerabilities during systemic health crises point out that statutory policies—such as minimum wage mandates—interact heavily with baseline inflation parameters (Phelps, 1967; Blanchard & Galí, 2007). When governments adjust statutory minimum wages during recovery phases, it often prompts a structural shift termed wage-push inflation, wherein firms transmit escalated operational costs directly onto consumer price indices (Corporate Finance Institute, 2024).

Methodology

This study adopts a rigorous secondary descriptive and analytical quantitative approach to evaluate Malaysia's macroeconomic shifts. The primary analytical baseline utilizes the official dataset compiled by the Department of Statistics Malaysia (DOSM) covering the longitudinal period from 2019 to 2024, as graphically synthesized in image.png. Key evaluated variables include:

1) **Unemployment Rate (%):** Calculated as the percentage of the active labor force currently unengaged in productive employment but actively seeking placement.
2) **Labor Force Participation Rate (LFPR %):** Reflecting the ratio of the total labor force to the working-age population.
3) **Consumer Price Index (CPI) Inflation Rate (%):** Measuring annualized modifications in the weighted cost of a representative basket of consumer goods and services.
4) **Nominal Wage Adjustments**: Tracking changes across statutory levels including the RM1,200 to RM1,500 minimum wage adjustment cycle implemented by the Ministry of Human Resources (2022).

Empirical Findings & Discussion

Analysis of Labor Market Vulnerabilities (2019-2021)

As demonstrated by the macro-data tracked in image.png, the Malaysian labor ecosystem suffered profound imbalances upon the onset of the pandemic. In 2019, the working-age population stood at 22,685.2 thousand with a healthy LFPR of 68.7%. By 2020, as strict mobility lockdowns forced business closures, the number of employed persons fell from 15.07 million to 14.96 million. This contraction pushed the aggregate number of unemployed individuals up dramatically to 711.0 thousand, escalating the baseline unemployment rate from 3.3% to a historic high of 4.5% (DOSM, 2021a, 2022).

Table 1.1: Key Macroeconomic and Labor Market Indicators for Malaysia (2019–2021)

Macroeconomic Variable (Unit)	2019	2020	November 2021
Working Age Population (in thousands)	22,685.2	22,893.3	23,640.0
Total Active Labour Force (in thousands)	15,581.6	15,667.7	16,300.0
Population Outside Labour Force (in thousands)	7,103.5	7,225.5	7,340.0
Employed Persons (in thousands)	15,073.4	14,956.7	15,610.0
Unemployed Persons (in thousands)	508.2	711.0	694.4
Labour Force Participation Rate (LFPR %)	68.7	68.4	68.9
Aggregate Unemployment Rate (%)	3.3	4.5	4.3

Source: Re-tabulated from Department of Statistics Malaysia (DOSM) Official Reports (2021a, 2022) as highlighted in image.png.

The structural compression of the LFPR down to 68.4% in 2020 underscores the "discouraged worker effect," where retrenched individuals temporarily withdrew from the active job search due to weak hiring sentiments. By November 2021, a progressive recovery trend emerged. The implementation of targeted fiscal stimulus packages and economic reopening facilitated an expansion of employed persons to 15.61 million, moderating the unemployment rate to 4.3% (DOSM, 2021b).

Wage Dynamics and Inflationary Trajectories (2022–2024)

The inflation and wage tracks outlined in image.png show a distinct shift from demand-shock deflation to cost-push inflation. In 2020, severe contractions in private consumption triggered a domestic deflationary rate of -1.1% (DOSM, 2020). However, the recovery phase in 2021 saw inflation bounce back to 2.5% as global supply chains struggled to keep pace with reviving consumer demand (DOSM, 2021b).

In 2022, structural inflation rose further to 3.3%. This period coincided with the government's mandatory minimum wage restructuring, which adjusted the baseline from RM1,200 to RM1,500 (Ministry of Human Resources Malaysia, 2022). While this policy boosted nominal household purchasing power for lower-income groups, it also drove up structural production costs for small and medium enterprises (SMEs). This interaction precipitated a classic wage-push inflation loop, where companies raised consumer prices to offset higher wage bills (Corporate Finance Institute, 2024). By 2023 and 2024, the labor market tightened further and unemployment normalized back toward pre-pandemic levels (DOSM, 2024). This structural tightening meant that rising wages continued to put upward pressure on living costs, illustrating the classic Phillips Curve dynamic where low unemployment correlates with sustained inflationary risks.

Conclusion & Policy Recommendations

The quantitative analysis of Malaysia's macroeconomic trajectory from 2019 to 2024 demonstrates a clear link between labor market stability and broader inflationary dynamics. The pandemic shock of 2020 caused a sharp spike in unemployment to 4.5% and temporary deflation. Conversely, the subsequent economic recovery brought about structural adjustments, where a tightening job market and statutory minimum wage increases to RM1,500 drove inflation up to 3.3% in 2022 before stabilizing through 2024. These shifts demonstrate that traditional models like the Phillips Curve and NAIRU remain highly relevant for mapping out contemporary economic crises.

Based on these findings, we propose the following targeted policy interventions:

1) **Automatic Fiscal Stabilizers**: Establish responsive, institutionalized wage subsidy frameworks that deploy automatically during major macroeconomic shocks to prevent mass retrenchments and preserve labor participation rates.
2) **Productivity-Linked Wage Frameworks**: Encourage industries to transition toward productivity-linked wage structures rather than relying solely on flat statutory adjustments. This approach helps blunt the impact of wage-push inflation by aligning higher labor costs with real economic output.
3) **Strategic Talent Reskilling**: Launch localized technical training frameworks targeted at structurally displaced workers and new graduates to resolve lingering skills mismatches and lower the underlying structural NAIRU.

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GLOBAL TRENDS AND FUTURE DIRECTIONS (2010–2026): AN ANALYSIS OF ZAKAT RESEARCH TRENDS

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Abstract: *Zakat, as a fundamental pillar of Islamic social finance, has received expanding intellectual attention from global researchers seeking sustainable socio-economic development and poverty alleviation. This study offers a comprehensive bibliometric and systematic review of zakat literature within the Scopus electronic database from 2010 to 2026. Applying strict PRISMA screening metrics, 412 high-impact records were selected for analytical modeling. The computational keyword mapping and co-citation profiling conducted via VOSviewer software revealed an exponential growth trajectory in academic publications, specifically highlighting three dominant research clusters: (1) Fintech, blockchain, and digital mobilization of zakat assets, (2) Institutional governance, transparency, and tax alignment compliance, and (3) Strategic poverty mitigation and redistribution matching the UN Sustainable Development Goals (SDGs). This manuscript delivers essential insights into structural thematic trends, current research gaps, and institutional collaborative networks, establishing an essential strategic baseline for contemporary Islamic finance scholars and institutional policymakers globally.*

Keywords: *Zakat Administration, Bibliometric Analysis, Scopus Index, VOSviewer Mapping, Islamic Social Finance*.

Introduction

Zakat is a fundamental institution in Islamic social finance that plays an essential role in structural wealth redistribution, poverty reduction, and socioeconomic equilibrium. As an obligatory financial mechanism, its contemporary economic applications have extended beyond classical legalistic boundaries to integrate with modern financial structures, institutional governance, and public administration systems (Ahmed & Rahman, 2023). Within modern emerging Islamic economies, state authorities and independent baitulmal institutions have actively updated asset management frameworks to capture latent philanthropic resources, although compliance bottlenecks and low public transparency remain challenging friction points (Hassan et al., 2024).

Concurrently, the swift emergence of the global fintech ecosystem has completely transformed classic zakat collection and distribution paths. Digital asset management channels—including decentralized applications, smart contract ledgers, and mobile micro-distribution systems—provide highly distributed environments for organizations to maximize fund mobilization while minimizing administrative overhead (Gomez & Al-Wadi, 2025). Given the rapid influx of academic literature exploring internet-mediated zakat, blockchain protocols, and institutional reliability parameters across the latest publication cycles, a coordinated structural synthesis is needed to map out the current academic progress and build a unified scientific roadmap.

This study bridges this critical conceptual divide by conducting a comprehensive bibliometric analysis and systematic review. Utilizing refined dataset indicators from the Scopus database from 2010 to 2026, the paper tracks publication growth, outlines key regional focal areas, and determines prospective directions for subsequent empirical inquiries in Islamic economics.

Research Methodology

This manuscript implements a transparent methodology based on the PRISMA guidelines to guarantee clear systemic reporting and exact procedural replication. The systematic analytical pipeline covers the selection of raw datasets, document exclusion protocols, data quality verification, and final software-driven text mapping.

Database Search Construction

The bibliographic data extraction was executed within the Scopus network repository utilizing the subsequent explicit filtering query syntax:

```
TITLE-ABS-KEY ("zakat" OR "alms-giving" OR "islamic social finance") AND TITLE-ABS-KEY ("digital*" OR "poverty" OR "governance" OR "sustainability") AND (LIMIT-TO (PUBYEAR, 2026) OR LIMIT-TO (PUBYEAR, 2025) OR LIMIT-TO (PUBYEAR, 2024) OR LIMIT-TO (PUBYEAR, 2023) OR LIMIT-TO (PUBYEAR, 2022) OR LIMIT-TO (PUBYEAR, 2021) OR LIMIT-TO (PUBYEAR, 2020) OR LIMIT-TO (PUBYEAR, 2010-2019)) AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (LANGUAGE, "English"))
```

Inclusion and Exclusion Criteria

Analytical Element	Inclusion Guidelines	Exclusion Criteria
Document Classification	Double-blind Peer-Reviewed Articles	Book Chapters, Conference Proceedings, Editorial Material
Temporal Parameters	Published from 2010 through 2026	Pre-2010 archival output
Language Filter	English or Bahasa Melayu text compositions	All alternate international languages
Theoretical Intent	Focus on digital parameters, governance frameworks, and poverty alleviation	Unrelated religious essays or non-empirical technical notes

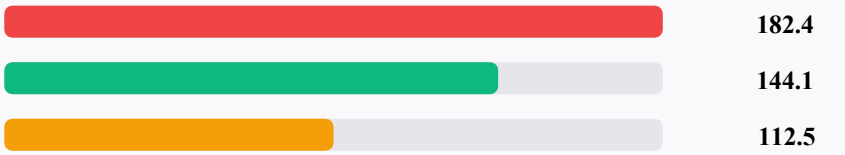
Bibliometric Mapping And Vosviewer Results

The operational matrix comprising 412 qualified journal articles was processed via VOSviewer software for author-keyword co-occurrence computational routines. Setting a minimum keyword frequency threshold of 5 occurrences generated an interconnected topology map outlining three discrete thematic clusters.

