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CORPORATE STRATEGIES FOR SUSTAINABLE DEVELOPMENT AND ADOPTION OF NEW TECHNOLOGIES

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SPECIAL ISSUE

CORPORATE STRATEGIES FOR SUSTAINABLE DEVELOPMENT AND ADOPTION OF NEW TECHNOLOGIES

Aligning Corporate Strategies with the Sustainable Development Goals

Introductory article by the special issue editors

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Introduction

The preceding three decades have been characterised by several social, technological, and environmental changes, which have customized the operational environment of corporations. One of those changes is the emergence of green sustainability (Gray, 1994; Abbas, 2019), which has an interlacing effect on creating customer value and sustaining companies' environmental, social, and financial performance. The responses to these important issues are gaining relevance, increasing the impetus for companies to develop new business models consistent with this paradigm and share this information with external stakeholders, including the public. Such an approach will help create a holistic, integrated view of implementing sustainable development practices and foster a new culture consistent with a large-scale transition to a green sustainable future.

The age of the digital era, which eliminated the geographical boundaries for businesses as well as for customers, has resulted in mass globalization. In this era, not only can customers easily contact different suppliers around the world, they can also find substitutes that fulfil their needs at a lower cost (Singh, 2020; Mather, 2020), making the acquisition and maintenance of competitive advantage a real challenge for firms. Such an ambitious task is driven by the commitment to follow the UN Sustainable Development Goals (SDGs) and the consequential need to align business strategies with the SDGs. Therefore, to fulfil the needs of customers and achieve the SDGs, dynamic organizations adopt multiple strategies with proven success in enhancing organizational performance, such as re-orienting business plans and the development of capabilities.

In 2015, all United Nations (UN) member states ratified and adopted the 2030 Agenda for Sustainable Development as a plan of action to end poverty, protect the planet, and ensure prosperity for all people worldwide (UN, 2015). At the core of the UN 2030 Agenda for Sustainable Development are 17 integrated sustainable development goals (SDGs) and 169 associated specific measurable targets. A prominent feature of the UN 2030 Agenda for Sustainable Development is the emphasis on the role of the private sector in advancing and achieving sustainable development initiatives, working in partnership with governments, civil society, and other stakeholders. In relation to this, business and industry, working with political leaders and civil society, were significantly involved in, and contributed to the design of, the SDGs (UN, 2015).

Effective green sustainability models can promote the diffusion and integration of SDGs into business practices, thus helping one to achieve the SDGs (Mangena, 2012; Pirzada, 2017). In this context, it is important to provide an understanding of whether and how green sustainabil-

ity models affect or influence the corporate sector's engagement with SDGs (including environmental, social, and governance aspects).

Overview of the Special Issue Papers

This special issue of Corporate Strategies comprises eight papers examining the role of corporate strategy arrangements for sustainable green development and knowledge generation on SDGs in the context of Asian and Eastern Europe countries.

The first paper by Wong Wai Khuen, Teh Boon Heng, and Tan Siow-Hooi examines the impact of organizations disclosing important environmental, social, and governance (ESG) issues. The continued flatlining of ESG reporting quality has led some parties to call on policymakers to take advantage of the distinct contextual pressure from external stakeholders to improve corporate ESG commitment. However, the relationship between external stakeholders and ESG disclosure remains theoretically and empirically ambiguous. Grounded in stakeholder theory, legitimacy theory, resource-based theory, and slack resource theory, this article reconceptualizes the Ullmann (1985) model of corporate social performance and presents a novel conceptual framework to examine the external stakeholders-ESG disclosure relationship. The empirical exploration of the framework will assist policymakers to identify salient external stakeholders to collectively promote greater ESG commitment amongst corporate organizations. Future research could entail a longitudinal study using regression techniques to test and validate the conceptual framework.

The second paper by Kiet Hong Vo Tuan Truong, Van Pham Huynh, and Huy Dang Nguyen, focuses on the crucial role of universities in training and educating future businesspeople to holistically comprehend sustainable thinking. This demonstrates the importance of preparing the next generation of businesspeople with factual knowledge, practical skills, and a sense of responsibility toward sustainability. This study examines the ideas of economics students and compares these with the opinions of professionals (international and local scholars and transporter/logistics) toward sustainable business practices. The findings show that students, in general, are highly aware of the principles of sustainable development and ready to implement them in practice during business planning. With the help of matrices of factor analysis, four alternative realistic patterns of corporate strategies for sustainable development, with appropriate recommendations for their implementation, were compiled. They serve as a basis for decision-making by current and future entrepreneurs when forming their own business plans.