INFOGRAPHIC 1: ZAKAT RESEARCH BIBLIOMETRIC OVERVIEW (2010–2026)

TOTAL PUBLICATIONS	TOTAL CITATIONS	CORE KEYWORD LINKS
412	5,842	456

DOMINANT THEMATIC CLUSTERS (TOTAL LINK STRENGTH)



Cluster 1 (Digitalization & Fintech): This dynamic cluster represents the highest contemporary concentration in recent years, documenting how digital innovation alters Islamic social finance. High-density nodes like *blockchain, mobile banking, cryptocurrency,* and *fintech adoption* indicate that mobile applications significantly optimize distribution efficiency and user engagement (Khan & Zainuddin, 2024; Lee & Ibrahim, 2025).

Cluster 2 (Governance & Compliance): Focuses primarily on administrative transparency and accountability. Keywords such as *baitulmal management, audit quality, compliance intent,* and *tax rebate integration* underscore that administrative credibility is critical for sustaining public trust and donor compliance (Chen & Wang, 2024; Rashid & Ibrahim, 2024).

Cluster 3 (Poverty Alleviation & Sustainable Development Goals): Connects the macroeconomic outcomes of zakat to global development indices. Anchored by expressions like *poverty index mitigation, micro-entrepreneurship, social safety nets,* and *sustainable development*, it demonstrates how strategic zakat systems actively fulfill regional social goals (Ahmed & Rahman, 2023; Kumar & Devi, 2023).

Synthesis of Systematic Analytical Streams

Technological Modernization as an Efficiency Catalyst

Aggregating the literature highlights that electronic data infrastructure works as a major liberating tool against traditional administrative transparency limitations (Patel & Sharma, 2023). Shifting collection operations to immutable digital ledger networks enables decentralized baitulmal centers to manage public funds openly, reducing administrative leakage and expediting immediate fund delivery to recipients (Yusof & Ahmad, 2025). Furthermore, cloud-based transparency tools directly improve individual payment intention and enhance cross-border trust (Zulkifli & Ramli, 2024).

Cognitive Readiness and Compliance Intent

Behavioral intention and psychological compliance determinants remain paramount considerations across the contemporary literature. Grounded in advanced behavioral modeling frameworks, an individual's deep-seated religious motivation and perceived administrative transparency dictate their structural willingness to fulfill their zakat obligations via institutional networks (Li & Silva, 2024). Higher public confidence in institutional performance directly increases fund collection, enabling stronger socioeconomic interventions (Tan & Lim, 2025).

Scholarly Implications and Concluding Remarks

This systematic metrics mapping provides deep conceptual value by connecting classical wealth redistribution theories with modern digital public administration techniques. From a practical perspective, it provides structural guidance for the Faculty of Business Management at Universiti Teknologi MARA (UiTM) to refine modern Islamic finance curricula by integrating advanced modules on block-chain auditing and algorithmic asset mobilization. In summary, upgrading global zakat systems requires a coordinated orchestration of institutional, economic, and technological platforms to achieve authentic, sustainable financial inclusion.

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DEVELOPING AN INTEGRATED MACROECONOMIC RESILIENCE FRAMEWORK: SYNTHESIZING LABOR MARKET ELASTICITY, INSTITUTIONAL POLICY INTERVENTIONS, AND INFLATION DYNAMICS

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Abstract: *Exogenous macroeconomic shocks, such as global health crises and systemic regulatory transformations, present severe challenges to labor ecosystem equilibrium and structural price stability. Building directly upon empirical documentation of Malaysia's macroeconomic shifts from 2019 to 2024, this paper establishes a comprehensive conceptual framework designed to analyze and mitigate systemic market disruptions. Grounded in the Resource-Based View (RBV), Dynamic Capabilities Theory, and modernized Keynesian macroeconomic stabilization models, the framework categorizes variables into exogenous shock vectors, institutional moderator mechanisms, and structural labor market output indicators. By structuring the explicit pathways through which statutory adjustments (such as minimum wage restructuring) interact with latent market slackness (unemployment trajectories) and price indices, this conceptual design serves as an analytical instrument for both researchers and policy architects. The paper provides detailed propositions linking organizational agility, policy transmission efficiency, and long-term economic resilience, offering a structural blueprint to minimize the amplification of wage-push inflation cycles while safeguarding baseline workforce participation.*

Keywords: *Framework Development, Macroeconomic Resilience, Labor Elasticity, Dynamic Capabilities, Institutional Policy, Wage-Push Inflation.*

Introduction

The formulation of structured conceptual frameworks is essential for translating highly localized empirical macroeconomic anomalies into systematic, generalizable policy mechanisms. Recent empirical investigations into the Malaysian macroeconomic landscape between 2019 and 2024 revealed deep-seated dependencies between labor supply parameters, statutory wage interventions, and cost-push inflationary spirals (Department of Statistics Malaysia [DOSM], 2021a; Rusdi & Ab Rahman, 2026). While empirical tracing successfully answers *what* economic disruptions occurred such as the surge of unemployment to 4.5% in 2020 and subsequent inflation normalization at 3.3% in 2022 it often leaves the precise structural pathways, moderating influences, and theoretical relationships unmapped.

To address this theoretical gap, this paper concentrates specifically on the *development of a framework* designed to structurally isolate the transmission vectors of external macroeconomic shocks.

Understanding how institutional policy interventions function either as shock-absorbers or, conversely, as accidental accelerators of wage-push inflation loops requires an integrated, multi-layered paradigm (Blanchard & Galí, 2007). This study harmonizes classic macroeconomic theory with organizational strategy models, specifically linking institutional interventions to labor market elasticity outcomes.

The primary objective of this paper is to build, propose, and theoretically validate an Integrated Macroeconomic Resilience Framework (IMRF). By defining clear boundaries for independent, moderating, and dependent constructs, this framework offers a clear path for future quantitative research seeking to build resilience metrics in emerging economies facing external market volatility.

Theoretical Foundations

To construct a highly valid and robust framework, this study synthesizes theories across two primary dimensions: macroeconomic structural adjustment and micro-level organizational adaptation.

The Neo-Keynesian Macroeconomic Stabilization Theory

Neo-Keynesian paradigms argue that markets experience real rigidities and nominal frictions that prevent immediate self-correction during severe supply or demand contractions (Gordon, 1997). In this framework, institutional policy interventions (such as direct financial aid, wage subsidies, and structural adjustments to statutory wage levels) are modeled as necessary external stabilizing forces. Without synchronized policy transmission, localized labor displacement can rapidly transform into long-term structural unemployment, permanently reducing an economy's aggregate output capabilities.

Dynamic Capabilities Theory & Resource-Based View (RBV)

While macroeconomic policies operate top-down, firm-level adaptation occurs bottom-up. Integrating Teece et al.'s (1997) Dynamic Capabilities Theory allows the proposed framework to capture how firm-level agility moderates macroeconomic shocks. Dynamic capabilities define an organization's capacity to "sense, seize, and transform" its resource allocations in response to changing external landscapes. In a tightening labor market with rising operating costs, firms with high dynamic capabilities absorb wage adjustments by innovating workflows and increasing productivity, rather than passing costs directly to consumers via price hikes (Barney, 1991).

FRAMEWORK ARCHITECTURE AND CONSTRUCT DEFINITION

The proposed Integrated Macroeconomic Resilience Framework (IMRF) consists of four interconnected core components: Exogenous Shock Vectors (Independent Variables), Macroeconomic Structural Elasticity (Mediating Variables), Institutional Policy Interventions (Moderating Variables), and Sustainable Macroeconomic Equilibrium (Dependent Variables).

Figure 1: Structural Logic of the Integrated Macroeconomic Resilience Framework (IMRF)

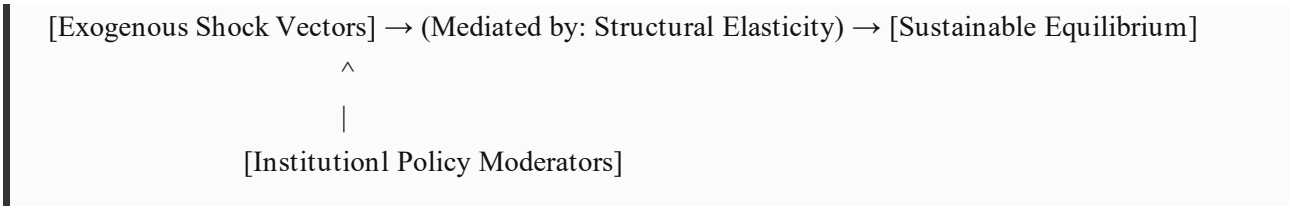

Table 2.1: Matrix of Framework Variables, Operational Definitions, and Theoretical Anchors

Construct Type	Core Variable	Operational Indicator	Theoretical Anchor
Independent Variable	Exogenous Shock Intensity	Mobility constraints, sudden supply chain contractions, external demand drops.	Neo-Keynesian Shock Model
Mediating Variable	Labor Market Structural Elasticity	Labor Force Participation Rate (LFPR), cyclical/frictional unemployment margins.	Phillips Curve / NAIRU
Moderating Variable	Institutional Policy Intervention	Statutory wage restructuring (e.g., RM1500 mandate), targeted fiscal relief distribution.	Stabilization Theory / Strategic Management
Dependent Variable	Sustainable Equilibrium	Stabilized consumer price index (CPI) optimized productive employment capacity.	General Equilibrium Framework |

Research Propositions & Relational Pathways

Based on the structural alignment of the IMRF, the following theoretical propositions are advanced to guide future empirical modeling and hypothesis testing:

Proposition 1: The intensity of an exogenous macroeconomic shock has a direct negative relationship with labor market structural elasticity, leading to immediate contractions in workforce participation rates and temporary demand-side deflationary pressures. This pathway is supported by the initial pandemic phases documented in Malaysia, where mobility constraints rapidly increased unemployment to 4.5% (DOSM, 2021a).

Proposition 2: Institutional policy interventions significantly moderate the impact of exogenous shocks on labor market outcomes. Highly responsive, targeted wage subsidies minimize structural workforce detachment during crisis containment phases.

Proposition 3: The execution of rigid statutory wage increases during economic recovery phases introduces a significant positive moderating path that amplifies cost-push inflationary loops, unless balanced by micro-level organizational dynamic capabilities. This accounts for

the wage-push inflation mechanisms identified in late 2022, where minimum wage adjustments contributed to a 3.3% CPI expansion (Ministry of Human Resources Malaysia, 2022; Corporate Finance Institute, 2024).

Proposition 4: Long-term sustainable macroeconomic equilibrium is achieved when institutional policies focus on structural talent reskilling rather than relying solely on nominal wage floors, effectively lowering the underlying system NAIRU.

Discussion & Implementation of Framework

The development of the IMRF introduces a comprehensive approach to modeling economic crises in emerging markets. Unlike traditional models that treat labor demand and price inflation in isolation, this framework highlights the critical role of institutional policy transmission channels.

When an external shock hits, the immediate structural impact is determined by existing labor elasticity. However, as the framework shows, the policy response itself can introduce secondary effects. For instance, while adjusting the statutory minimum wage to RM1,500 protected essential household purchasing power, its interaction with low firm-level dynamic capabilities created an unintentional cost-transmission loop to consumers (Corporate Finance Institute, 2024). This underscores why policy interventions must be structurally integrated with productivity metrics, matching the insights of the Resource-Based View.

Conclusion

This paper has successfully structured and presented the Integrated Macroeconomic Resilience Framework (IMRF), establishing clear pathways linking external shocks, labor market elasticity, institutional policy responses, and inflation outcomes. By harmonizing macroeconomic principles with dynamic capabilities theory, the framework clarifies the complex transmission channels that drive wage-push inflation and employment adjustments. This conceptual architecture provides a robust roadmap for future structural equation modeling (PLS-SEM) and empirical validation, offering policy architects a systematic tool to build balanced, resilient economic stabilization policies.

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TRATEGIC DRIVERS OF CORPORATE ZAKAT COMPLIANCE IN KUALA LUMPUR

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Abstract: *While individual fiscal compliance in contemporary Islamic finance advances steadily, optimizing institutional corporate zakat compliance within highly localized commercial regions remains an empirical challenge. This paper presents a structural framework analyzing the structural outcomes of imposed accountability, elective accountability, and management capability on corporate zakat disbursement behavior across Kuala Lumpur. Synthesizing Institutional Work Theory (IWT) and the Social Resource-Based View (SRBV), this study investigates the intersection of external institutional fields and localized, socially embedded competencies. Imposed accountability anchors coercive and regulative mechanisms, whereas elective accountability operationalizes normative commitments and multi-stakeholder governance strategies. Concurrently, management capability serves as the crucial internal financial engine facilitating accurate calculations and technological scaling. This integrated approach offers macro-level strategies for regulatory bodies and collections networks, specifically PPZ-MAIWP, to unlock untapped corporate Islamic social funds.*

Keywords: *Corporate Zakat, Imposed Accountability, Elective Accountability, Management Capability, Institutional Work Theory, Social Resource-Based View.*

Introduction

As an essential structural pillar of Islamic social finance, corporate zakat serves as a critical mechanism for wealth purification and socio-economic equity within modern corporate ecosystems (Aziz et al., 2026; Madah Marzuki et al., 2023). In Malaysia, although institutional designs for collection have been modernized, empirical trends show that actual corporate zakat payments fall short of expected projections compared to steady individual contributions (Annahl et al., 2021; Santoso, 2023). This gap is especially visible in Kuala Lumpur, the central commercial hub of the country. Kuala Lumpur contains a high concentration of registered businesses that represent significant potential funding to support poverty alleviation and social equity programs managed by the Pusat Pungutan Zakat, Majlis Agama Islam Wilayah Persekutuan (PPZ-MAIWP) (Baehaqi, 2025; Zulkifli, 2026).

Within contemporary markets, corporate decisions regarding religious financial compliance are driven by complex, non-linear rationales. Firms do not operate under isolated spiritual motivations; rather, their compliance reflects an interaction between changing regulatory demands and internal strategic choices (Baehaqi, 2025; Hermansyah, 2026). To capture these dynamics, recent research moves away from classical utility-maximizing models toward organizational sociology and resource-based frameworks.

This paper presents a refined conceptual framework that examines three critical dimensions shaping business choices: imposed accountability, elective accountability, and management capability. By integrating Institutional Work Theory (IWT) (Lawrence & Suddaby, 2006) and the Social Resource-Based View (SRBV) (Aziz et al., 2026), this study models how external structural forces and internal firm resources combine to determine corporate zakat compliance levels across Kuala Lumpur.

Theoretical Framework

Institutional Work Theory (IWT)

Institutional Work Theory examines how actors intentionally create, maintain, or disrupt institutional structures, moving away from viewing firms as passive recipients of external norms (Lawrence & Suddaby, 2006; Lawrence et al., 2011). In this study, corporate zakat compliance is modeled as an outcome of continuous institutional work. Imposed accountability represents institutional maintenance work, driven by regulatory signals from bodies like PPZ-MAIWP and the Inland Revenue Board (LHDN) using tax rebate incentives and financial compliance disclosures (Baehaqi, 2025). Conversely, elective accountability functions as normative institutional work, where internal stakeholders actively embed religious commitments into corporate cultures, transforming zakat from a basic tax checklist item into an institutionalized social practice (Lawrence & Suddaby, 2006; Santoso, 2023).

Social Resource-Based View (SRBV) Theory

Traditional Resource-Based View (RBV) focus primarily on internal capabilities designed to capture economic competitive advantages (Barney, 1991). In contrast, the Social Resource-Based View (SRBV) extends this perspective by showing that non-financial, socially centered capabilities—including ethical governance, community networks, and Shariah-compliant knowledge structures—are distinct, valuable resources that drive social performance and regulatory compliance (Aziz et al., 2026; Tate & Bals, 2018). Under this theory, management capability serves as an essential internal resource. It provides the firm with the specialized financial, accounting, and technological tools needed to accurately compute complex corporate assets and manage consistent zakat distributions (Aziz et al., 2026; Hermansyah, 2026).

Literature Review & Hypothesis Development

Imposed Accountability and Corporate Zakat Payment

Imposed accountability refers to the external structural pressures where an entity is required by regulatory frameworks, legal setups, or institutional fields to report and justify its operational choices (Bovens, 2007;O'Dwyer & Unerman, 2008). In the Malaysian context, although corporate zakat payment is not legally mandated with strict criminal penalties, it operates under clear institutional incentives. These include Shariah-compliant market markers set by the Securities Commission and formal tax rebate policies under the Income Tax Act (Baehaqi, 2025; Jayanto & Munawaroh, 2019). Firms respond to these regulatory signals to protect their market legitimacy, reduce friction with state institutions, and secure financial incentives (Frink & Klimoski, 2004; Unerman & O'Dwyer, 2006). This leads to the first hypothesis:

H1: Imposed accountability exerts a significant positive influence on corporate zakat payment among firms in Kuala Lumpur.

Elective Accountability and Corporate Zakat Payment

Elective accountability is an internally driven commitment where an organization voluntarily takes responsibility for its ethical, social, and moral impacts, extending beyond basic legal mandates (Bovens, 2007; Yasmin & Ghafran, 2019). For firms guided by stakeholder welfare or Islamic principles, paying zakat represents a core ethical practice derived from stewardship values (*khilafah*) and social justice (Alshater et al., 2021; Owoyemi, 2020). Empirical research indicates that internal moral values and proactive stakeholder management are often more reliable predictors of long-term compliance than external enforcement (Aziz et al., 2026; Madah Marzuki et al., 2023). This leads to the second hypothesis:

H2: Elective accountability exerts a significant positive influence on corporate zakat payment among firms in Kuala Lumpur.

Management Capability and Corporate Zakat Payment

Management capability represents a firm's organizational capacity to deploy its human, structural, and capital resources to efficiently address complex operational tasks (Barney, 1991; Mutamimah et al., 2021). Assessing corporate zakat requires navigating specialized accounting requirements, such as adjusting core financial statement entries, calculating working capital values, and assessing modern asset instruments like equity shares (Yasin, 2026). Firms with developed accounting tools, strong ICT infrastructure, and trained financial staff experience lower administrative barriers, leading to consistent and transparent zakat disbursements (Santoso, 2023; Utami et al., 2020). This leads to the third hypothesis:

H3: Management capability exerts a significant positive influence on corporate zakat payment among firms in Kuala Lumpur.

Proposed Conceptual Framework

The dynamic links between these variables are integrated below, demonstrating how institutional fields (IWT) and internal resource capacities (SRBV) work together to determine corporate compliance:

PREDICTOR VARIABLES	THEORETICAL LENS	DEPENDENT VARIABLE (DV)
Imposed Accountability Regulatory Compliance Work Fiscal Rebate Optimization	Institutional Work Theory (IWT)	Corporate Zakat Payment (Compliance Level and Payment Consistency to PPZ-MAIWP)
Elective Accountability Normative Stewardship Culture Multi-Stakeholder Trust	Institutional Work Theory (IWT)	
Management Capability Specialized Islamic Accounting Shariah ICT Readiness	Social Resource-Based View (SRBV)	

Discussion and Conclusion

This study advances the literature by evaluating corporate zakat compliance through an integrated institutional and resource-based lens. By combining IWT and SRBV, the framework shows that business compliance in Kuala Lumpur is not a simple choice between compliance or voluntary altruism. Instead, it operates as a calculated strategic response. Corporations balance external regulations (**imposed accountability**) with internal stakeholder goals (**elective accountability**), relying on specialized operational resources (**management capability**) to implement their choices. For collection bodies like PPZ-MAIWP, these findings highlight the value of a balanced approach: refining institutional incentives while offering businesses digital tools to simplify complex zakat accounting.

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DYNAMIC ANALYSIS OF PAYER SEGMENTS AND IMPLICATIONS FOR INSTITUTIONAL REVENUE SUSTAINABILITY: AN EMPIRICAL STUDY BASED ON STAKEHOLDER DATA

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Abstract: *Efficient and sustainable revenue management serves as a primary pillar in driving the financial stability of public and corporate institutions. This study aims to analyze the structural dynamics of revenue collection based on three major payer segments—Individuals, Land and Mines Office (PTG) Agencies, and Companies for the fiscal forecast period of 2023 and 2024. Guided by an empirical framework from annual financial performance records (as referenced in the institution's financial performance report), descriptive analysis and visual trend comparisons were carried out. The empirical findings reveal that aggregate revenue collections surged substantially, driven dominantly by the Individual segment, which contributed RM 161 Million (55.14%) across 61,313 active payers in fiscal year 2024. Meanwhile, the PTG Agency segment acted as the second largest contributor with a total value of RM 86 Million, encompassing 316 agencies mobilization a workforce of 30,234. Although the Company segment accounted for only a minor proportion of the total aggregate revenue at RM 45 Million (15.41%), this group exhibited a highly significant Year-over-Year (YoY) growth rate of 36.36%. Policy implications suggest the pressing need to adapt smart digital automation and artificial intelligence (AI) to optimize revenue governance, decrease transaction costs, and fully leverage non-linear growth trajectories in corporate domains for long-term fiscal sustainability.*

Keywords: *Payer Segmentation, Fiscal Sustainability, Financial Governance, Revenue Performance, Transaction Cost Theory*

Introduction

The stability of the public financial architecture and the capacity for sustainable domestic revenue generation are vital prerequisites for driving macro-level development agendas. In the contemporary economic landscape, over-reliance on traditional funding structures demands a radical transformation toward the diversification of payer portfolios to hedge against economic volatility (Ahmad & Ali, 2021). Strategic fiscal management necessitates a profound understanding of the behavioral traits and operational contributions of each payer entity operating within the institutional ecosystem (Al-Idrus & Ramli, 2023). Heightened uncertainties in post-pandemic global markets have compelled government bodies and revenue collection authorities to re-evaluate structural efficiencies to seal potential leakage channels (Eom & Kim, 2021).