The third paper by Roslee Uyob, Ku Maisurah Ku Bahador, and Ram al Jaffri Saad examines evidence from Malaysia to investigate how incentives for Extensible Business Reporting Language (XBRL) affect the relationship between intention to use and user behavior when filing submissions. In this regard, a survey was implemented among company employees involved in the preparation and submission of filings to Suruhanjaya Syarikat Malaysia (SSM). The results indicate that incentives strengthen the positive relationship between XBRL filing intentions and usage behavior. The study also discovers that intent to use significantly impacts XBRL filing behavior. Compared to perceived usefulness, perceived ease of use was found to have a greater influence on XBRL filing intentions. Perceived ease of use was also found to be a significant indicator of XBRL filing perceived usefulness. The results of this study provide guidelines for incorporating XBRL technology into the practices of government authorities and policymakers. The paper's findings can also be used to develop strategies to encourage filers to submit voluntary filings using the XBRL platform.

The fourth paper by Thomas Turner and Konstantin Bagrationi investigates the resistance of middle managers to innovative digital transformation initiatives and suggests strategies for overcoming such opportunistic behavior in the context of a major Russian transportation company. This study assesses the values and attitudes of middle managers, and identifies patterns of resistance behavior among middle managers. The findings reveal a significant relationship between employees' attitudes toward routine and their resistance to digital transformation. Managers with high scores in tradition, conformity, security, and power values, as well as strong positive attitudes toward routine, were more resistant to change. Conversely, those with high scores in universalism, self-direction, and stimulation values were more open to change. By addressing the values and concerns driving middle managers' attitudes, organizations can better support them in overcoming resistance to digital transformation.

The fifth paper by Fara Adilah Firdaus Mohd Rom and Osamu Soda explores good governance concepts and their relevance for project administration and implementation success. This paper investigates the link between the understanding of good governance concepts and their delivery from the perspective of the management of public projects in affordable housing in Malaysia. The findings identified that most of the managers surveyed understood the concept of good governance and what constitutes it and were aware of the importance of good governance practices in public projects. This paper recommends that a government, through its authorities or agencies, continuously educate organizations and the public in understanding the true concept of good governance for smoother project administration and implementation for the growth of the whole nation.

The sixth paper by Sofi Dinesh and Suddhachit Mitra, relying on the behavioral economics concept, investigates the influence of the Big Five personality traits which include extraversion, agreeableness, conscientiousness, neuroticism, and openness, in molding the adoption intention of consumers toward electric vehicles (EVs) in India. The study was undertaken in two stages. In the first stage, users and non-users of electric vehicles were surveyed. The results show a significant effect of all Big Five personality traits on adoption intention, except for neuroticism. There was no significant difference in the adoption intention based on the differences in personal-

ity traits between men and women. In the second stage, the study used an expert-opinion based survey that was conceptualized based on the Diffusion of Innovation theory combined with the idea of memetics in new product diffusion. The results from the first stage of the research were bolstered by the fact that the second stage indicated that product attributes influencing diffusion would have a negative influence on adoption intentions of persons with high neuroticism. The paper provides useful insights into consumer behavior based on personality for marketers of electric vehicles and policymakers interested in bringing about sustainable consumption practices.

The seventh paper by Fuad Fakhri Murshudli examines the role of green financial policy in the solving of major global environmental problems with a focus on international banking activities. For developing countries, international bank financing is one of the main sources of environmentally sustainable development. Therefore, this study aims to analyze how international green banking affects the environmental sustainability of developing countries. The data series retrieved from the OECD and World Bank Open Data for the period 2010 to 2020 compiled the information basis of this study. The identified effects can be useful for government officials to determine the benefits of using international green banking toward achieving environmental sustainability.

The eighth and final paper in this special issue is by Shady Shayegan, Ardeshir Bazrkar and Reza Yadegari. This paper investigates and analyzes the level of realization of sustainable organizational performance of companies active in Iran's automotive industry using new technologies and green human resource management practices. The study surveyed more than 200 senior and middle managers of active companies in the automotive industry of Iran. The results of the research hypothesis tests show that the use of new technologies has a positive and significant effect on sustainable organizational performance and the effective implementation of green human resource management practices of the studied companies. In addition, the relationship between the use of innovative and sustainable organizational performance and variable green human resource management practices has a mediating effect.

Conclusion

The United Nations 2030 Agenda and the SDGs have been heralded as an important and unprecedented step in ending poverty, protecting the planet, and ensuring prosperity for everyone worldwide (United Nations General Assembly, 2015; Tsalis, 2020). A key feature of the UN 2030 Agenda is the acceptance of the huge role played by the private sector in advancing and achieving the SDGs by integrating sustainability principles into their corporate strategies. However, integrating the SDGs into corporate strategies depends on effective firm-level sustainable green development and the knowledge generation of SDGs in the business purpose and values, including sustainable practices in their day-to-day operations.