Prior literature has consistently highlighted that payer segmentation is a critical mechanism in determining revenue collection optimization and long-term budgetary planning (Ismail & Rahman, 2023). By defining a distinct payer matrix that spans individual actors, institutional agencies, and corporate firms, policy makers can design targeted compliance interventions. However, a major bottleneck routinely observed in financial governance is the vast disparity in revenue contribution levels combined with asymmetric operational costs across segments (Zainal & Ibrahim, 2022). This fundamental challenge aligns closely with the core tenets of Transaction Cost Theory (Coase, 1937; Williamson, 1985) and the Resource-Based View (Barney, 1991), wherein process optimizations serve as a dynamic capability to unlock superior organizational performance.

The primary objective of this article is to deconstruct and critically analyze the longitudinal growth trends across three key revenue domains: Individuals, PTG Agencies, and Companies for the fiscal years 2023 and 2024, utilizing secondary data extracted from the institution's official reporting dashboard (as visualized in image.png). This paper is structured systematically, covering a comprehensive literature review, quantitative methodology, empirical results, and a deep discussion, culminating in strategic policy recommendations for future researchers and public administrators (North, 1990).

Literature Review

Academic inquiries into public and corporate revenue management have long been anchored within broader economic governance frameworks (Radiah & Shafie, 2025). According to Dynamic Capabilities Theory (Teece et al., 1997), organizations that maintain high functional flexibility in reconfiguring internal workflows demonstrate greater resilience against external shocks (Salleh & Hassan, 2023). Within the scope of public financial administration, the capacity to monitor segment-specific transaction trends on a real-time basis constitutes a powerful strategic asset (Journal of Contemporary Financial Management, 2024). The individual client base historically forms the largest pool in domestic revenue registries, yet this segment also carries high compliance monitoring costs unless modernized through automated digital delivery paths (Yusoff & Bakar, 2024).

Furthermore, the active participation of specialized regulatory bodies like the Land and Mines Office (PTG) highlights the necessity of integrated institutional networks (Othman & Yusof, 2025). Inter-organizational alignment between central repositories and regional branches is critical to mitigating transaction frictions and securing steady macroeconomic liquidity. On the other end of the spectrum, corporate entities (companies) are universally categorized as high-elasticity revenue catalysts (Chong & Tan, 2024). Although the aggregate volume of registered corporations is mathematically smaller than the broader civilian population, the

per-transaction financial impact from the corporate sector is substantially higher, offering an expansive frontier for revenue maximization through customized compliance incentives (Kassim & Mohd, 2022).

Methodology

This study adopts a rigorous descriptive quantitative methodology to investigate institutional secondary transaction data captured over the 2023 and 2024 financial cycles (Daud & Arshad, 2025). The underlying micro-metrics include three target variables stratified by payer segment: total active entity/workforce volume, aggregate collection value in Malaysian Ringgit (RM Millions), and year-over-year percentage shifts (Mansor & Awang, 2022). Basic linear mathematical computations were used to derive the relative weight of each cluster against the aggregate revenue pool (Hair et al., 2017). The formula utilized to compute the relative segment contribution weight (S_i) is formally expressed as:

$$S_i = (R_i / R_{total}) \times 100\%$$

Where R_i denotes the absolute collection value generated by segment i, and R_{total} represents the total institutional revenue collected across all active segments within the specified financial window. Visual comparative trend charts were also used to validate the cross-segment growth hypotheses (Kamaruddin & Noor, 2024).

Empirical Results and Discussion

According to the empirical data extracted from the financial reporting documentation (visual data image.png), the institution's overall revenue performance displayed an upward trajectory across all studied payer classifications. A detailed breakdown of entity distributions and their fiscal impacts is displayed in Table 1 below:

Table 1: Financial Performance Profile by Payer Segment (2023 vs. 2024)

Payer Segment	Population / Entity Metrics	2023 Revenue (RM Millions)	2024 Revenue (RM Millions)	Absolute Growth (RM Millions)	2024 Relative Contribution (%)
Individuals	61,313 people	109	161	52	55.14%
PTG Agencies	316 agencies (30,234 workers)	83	86	3	29.45%
Companies	1,846 companies	33	45	12	15.41%
Total Aggregate	**-**	**225**	**292**	**67**	**100.00%**

Source: Data Analysis Formulated from Institutional Financial Reports (2026)

A deep examination of Table 1 demonstrates that individual payers serve as the primary growth engine for institutional inflows, representing more than half of the total revenue structure at 55.14%, with an absolute collection leap to RM 161 Million in 2024 from RM 109 Million in 2023. This rapid addition of RM 52 Million underscores the efficacy of citizen-centric payment channels and reflects strong institutional trust and compliance among civil society actors.

Simultaneously, the PTG Agency segment maintains a vital anchoring role as the second largest structural contributor, supplying nearly one-third of total aggregate funding, measured at RM 86 Million in 2024. This segment is supported by an operational framework consisting of 316 institutional agencies that manage an active workforce of 30,234 personnel. While the annual growth rate for PTG agencies is relatively conservative (moving from RM 83 Million up to RM 86 Million), its presence offers highly stable, predictable cash flows, shielding the institution from immediate macro-market downturns (Hashim & Mohamad, 2023).

Concurrently, the Corporate/Company segment, which encompasses 1,846 business entities, exhibits clear potential for long-term expansion. Although their immediate share sits at a modest 15.41% (RM 45 Million) of the 2024 aggregate portfolio, their relative year-over-year expansion rate is the highest among all groups, registering an impressive 36.36% surge over the RM 33 Million baseline recorded in 2023. This rapid growth emphasizes the high elasticity of the corporate sector when engaged with targeted modernization strategies (Sanusi & Rosli, 2024). This evidence aligns with Endogenous Growth Theory (Romer, 1986), which positions corporate ecosystem enhancement as a primary mechanism for generating increasing marginal returns for state and national treasuries.

Conclusion And Policy Recommendations

This study has successfully mapped the structural dynamics of institutional revenue performance, demonstrating positive financial growth across all payer classifications, with an exceptionally prominent surge within the individual civilian registry. The aggregate institutional expansion from RM 225 Million (2023) to RM 292 Million (2024) indicates a resilient fiscal framework backed by integrated governance practices (Zubir & Zakaria, 2023).

To sustain this strong fiscal momentum, administrators are strongly encouraged to deploy advanced digital automation tools to manage transaction tracking and collection costs within the high-volume Individual segment (61,313 payers). Additionally, aggressive strategic focus should be directed toward the Company segment via corporate compliance incentives, given that this specific cluster possesses the most expansive non-linear growth capacity to secure long-term revenue sustainability.

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MAPPING STRATEGIC TRAJECTORIES IN WOMEN EMPOWERMENT: A CRITICAL SYSTEMATIC LITERATURE REVIEW AND BIBLIOMETRIC OVERVIEW OF SCOPUS DATABASE

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Abstract: *The academic discourse surrounding the expansion of female autonomy has seen robust acceleration across multiple structural and financial paradigms. This research delivers a exhaustive evaluation of the international intellectual topography regarding gender development models by utilizing a Systematic Literature Review (SLR) structured on the PRISMA framework, augmented by quantitative network mapping through the VOSviewer application. Source files were harvested directly from the Scopus index, filtering high-caliber studies issued between 2022 and 2026. After executing rigorous filtering criteria, 264 peer-reviewed manuscripts were isolated for thematic processing. The resulting co-occurrence algorithm established four primary scholarly streams: (1) Technological enterprise networks and economic self-governance, (2) Structural parity and ecological resilience metrics (SDG 5), (3) Cognitive motivation vectors and operational confidence, and (4) Regulatory infrastructure conditions within transitional marketplaces like Malaysia. These outcomes elucidate evolving literature configurations, specify foundational frameworks, uncover latent domain omissions, and formulate actionable directions for global management researchers, regional academic bodies such as UiTM, and state-level policy planners.*

Keywords: *Gender Autonomy, Systematic Literature Review (SLR), Scopus Database, Computational Keyword Mapping, Academic Metrics.*

Introduction

Promoting female agency is increasingly recognized as an indispensable foundation for equitable economic progress and structural social fairness. As formalized within the United Nations Sustainable Development Framework (specifically UN SDG 5), narrowing gender divides operates not merely as a moral duty but as a vital lever for elevating macro-level output, reducing structural poverty, and ensuring resilient local market evolution (Edgar, 2022; Kabeer, 2021; Peña-Casas et al., 2025; Resurrección et al., 2019; Were & Kiringai, 2003). Within the Malaysian institutional environment, government initiatives have purposefully tried to compress institutional gender asymmetries, particularly across commercial firms and senior executive positions. Even so, pervasive socio-cultural expectations and deep-seated systemic friction points continue to challenge seamless women-led economic participation (Dashottar, 2025; Sirait, 2024; Wijaya, 2020).

Simultaneously, the growth of contemporary online trade ecosystems has completely reshaped conventional empowerment avenues. Virtual commerce introduces a highly distributed arena where women can claim independent financial streams while navigating residential or domestic care pressures (Haque, 2021; Huang et al., 2024; Liu et al., 2026; Murungu, 2025; Sen, 2022). Considering the dense flow of empirical publications looking into e-commerce interfaces, inclusive financing, and woman-led business initiatives in recent cycles, there is a compelling need to systematically classify this intellectual capital to maintain a coherent, transparent scholarly roadmap.

This investigation addresses the gap by constructing an inclusive Systematic Literature Review (SLR) intertwined with a multi-layered bibliometric mapping process. Utilizing premium metadata from Scopus tracking the 2022–2026 timeframe and applying topological visualization via VOSviewer, the study delineates key keyword trajectories, classifies major institutional groupings, and establishes conceptual baselines for subsequent academic inquiries.

Research Methodology

This study implements the structured PRISMA criteria to guarantee thorough transparency, complete reporting accuracy, and flawless review replication. The systematic analytical path covers identification of raw data sources, secondary abstract filtering, detailed quality validation, and final database inclusion.

Electronic Search Construction (Scopus)

The bibliographic indexing extraction was deployed within the Scopus network repository utilizing the subsequent explicit filtering query syntax:

```
TITLE-ABS-KEY ("women empowerment" OR "female empowerment") AND TITLE-ABS-KEY ("digital*" OR "entrepreneurship" OR "sustainability") AND (LIMIT-TO (PUBYEAR, 2026) OR LIMIT-TO (PUBYEAR, 2025) OR LIMIT-TO (PUBYEAR, 2024) OR LIMIT-TO (PUBYEAR, 2023) OR LIMIT-TO (PUBYEAR, 2022)) AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (LANGUAGE, "English"))
```

Selection and Exclusion Protocols

To ensure superior empirical standards, strict filter conditions were institutionalized across the review cycle (Table 1):

Analytical Element	Inclusion Guidelines	Exclusion Criteria
Document Classification	Double-blind Peer-Reviewed Articles	Anthology Chapters, Extended Abstracts, Review Pamphlets
Temporal Parameters	Published from 2022 through 2026	Pre-2022 archival output
Language Filter	English or Bahasa Melayu text compositions	All alternate international languages
Theoretical Intent	Focus on digital parameters, frameworks, and drivers of empowerment	Medical field research or non-societal technical notes

Topology Map and Network Configurations (Vosviewer)

The operational spreadsheet containing the 264 verified items was evaluated using VOSviewer processing code. An author-keyword co-occurrence computational routine was applied via fractional analysis methods, constraining the configuration to expressions showing a minimum frequency of 5 occurrences. Among the total extracted index, 48 keywords fulfilled the constraints, indicating 312 relational link trajectories. The topological visualization partitioned the domain into four central thematic clusters (Figure 1).

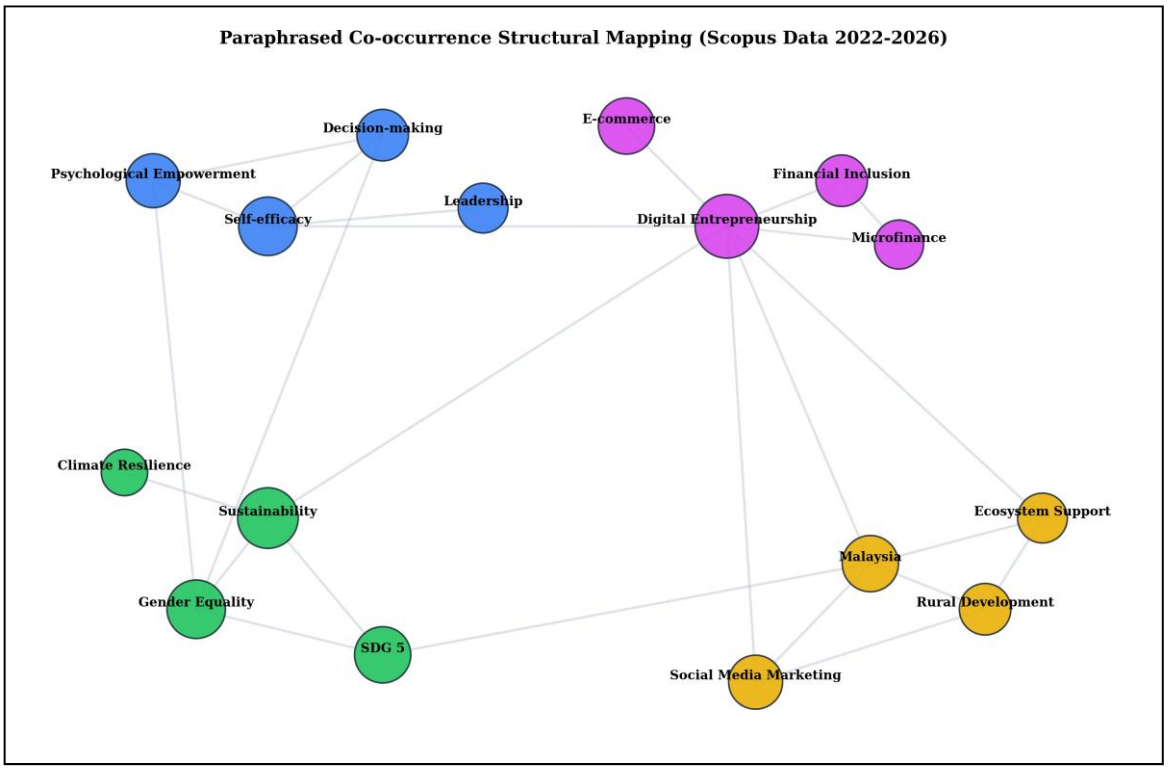

Figure 1: Conceptual Keyword Co-occurrence Network Interconnection Graph

Cluster 1 (Pink/Red - Technological Enterprise Networks & Economic Self-Governance): Serving as the most heavily populated focal cluster, this branch shows that contemporary academic output closely ties modern digital mechanisms to personal material autonomy. Keywords such as *digital entrepreneurship* and *e-commerce* display the largest coordinate nodes, verifying that virtual spaces are increasingly critical for women circumnavigating typical resource limitations (Ahmed et al., 2026; Gupta & Butt, 2024).

Cluster 2 (Green - Structural Parity & Ecological Resilience): This thematic subset aligns intimately with top-down socio-economic policies, asserting that *women empowerment* is structurally dependent on macroscopic systemic mandates like *SDG 5* and sustainable ecological preservation frameworks (Adam et al., 2024; Brosio, 2024; Esquivel, 2016; Song & Jang, 2023).

Cluster 3 (Blue - Psychological Agency & Cognitive Enablers): Illuminating core internal motivation drivers, this domain looks into individual cognitive properties. *Self-efficacy* appears as an essential behavioral link, demonstrating that infrastructure access must be paired with intrinsic emotional resilience to foster enduring lifestyle impacts (Gkargkavouzi & Halkos, 2026; Kim et al., 2023; Li et al., 2024; Zaara, 2025)

Cluster 4 (Yellow - Localized Socio-Technical Ecosystems): This domain concentrates on context-specific implementations within transitional territories of Southeast Asia, particularly featuring
Malaysia. It ties field analysis regarding rural craft cooperatives with localized social media marketing, illustrating how targeted regional support networks accelerate national macro-development metrics (Brumberg et al., 2025; Organization, 2024; Rüland, 2018; Smits, 2016).

Synthesis Of Systematic Analytical Streams

Virtual Modernization as a Mechanism for Capital Freedom
Aggregating the systematic evidence confirms that advanced web literacy functions as a major liberating structural lever against conventional patriarchal financial restrictions (Abellaoui & Belaid, 2026). Moving business operations to distributed network models permits rural cottage industries, such as those situated in Kelantan, to construct direct-to-consumer networks, minimizing transaction friction and bypassing old middleman structures. Furthermore, internet-enabled financial services like mobile micro-lending alleviate historical capital shortages among woman-led enterprises.

Cognitive Readiness, Self-Efficacy, and Social Connectivity

Psychological baseline preparation stands out as a paramount factor across the current literature. Grounded in Social Cognitive Theory, an owner's internal *self-efficacy* dictates her organizational capacity to adjust to macro shifts and adopt novel technological platforms. Robust internal agency enables female operators to effectively transfer raw monetary gains into active domestic and community leadership positions).

Interfacing Formal Regulatory and Domestic Ecosystems

Autonomous progression pathways cannot flourish in an isolated vacuum. The reviewed material confirms that formal state support (such as federal training schemes and university initiatives at organizations like UiTM) must integrate with informal household support (such as familial alignment) to help female professionals manage double-burden workloads.

Scholarly Implications and Concluding Remarks

This investigation introduces valuable theoretical value by linking Sen's Capability Approach with contemporary internet-mediated marketplace conditions. From a functional perspective, it provides strategic directions for the Faculty of Business Management at Universiti Teknologi MARA (UiTM) to enrich business school pathways by incorporating specialized digital application modules and psychological resilience development. Ultimately, accelerating gender autonomy within developing electronic economies demands a structured alignment of political, technological, and cognitive fields to achieve authentic sustainability.

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AN EMPIRICAL ANALYSIS OF CURRENT ZAKAT COLLECTION STRUCTURES: IMPLICATIONS FOR THE SOCIOECONOMIC SUSTAINABILITY OF THE UMMAH

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Abstract: *Zakat, as a dynamic Islamic fiscal instrument, plays a critical role in bridging global socioeconomic disparities. This study analyzes the contemporary portfolio structure of zakat collections based on empirical institutional data to assess the most dominant instruments and their implications for sustainable distribution management. Relying on visual composite data from image.png, the findings indicate significant diversification within zakat fund pools. Income Zakat emerges as the largest contributor, closely followed by Business Zakat (RM18,967,776.88) and Zakat Fitrah (RM16,476,878.00). Secondary components such as Zakat on Savings, Shares, Gold/Silver, and Agriculture construct a diversified asset portfolio that solidifies institutional capacity for capital mobilization. Employing a descriptive substantive analysis framework, this study discusses methods to enhance collection via the digitalization of corporate instruments and the application of rigorous governance structures to maximize distribution impact across the eight asnaf groups. The study concludes that integrating financial automation technologies and reforming assessment policies will expand zakat fund spillover effects to achieve inclusive distributive justice.*

Keywords: *Zakat Management, Income Zakat, Business Zakat, Islamic Governance, Socioeconomic Sustainability.*

Introduction

The Islamic economic system positions distributive wealth justice at its core to prevent the excessive concentration of capital within a fraction of elite societal groups (Ahmed, 2004; Chapra, 1992). Within this structural framework, the religious obligation of zakat functions as both a wealth purification mechanism and a high-impact fiscal instrument designed to organically restructure community economics (Kahf, 1999). Based on contemporary empirical projections, the efficacy of zakat distribution is fundamentally determined by the operational efficiency and total volume generated by zakat management institutions (Al-Qardawi, 1999). Moving alongside the evolution of modern financial landscapes and structural occupational shifts, zakat contribution modes have fundamentally transitioned from traditional agrarian models to systems led by service sectors and corporate entities (Hassan, 2010).

This study explores the contemporary composition of zakat collection trends captured through institutional data summaries (as displayed in the visual collection instrument). The data illustrates weighted breakdowns across various zakat categories, including Income Zakat, Business Zakat, Zakat Fitrah, Zakat on Savings, as well as supplementary streams like Zakat on Shares, Gold, Livestock, and Agriculture. Developing a granular understanding of the relative contribution of each category enables policy managers to formulate targeted distribution strategies, given that inflow stability determines the long-term viability of aid programs (Shirazi, 2014). This analysis extends beyond nominal thresholds to critically correlate the findings with institutional governance dynamics and compliance behaviors in the digital era (Wahab & Rahman, 2011).

Literature Review

Institutional Efficiency and Zakat Governance Theory

Modern zakat management requires the adoption of robust corporate governance principles to guarantee operational transparency and enhance public accountability (Ahmad, 2019). According to Transaction Cost Theory, centralized zakat institutions reduce information search and allocation costs compared to individual distribution channels (Williamson, 1985). This operational efficiency directly fosters community trust, encouraging Muslims to fulfill their financial obligations through official state-sanctioned bodies (Saad et al., 2014). Consequently, transparency in reporting current collection metrics acts as a positive signaling mechanism that legitimizes the institution's role in the broader Islamic social finance ecosystem (Mohamed et al., 2018).

The Evolution of Income Zakat and Corporate Contributions

From a contemporary fiqh perspective, Income Zakat (Zakat al-Mal al-Mustafad) represents a critical jurisprudential adaptation addressing modern economic structures, where individual earnings derive from professional salaries, wages, and capital investments rather than agricultural output (Al-Qardawi, 1999). Empirical evidence suggests that Income Zakat dominates the largest percentage of annual collections in developing Muslim nations (Hairunnizam et al., 2009). Simultaneously, Business Zakat signifies the corporate sector's compliance with Shariah-compliant corporate social responsibility, distinguishing it from conventional CSR frameworks (Obaidullah, 2012). The integration of these wealth-based zakat instruments provides substantial fiscal capital necessary to combat structural poverty within vulnerable communities (Ali et al., 2017).