The papers in this special issue investigate the role of corporate strategies for sustainable green development and knowledge generation in implementing the SDGs or principles in Asian and Eastern Europe countries, including Malaysia, Vietnam, Iran, Japan, India, Azerbaijan, and Russia. Although the papers provide important insights into the drivers of SDGs, they are from seven different countries, highlighting the need for further studies on the contribution of corporate strategies toward the achievement of the SDGs in the context of a wider group of countries. Such studies could also consider a cross-country analysis to provide insights into how institutional differences among countries influence the implementation and achievement of SDGs. There is also a need to understand the role of other corporate strategies, such as integrated reporting and long-term value, on the achievement of SDGs. It is a matter of great importance for companies to explain how their corporation creates value for their key stakeholders in the long term not only to preserve their existence, but to remain in sharp focus for all entities.

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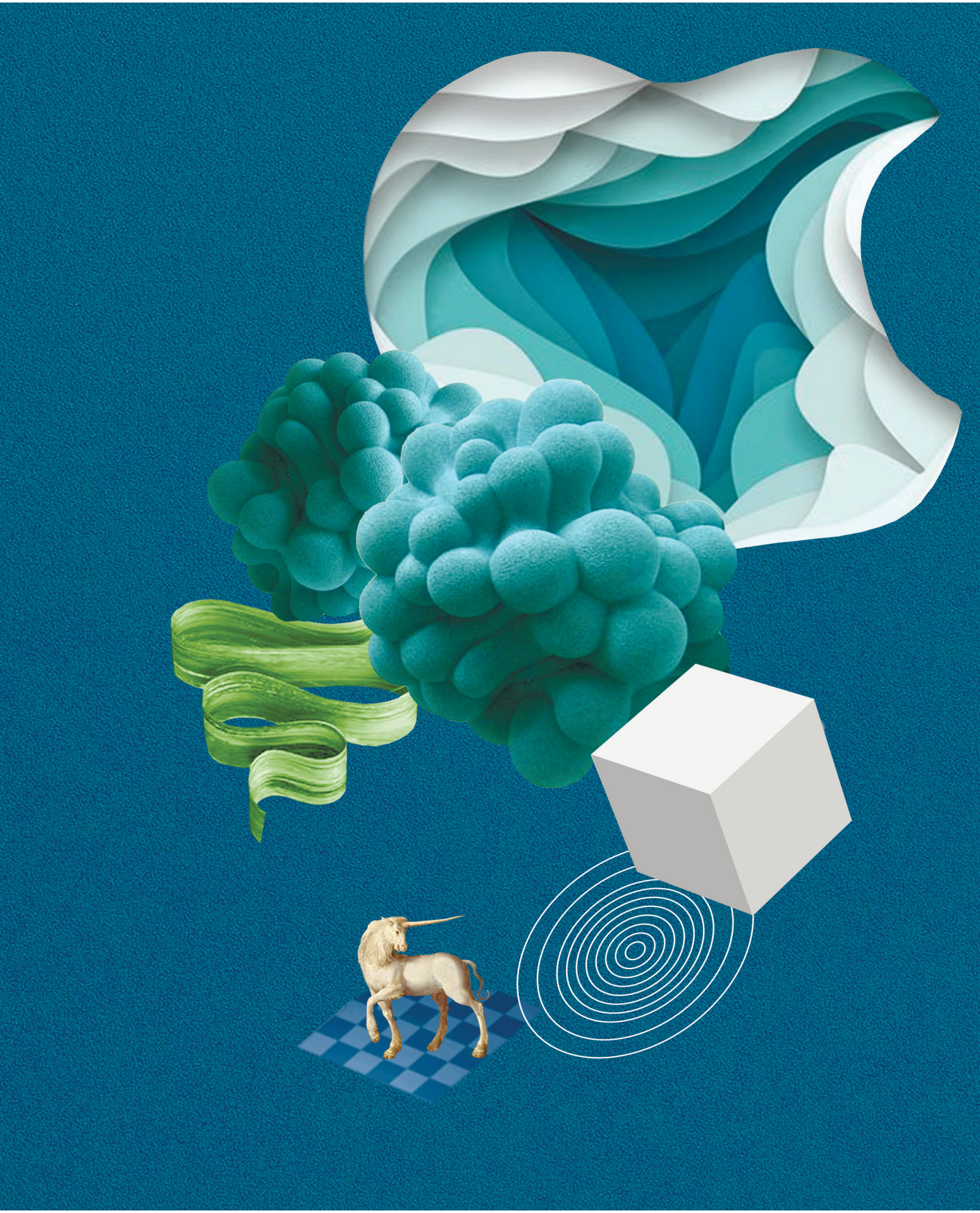