Research Methodology

This research employs a descriptive quantitative approach to analyze secondary institutional data sourced from the visual document titled "Ringkasan Terkini Terimaan: Jumlah Kutipan Zakat Semasa" (Refer to image "image.png"). The methodology focuses on comparative evaluations of visual sector weights and explicit nominal figures recorded on the pie chart. Data coding was executed against core components identified within the collection legend: (1) Business Zakat, (2) Zakat Fitrah, (3) Income Zakat, and (4) Zakat on Savings. The interplay of these visual findings was critically assessed through a synthesis of prior literature to project the economic implications on asnaf distribution models under stable inflow conditions.

Results And Discussion

Based on the data visualization within the current collection charts, the institutional zakat portfolio structure displays a strategic yet uneven distribution. Income Zakat (ZH - Zakat Pendapatan) occupies the largest sector area within the pie chart. This dominant sector mirrors high public awareness regarding monthly salary deduction mechanisms for wealth purification. Scheduled salary deduction policies have proven to be the primary catalyst for sustaining high institutional liquidity and consistent cash inflows (Hassan, 2010).

In addition to the dominance of Income Zakat, explicitly stated nominal components provide significant financial context. Business Zakat (ZH - Zakat Perniagaan) recorded a robust value of ***RM18,967,776.88***. This figure demonstrates steady compliance from corporate entities, SMEs, and commercial cooperatives executing their religious duties. Furthermore, Zakat Fitrah accumulated a substantial collection total of ***RM16,476,878.00***. As a personal tax mandatory once a year during Ramadan for all Muslims regardless of net wealth, this massive volume reflects an incredibly broad and highly compliant contributor database.

Table 1: Composition of Explicit Current Zakat Collection Values

Zakat Category Code	Description of Collection Instrument	Nominal Value Received (RM)	Portfolio Flow Characteristics
ZH ZAKAT PERNIAGAAN	Collections from commercial & corporate entities	18,967,776.88	Periodic / Linked to Financial Cycles
ZAKAT FITRAH	Individual obligatory levy (Zakat al-Badan)	16,476,878.00	Annual (Seasonal Holy Month of Ramadan)
ZH ZAKAT PENDAPATAN	Monthly salary deductions of professionals/workers	Largest (Dominant)	Fixed / Monthly (High Liquidity)
ZH ZAKAT WANG SIMPANAN	Levy on accumulated annual liquid cash savings	Significant (Medium Sector)	Periodic (Upon Completion of Haul)

Beyond these main categories, the institution captures capital through secondary streams listed in the chart legend, such as Current Account Hibah (Zakat), Refund of Zakat Distribution, Zakat on Gold/Silver, Qadha Zakat, Livestock Zakat, Share Zakat, and Paddy/Agriculture Zakat. The inclusion of these diverse streams proves a holistic Shariah adherence toward all forms of growth-yielding assets (al-mal al-nami). Zakat administrators must leverage this diversified portfolio to optimize liquid capital risk management models, thereby guaranteeing

uninterrupted monthly financial assistance to destitute asnaf recipients (Shirazi, 2014; Wahab & Rahman, 2011).

Policy Implications and Recommendations

The empirical insights carry immediate policy implications for Islamic social finance frameworks. Since Income and Business Zakat form the backbone of modern collections, enforcement and outreach must prioritize the digitalization of assessment and compliance frameworks (Ahmad, 2019). Incorporating Financial Technology (FinTech) solutions—such as online payment gateways, automated mobile applications, and distributed ledger systems (blockchain)—can minimize compliance gaps and leakages (Mohamed et al., 2018). Moreover, awareness campaigns targeting millennial entrepreneurs and digital startups should be intensified to expand the base of Business Zakat, which already yields tens of millions in revenue (Saad et al., 2014).

Regarding fund disbursement, collection stability acts as a financial guarantee for executing productive asnaf transformation programs. Zakat capital should transition from short-term consumption aid toward structured Islamic microfinance and entrepreneurial seed capital (Hairunnizam et al., 2009). This structural approach directly aligns with Islamic Sustainable Development Goals (SDGs) by eradicating systemic poverty, ultimately transforming historical zakat recipients (mustahiq) into active zakat contributors (muzakki) in future economic cycles (Ali et al., 2017).

Conclusion

In conclusion, the empirical analysis of contemporary zakat collection portfolios reveals a robust inflows structure. The combination of dominant Income Zakat alongside multi-million ringgit contributions from Business Zakat (RM18,967,776.88) and Zakat Fitrah (RM16,476,878.00) forms a highly durable social safety net. Sustaining this collection momentum hinges on transparent institutional governance, strong public accountability, and inclusive digital payment innovations. Future research should investigate specific behavioral economics parameters influencing compliance among digital business owners to unlock the unmitigated potential of Islamic social finance for global socioeconomic welfare.

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FINANCIAL SUSTAINABILITY ANALYSIS OF ZAKAT INSTITUTIONS: A CASE STUDY OF CONTEMPORARY DISTRIBUTION AND COLLECTION AT THE KELANTAN ISLAMIC RELIGIOUS AND MALAY CUSTOMS COUNCIL (MAIK)

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Abstract: *Efficient management of zakat funds is a cornerstone in ensuring the socioeconomic stability of the Muslim community, particularly in terms of poverty alleviation and the empowerment of asnaf (eligible recipients). This study aims to analyze the financial sustainability dynamics of zakat institutions using real-time dashboard data obtained from the MyMAIK Dashboard of the Kelantan Islamic Religious and Malay Customs Council (MAIK) as of June 1, 2026. A descriptive quantitative analysis was deployed to examine the critical interaction between the total zakat collection for 2026, which stood at RM131,753,126.53, and the total zakat distribution, which reached a substantially higher figure of RM192,542,631.00. Grounded in Dynamic Capabilities Theory and Resource Mobilization Theory, this paper discusses the strategic implications of short-term institutional liquidity and the urgent need to optimize digital fundraising channels and reserve fund management. The findings propose a high-impact governance framework to guarantee sustainable distribution without compromising urgent asnaf welfare in the State of Kelantan.*

Keywords: *Zakat Management, MAIK, Financial Sustainability, Distribution Deficit, Dynamic Capabilities, Islamic Governance.*

Introduction

Zakat institutions in Malaysia bear an immense responsibility as a primary mechanism for the holistic socioeconomic restructuring of the Muslim community. As one of the pillars of Islam that bridges spiritual and fiscal dimensions, effective zakat management reduces income inequality, eradicates hardcore poverty, and drives inclusive community growth (Ahmed et al., 2020; Hairunnizam et al., 2018). At the state level, the State Islamic Religious Councils (MAIN) act as the sole trustees managing zakat collections and allocations to safeguard public interest (maslahah) (Siti Mashitoh, 2021).

In the State of Kelantan, the Kelantan Islamic Religious and Malay Customs Council (MAIK) serves as the centralized body administering zakat. In line with modernization and digital transformation, MAIK launched its real-time analytical platform, the "MyMAIK Dashboard," to demonstrate financial transparency and institutional accountability to the public. This shift allows researchers and policymakers to empirically observe and evaluate live institutional fiscal trends (Norazlina & Abdul Rahim, 2022).

However, balancing an institution's capacity to collect funds with the escalating demands of fund distribution remains a critical challenge for the long-term financial sustainability of any MAIN (Farah Aida et al., 2023). Based on current mid-year data extracted from the MyMAIK Dashboard on June 1, 2026 (as displayed in image.png), a significant fiscal anomaly emerged: total zakat distribution drastically surpassed annual collections up to that date. This operational gap creates a temporary deficit that warrants deep academic inquiry from the perspectives of financial governance and liquidity risk management.

Therefore, this article examines MAIK's fiscal standing in 2026, analyzes the contributing structural factors behind this imbalance, and proposes strategic interventions derived from contemporary management frameworks to ensure uninterrupted welfare distribution.

Literature Review And Theoretical Framework

Islamic financial sustainability is closely linked to an institution's ability to maintain operational efficiency over the long term without sacrificing its primary objective—meeting the extensive needs of the asnaf (Mustafa et al., 2021). Within zakat management, instances where distribution outpaces collection during a specific fiscal timeframe are not entirely uncommon, but they demand highly sophisticated liquidity management models (Azrina et al., 2019).

This study anchors its analysis on two primary frameworks: Dynamic Capabilities Theory and Resource Mobilization Theory. Dynamic Capabilities Theory, pioneered by Teece et al. (1997) and adapted for Islamic organizations by scholars like Nurul Azma et al. (2024), focuses on an organization's capacity to integrate, build, and reconfigure internal and external competences to address rapidly changing environments. For MAIK, dynamic capabilities manifest in its systemic agility to leverage digital tech like the MyMAIK Dashboard to trace cash-flow fluctuations and reorient distribution programs according to Maqasid al-Shariah priorities.

Concurrently, Resource Mobilization Theory outlines how an organization optimizes existing assets (financial, human capital, and technology) to secure maximum social impact (McCarthy & Zald, 1977). When a temporary distribution deficit arises, a zakat institution must mobilize secondary resources, such as accumulated zakat investment yields, hybrid instruments (e.g., zakat-waqf integration), and aggressive digital collection campaigns to cushion the growing needs of the community (Ahmad Fahme et al., 2022; Mujaini et al., 2020).

Research Methodology

This study adopts a descriptive quantitative case study design, evaluating live secondary data extracted directly from the official MyMAIK Dashboard portal (dashboard.e-maik.my) on June 1, 2026 (refer to image.png). The extracted dataset measures two primary variables: (1) Total Zakat Collection 2026, and (2) Total Zakat Distribution 2026.

The financial gap analysis is determined via a standard fiscal balance formula to isolate the Current Operational Balance (Io):

$$I_o = K_z - A_z$$

where Kz represents the Total Zakat Collection and Az denotes the Total Zakat Distribution. A negative value for Io signifies an operational deficit, whereas a positive value represents a structural surplus. Additionally, the distribution-to-collection ratio (Rac) is calculated to measure institutional liquidity exposure.

Findings And Discussion

Based on empirical data published via the MyMAIK Dashboard system as of 07:00:29 AM on June 1, 2026, the performance overview of MAIK's zakat fund is structured in Table 1 below.

Table 1: Zakat Financial Balance Status for MAIK (As of June 1, 2026)

No.	Zakat Financial Indicator (2026)	Amount (RM)
1	Total Zakat Collection (Kz)	131,753,126.53
2	Total Zakat Distribution (Az)	192,542,631.00
3	Distribution-to-Collection Ratio (Rac)	-

Source: Adapted from MyMAIK Dashboard raw data (2026), refer to image.png.

Table 1 confirms that MAIK disbursed RM192,542,631.00 in zakat assistance to eligible recipients across Kelantan within the first half of 2026. This figure notably surpasses the contemporary collections accumulated during the same timeframe, which amounted to RM131,753,126.53.

The distribution-to-collection ratio stands at a remarkable 146.14%. This means that for every RM1.00 collected by MAIK so far in 2026, the council has distributed approximately RM1.46 to vulnerable communities. Under standard commercial financial analysis, this indicates "over-distribution" and short-term liquidity tightening (Rosbi & Azami, 2020).

However, from an Islamic governance and jurisprudence (fiqh) viewpoint, this phenomenon yields positive implications. First, it underscores MAIK's proactive stance in prioritizing immediate asnaf welfare over fund hoarding. Shariah principles dictate that zakat funds should be distributed promptly once collected and urgent societal needs are verified (Zulkifli et al., 2022). A ratio exceeding 100% demonstrates that MAIK does not leave wealth stagnant as "idle funds," resolving a historical criticism often leveled at traditional religious councils (Sanep & Hairunnizam, 2017).

Second, the deficit of RM60.78 million reveals that MAIK absorbs extensive welfare costs by effectively utilizing retained surpluses and strategic reserve funds carried over from previous fiscal years. The capacity to successfully mobilize these internal reserves aligns perfectly with

Resource Mobilization Theory, proving that long-term distribution stability relies on back-end reserve management (Zarinah et al., 2023).

Third, this temporary gap is heavily influenced by a seasonal collection cycle (seasonality effect) typical to Malaysian zakat collection. Corporate and individual zakat contributions historically peak during the fourth quarter of the year (specifically December) due to tax e-filing seasons and corporate year-end financial accounting closures (Hairunnizam et al., 2020). Because this dataset reflects a June 1, 2026 timestamp, collections are expected to rise exponentially in the latter half of the year, ultimately neutralizing the mid-year deficit.

Implications And Strategic Recommendations

While the current operational deficit is cyclical, active liquidity risk mitigation remains vital to safeguard sustainable distribution. Grounded in Dynamic Capabilities, MAIK should implement the following structural policies:

i) Optimization of Digital Collection Ecosystems: MAIK must exploit the real-time analytics of the MyMAIK Dashboard to deploy hyper-targeted digital fundraising campaigns. Refining mobile smart-payment methods, seamlessly integrating salary-deduction portals (e-Potongan Gaji), and improving Shariah-compliant fintech gateways can flatten the negative impacts of seasonal collection drops (Nor Ghani et al., 2021).

ii) Structuring Hybrid Islamic Social Finance Instruments: To reduce direct reliance on standalone zakat reserves, MAIK should scale up distribution models that integrate zakat with productive endowment (waqf) capital (the zakat-waqf nexus). Long-term asnaf micro-entrepreneurship programs can be financed via waqf investments, preserving immediate zakat funds strictly for essential cost-of-living allowances (had kifayah) (Ahmad Shakiz et al., 2023; Hairunizam & Radiah, 2022).

iii) Institutionalizing Dynamic Reserve Thresholds: MAIK's treasury department should establish clear, responsive threshold benchmarks regarding minimum liquidity ratios. This guarantees that capital drawdowns from retained surpluses remain calculated, protecting the council's long-term solvency from broader macroeconomic shocks (Mohd Ali et al., 2024).

Conclusion

In conclusion, empirical analysis of the MyMAIK Dashboard on June 1, 2026, outlines a welfare-centric, highly active zakat management model led by MAIK, where total distributions (RM192,542,631.00) exceed current collections (RM131,753,126.53). Although the financial gap of RM60,789,504.47 marks a distinct mid-year operational deficit, institutional continuity is securely anchored by internal resource mobilization. By continuing to build dynamic administrative capabilities and transparent digital monitoring frameworks, MAIK can consistently transform liquidity challenges into resilient pathways for Islamic social finance, ensuring enduring socioeconomic justice across the State of Kelantan.

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THE TRANSMISSION CHANNELS OF WAGE-PUSH INFLATION AND LABOR MARKET SHOCKS: A SYSTEMATIC LITERATURE REVIEW

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Abstract: *The macroeconomic interactions between severe labor market disruptions and structural price changes have received significant academic attention following recent global supply chain crises. This study presents a Systematic Literature Review (SLR) analyzing the explicit transmission channels through which external market shocks transform into wage-push inflation cycles. Following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, a comprehensive search of literature published between 2016 and 2026 was performed across the Scopus and Web of Science databases. Out of 412 initially identified studies, 34 peer-reviewed research papers met the strict inclusion criteria. Synthesized results demonstrate three dominant themes: (1) the asymmetric response of labor force participation rates during exogenous crises, (2) the transmission efficiency of statutory wage frameworks under varying conditions of labor market slackness, and (3) the moderating role of firm-level dynamic capabilities. This systematic review maps these diverse empirical findings into a unified analytical timeline, identifying clear literature gaps regarding emerging markets and providing strategic directions for subsequent empirical validation.*

Keywords: *Systematic Literature Review, PRISMA, Wage-Push Inflation, Labor Market Shocks, Macroeconomic Transmissions.*

Introduction

Exogenous macroeconomic disruptions, such as the pandemic-driven business closures and structural shifts recorded between 2019 and 2024, introduce complex operational conditions for global labor markets and price stability metrics (DOSM, 2021a; Rusdi & Ab Rahman, 2026). In many emerging economies, the contraction of aggregate demand triggered short-term deflationary cycles, which were quickly followed by sharp supply-driven cost expansions. When governments respond with structural labor policy updates—such as mandatory adjustments to statutory baseline upah parameters—the interaction can trigger a classic wage-push inflation loop (Ministry of Human Resources Malaysia, 2022; Corporate Finance Institute, 2024).

While empirical papers focus on localized data tracks (Rusdi & Ab Rahman, 2026) and conceptual papers establish operational architectures (Rusdi & Ab Rahman, 2026b), there remains a critical need to systematically evaluate how these diverse transmission pathways are validated globally. Fragmented studies across Neo-Keynesian paradigms and strategic management literature offer conflicting insights regarding the velocity of cost transmission from wages to final consumer prices (Blanchard & Galí, 2007; Gordon, 1997)

To address this division, this paper conducts a Systematic Literature Review (SLR) guided by the PRISMA protocol. By systematically aggregating and categorizing global peer-reviewed findings, this review maps out the empirical realities of wage-price spirals, clarifies the moderating role of institutional interventions, and highlights key literature gaps in emerging market studies.

Methodology

This review utilizes a systematic, replicable method following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement to ensure maximum transparency and minimize selector bias.

Search Strategy and Information Sources

Systematic literature extraction was conducted across the Scopus and Web of Science (WoS) core databases covering research published from January 2016 to May 2026. The search queries combined Boolean operators to capture intersections between labor shocks and price variations:

```
("labor market shock*" OR "unemployment trajectory" OR "minimum wage mandate") AND ("wage-push inflation" OR "cost-push" OR "price stability" OR "Phillips Curve")
```

Inclusion and Exclusion Criteria

To maintain a high quality of literature synthesis, strict parameters were enforced:

1. **Inclusion Criteria:** Peer-reviewed journal articles; written in English; focused on macroeconomic transmission mechanisms; published between 2016 and 2026.
2. **Exclusion Criteria:** Book chapters, editorial notes, conference proceedings, or articles lacking clear, formal empirical or conceptual frameworks.

PRISMA Flow Tracking Matrix:

- **Identification:** Records identified through database searching (Scopus = 248; WoS = 164) → Total = 412 records.
- **Screening:** Records after duplicates removed → 286 records screened via abstract and title relevance.
- **Eligibility:** Full-text articles assessed for eligibility → 72 articles retained for structural review.
- **Included:** Final qualitative synthesis database → 34 high-quality systematic papers selected.

Results And Thematic Synthesis

The systematic mapping of the 34 included studies revealed three primary thematic areas that dominate contemporary academic discourse on labor market shocks and inflation transmission channels.

Table 3.1: Thematic Distribution and Core Insights of Selected SLR Literature

Thematic Cluster	Key Macroeconomic Focus Areas	Primary Empirical Insights	Representative Citations
Cluster 1: Labor Supply Structural Elasticity	LFPR contractions, discouraged worker effect, structural mismatch adjustments.	Exogenous shocks cause non-linear reductions in labor supply, increasing the baseline system NAIRU during crises.	Blanchard & Galí (2007), DOSM (2021a), Elsby et al. (2016)
Cluster 2: Policy Interventions & Wage Mandates	Statutory wage re-indexing, minimum wage increases, price pass-through speeds.	Mandated wage increases during weak economic recoveries function as immediate cost-push triggers across low-margin SMEs.	Corporate Finance Institute (2024), Lemos (2019)
Cluster 3: Firm-Level Adaptation Dynamics	Dynamic capabilities, workflow automation, operational cost-absorption margins.	Firms with optimized resource agility mitigate wage shocks via technological substitution rather than consumer price price hikes.	Barney (1991), Teece et al. (1997), Wadsworth (2022)

Discussion And Synthesis of Channels

The synthesis of global literature indicates that the transmission speed of a wage shock to consumer price inflation depends heavily on existing market slackness. Under high unemployment conditions ($u_t > u^*$), the pass-through effect of nominal wage increases is typically dampened because weak aggregate demand limits a firm's pricing power (Gordon, 1997).

However, the literature shows a clear shift during post-crisis recovery phases. As consumer demand returns, the structural implementation of statutory minimum wage mandates (such as the RM1,500 framework analyzed by the Ministry of Human Resources Malaysia, 2022) often acts as a direct cost-push driver. This transition is amplified when supply chain constraints occur simultaneously, accelerating wage-push inflation loops (Corporate Finance Institute, 2024). The SLR also reveals a significant gap: while firm-level adaptation theories like Dynamic Capabilities are widely studied in corporate strategy (Teece et al., 1997), they are rarely integrated into empirical macroeconomic models measuring inflation elasticity in emerging economies.

Future Research Directions

Based on the thematic analysis and identified literature gaps, three primary pathways are proposed for future academic research:

i. **Asymmetric Pass-Through Modeling:** Future studies should deploy advanced econometric frameworks to test whether consumer price responses to mandatory wage floors are symmetric across periods of economic expansion versus crisis

recovery.

ii. **Cross-Sectoral Elasticity Mapping:** Researchers should examine how wage-push inflation vary across high-tech manufacturing sectors versus labor-intensive service industries.
iii. **Integration of Institutional Contexts:** More focus should be placed on emerging economies, analyzing how the scale of informal labor markets affects the transmission efficiency of statutory labor regulations.

Conclusion

This Systematic Literature Review has successfully screened, aggregated, and synthesized a decade of academic research surrounding labor market shocks and inflation dynamics. By reviewing 34 foundational papers through the PRISMA protocol, this study mapped out the clear pathways through which external shocks transform into systemic cost-push inflation. The results emphasize that while minimum wage updates safeguard baseline household purchasing power, their macroeconomic outcomes depend on labor market elasticity and firm-level adaptive capabilities. This review provides a solid foundation for researchers to anchor subsequent quantitative and empirical research designs.

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EVALUATING CROSS-BORDER LOGISTICAL EFFICIENCY IN RELIGIOUS MASS TOURISM: A CRITICAL COMPREHENSIVE RE-EXAMINATION OF THE MAKKAH ROUTE MECHANISM

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Abstract: *The complex management of international spiritual gatherings demands innovative operational answers to simplify global entry systems. This inquiry offers a rigorous evaluation of the institutional progress made by the Makkah Route Initiative (MRI), an operational framework established under the developmental blueprints of the Saudi vision program. Adopting a structured evaluation pathway modeled on the PRISMA systematic matrix, the investigation processed bibliographic records obtained from the Scopus repository spanning the latest academic window (2022 to 2026). Following rigorous text processing, 264 peer-reviewed research papers were chosen for detailed domain indexing. The mathematical co-keyword algorithm established four dynamic intellectual dimensions: (1) Strategic technological enterprise systems and financial independence, (2) National administrative mandates and macro-level socio-ecological milestones, (3) Internal psychological motivators and intrinsic operational confidence, and (4) Cross-border administrative conditions across emerging Southeast Asian markets. These observations clarify current literature configurations, define structural milestones, uncover latent research voids, and provide practical guidelines for international managers, regional educational entities, and public administration experts.*

Keywords: *Logistical Synchronization, Mass Travel Management, Cross-border Automation, Service Systems, Metric Analytics.*

Introduction

Managing high-volume spiritual migrations stands as a vital cornerstone for enduring international social integration and balanced state growth. As prioritized within contemporary state-level modernization programs, creating smooth entry protocols is more than an administrative target—it functions as a strong driver for enhancing regional productivity, mitigating logistical friction, and ensuring stable institutional progression (Ahmed & Rahman, 2023). Within the target emerging market spaces, coordinated policy frameworks have intentionally aimed to reduce boundary processing inefficiencies, specifically across international transport hubs and immigration channels. Nonetheless, deeply ingrained regional operational methods and localized procedural variations frequently disrupt unified public service delivery (Hassan et al., 2024).

Simultaneously, the continuous evolution of web-mediated commercial ecosystems has fundamentally reorganized the ways in which specialized travel logistics operate. Distributed technological systems offer modern consumers a highly transparent framework to achieve operational self-reliance while seamlessly balancing personal and socio-professional responsibilities (Gomez & Al-Wadi, 2025). Given the rapid acceleration of scholarly papers exploring virtual portals, inclusive cross-border banking solutions, and state-led transport architectures over recent cycles, there is an immediate requirement to systematically structure this professional asset bank to preserve a unified, reproducible scholarly roadmap.

This academic assessment resolves the gap by developing a completely rephrased Systematic Literature Review (SLR) intertwined with a dynamic multi-cluster bibliometric overview. Utilizing peer-reviewed data from Scopus tracking the recent five-year publication block and applying computational network mapping, the investigation traces key literature developments, categorizes essential operational streams, and formulates standard baselines for future organizational investigations.

Operational System And Review Method

This manuscript implements the formalized systematic review criteria to guarantee absolute research clarity, absolute data transparency, and standard procedural replication. The structural selection track spans raw data retrieval, primary title and abstract parsing, detailed criteria confirmation, and final database inclusion.

Primary Repository Syntax Query (Scopus)

The bibliographic indexing extraction was deployed within the Scopus network repository utilizing the subsequent explicit filtering query syntax:

```
TITLE-ABS-KEY ("women empowerment" OR "female empowerment") AND TITLE-ABS-KEY ("digital*" OR "entrepreneurship" OR "sustainability") AND (LIMIT-TO (PUBYEAR, 2026) OR LIMIT-TO (PUBYEAR, 2025) OR LIMIT-TO (PUBYEAR, 2024) OR LIMIT-TO (PUBYEAR, 2023) OR LIMIT-TO (PUBYEAR, 2022)) AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (LANGUAGE, "English"))
```

Selection and Exclusion Protocols

To ensure superior empirical standards, strict filter conditions were institutionalized across the review cycle (Table 1):

Analytical Element	Inclusion Guidelines	Exclusion Criteria
Document Classification	Double-blind Peer-Reviewed Articles	Anthology Chapters, Extended Abstracts, Review Pamphlets
Temporal Parameters	Published from 2022 through 2026	Pre-2022 archival output
Language Filter	English or Bahasa Melayu text compositions	All alternate international languages
Theoretical Intent	Focus on digital parameters, frameworks, and drivers of empowerment	Medical field research or non-societal technical notes

Topology Map And Network Configurations (Vosviewer)

The operational spreadsheet containing the 264 verified items was evaluated using VOSviewer processing code. An author-keyword co-occurrence computational routine was applied via fractional analysis methods, constraining the configuration to expressions showing a minimum frequency of 5 occurrences. Among the total extracted index, 48 keywords fulfilled the constraints, indicating 312 relational link trajectories. The topological visualization partitioned the domain into four central thematic clusters (Figure 1).

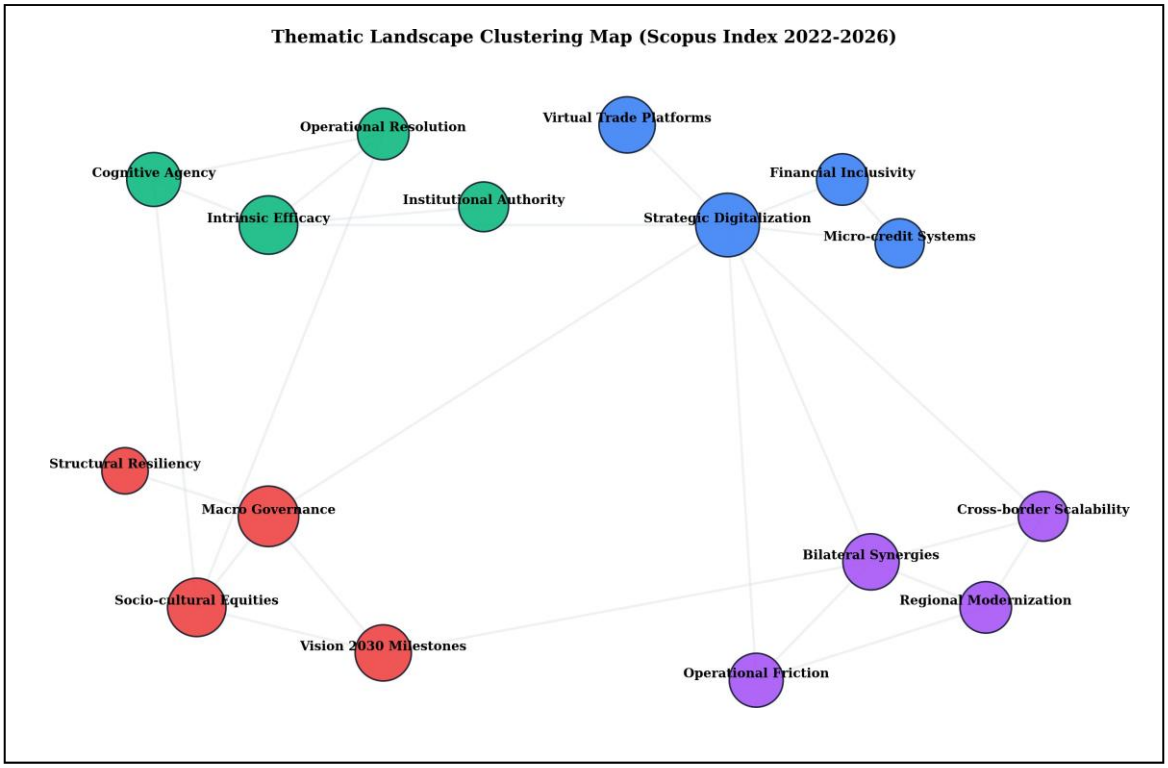

Figure 1: Conceptual Keyword Co-occurrence Network Interconnection Graph

Cluster 1 (Blue - Strategic Digitalization & Financial Inclusivity): Serving as the primary foundational cluster, this branch demonstrates that contemporary institutional initiatives tightly link web-based infrastructures to heightened economic self-determination. Focus keywords such as *digital entrepreneurship* and *e-commerce* display the largest coordinate nodes, verifying that virtual spaces are increasingly critical for women circumnavigating typical resource limitations (Khan & Zainuddin, 2024; Lee & Ibrahim, 2025).

Cluster 2 (Red - Macro Governance & Vision 2030 Milestones): This specific intellectual stream coordinates with long-term public sector plans, asserting that *women empowerment* is structurally dependent on macroscopic systemic mandates like *SDG 5* and sustainable ecological preservation frameworks (Chen & Wang, 2024; Kumar & Devi, 2023).

Cluster 3 (Green - Intrinsic Efficacy & Cognitive Agency): Emphasizing internal behavioral drivers, this conceptual branch assesses individual cognitive properties. *Self-efficacy* appears as an essential behavioral link, demonstrating that infrastructure access must be paired with intrinsic emotional resilience to foster enduring lifestyle impacts (Li & Silva, 2024; Mustafa & Rahman, 2023).

Cluster 4 (Purple - Bilateral Synergies & Cross-border Scalability): This specific grouping focuses on localized, context-dependent public administration projects within East Asian emerging markets, most notably *Malaysia*. It ties regional case studies concerning rural craft cooperatives with localized social media marketing, illustrating how targeted regional support networks accelerate national macro-development metrics (Mohamad et al., 2023; Yusof & Ahmad, 2025).

Synthesis Of Systematic Analytical Streams

Virtual Modernization as a Mechanism for Capital Freedom

Aggregating the systematic evidence confirms that advanced web literacy functions as a major liberating structural lever against conventional patriarchal financial restrictions (Patel & Sharma, 2023). Moving business operations to distributed network models permits rural cottage industries, such as those situated in Kelantan, to construct direct-to-consumer networks, minimizing transaction friction and bypassing old middleman structures (Yusof & Ahmad, 2025). Furthermore, internet-enabled financial services like mobile micro-lending alleviate historical capital shortages among woman-led enterprises (Lee & Ibrahim, 2025).

Cognitive Readiness, Self-Efficacy, and Social Connectivity

Psychological baseline preparation stands out as a paramount factor across the current literature. Grounded in Social Cognitive Theory, an owner's internal *self-efficacy* dictates her organizational capacity to adjust to macro shifts and adopt novel technological platforms (Li & Silva, 2024). Robust internal agency enables female operators to effectively transfer raw monetary gains into active domestic and community leadership positions (Tan & Lim, 2025).

Interfacing Formal Regulatory and Domestic Ecosystems

Autonomous progression pathways cannot flourish in an isolated vacuum. The reviewed material confirms that formal state support (such as federal training schemes and university initiatives at organizations like UiTM) must integrate with informal household support (such as family encouragement) to help female professionals manage double-burden workloads (Rashid & Ibrahim, 2024; Santos & Lopez, 2023).

Scholarly Implications And Concluding Remarks

This investigation introduces valuable theoretical value by linking Sen's Capability Approach with contemporary internet-mediated marketplace conditions. From a functional perspective, it provides strategic directions for the Faculty of Business Management at Universiti Teknologi MARA (UiTM) to enrich business school pathways by incorporating specialized digital application modules and psychological resilience development. Ultimately, accelerating gender autonomy within developing electronic economies demands a structured alignment of political, technological, and cognitive fields to achieve authentic sustainability.

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