The Influence of External Stakeholders on Environmental, Social, and Governance (ESG) Reporting: Toward a Conceptual Framework for ESG Disclosure

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Abstract

In recent years, governments and investors globally are compelling major corporate organizations to disclose important environmental, social and governance (ESG) issues. The continued flatlining of ESG reporting quality has led some parties to call on policymakers to take advantage of the distinct contextual pressure from external stakeholders to improve corporate ESG commitments. However, the relationship between external stakeholders and ESG disclosure remains ambiguous, both theoretically and empirically. Grounded in stakeholder theory, legitimacy theory, resource-based theory, and slack resource theory, this article reconceptualizes Ullmann's 1985 model of corporate social performance to present a novel conceptual framework to examine the external stakeholders-ESG disclosure relationship. This article contributes to the literature by illustrating the mediating effect of the strategic posture and the moderating effect of corporate financial performance on corporate ESG discourse perpetuated by powerful stakeholders.

Keywords: conceptual framework; environmental, social & governance (ESG); stakeholder theory; legitimacy theory; resource-based theory; slack resource theory

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Introduction

ESG is shorthand for a wide range of environmental, social, and governance issues that affect corporate behavior and the ability to create long-term value for stakeholders (Moats, DeNicola, 2021; Rose, 2021). In 2019, the market size of impact investing, which is guided by positive and measurable ESG impact and financial return, grew to approximately US$715 billion (Hand et al., 2020). The year 2020 also saw a record number of 619 sustainable funds that incorporated ESG factors successfully launched in Asia, the United States and the European Union. By early 2020, over 80 countries had introduced sustainability reporting instruments that either mandate or encourage corporate organizations to disclose their current and future ESG commitments.[1] However, recent literature revealed that mandatory disclosure affects an organization's propensity to file an ESG report, but does not increase the average quality of said reports (Krueger et al., 2021). This implied that new approaches are needed to encourage quality reporting, specifically among those companies that have yet to publish any quantitative data (Heaps et al., 2019).

Against this backdrop, policymakers were urged to take advantage of the distinctive contextual pressure exerted by external stakeholders to induce a greater commitment to and the disclosure of corporate sustainability information (Ali et al., 2017). Despite the consensus established in the extant literature as to which stakeholders are influential with regard to ESG disclosure, their influences are largely ambiguous, context-dependent, and vary over time depending on the issues considered (Buysse, Verbeke, 2003; Yunus et al., 2019). This lack of conclusive evidence may be attributed to the missing link concerning the underlying processes between the external stakeholder–ESG disclosure relationship that has yet to be thoroughly parameterized, analyzed, and explained. The seminal work by Ullmann (1985) outlined a three-dimensional model to illustrate this relationship, with the central proposition that stakeholder power, strategic posture, and economic performance are significant contributing factors for corporate social performance. Grounded in stakeholder theory, the Ullmann model has since been applied in research on corporate social, environmental and sustainability disclosure in developed counties including the United States, Canada, France, and Spain (Roberts, 1992; Magness, 2006; Lahouel et al., 2014; Moreno, Duarte-Atoche, 2019). However, the examination of ESG reporting, particularly in the setting of developing countries, without proper contextualization could perpetuate flawed understandings that are based on theories and hypotheses developed from studies carried out in developed countries (Tilt, 2016). In other words, the existing literature highlighted the limited applicability of the Ullmann model for ESG disclosure in developing countries, thus a timely review of the model is necessary.

Moreover, the reliance on the explanatory power of a single theory in prior studies also indicates a possible theoretical gap in capturing the greater perspectives concerning ESG disclosure (Omran, Ramdhony, 2015). Accordingly, ESG researchers are recommended to utilize more than one theory to investigate this phenomenon (Van der Laan, 2009; Nguyen, Nguyen, 2020). In this regard, there remains a missed opportunity to integrate multiple theories to enhance the applicability of the Ullmann model. Hence, the purpose of this article is to develop a conceptual framework for ESG disclosure by drawing on multiple theories to reconceptualize Ullmann model. Specifically, the conceptual framework lays out a logical structure of connected concepts in the form of a visual display within a theoretical framework to outline how the corporate discourse on ESG is perpetuated by powerful external stakeholders. This synthetic approach yields several benefits. First, a multi-theoretical framework provides a more holistic understanding of the ESG phenomenon, as each theory offers a unique perspective on the same topic. Despite the possible overlap of different perspectives, this endeavor could open new research opportunities for scholars to build or synthesise a more refined version of these theories (Omran, Ramdhony, 2015). Second, an integrated framework with multi-theoretical grounding allows for broader application in different contexts (Mayer, Sparrowe, 2013). Lastly, future researchers can use the resulting framework to empirically test the relationship between external stakeholders and ESG disclosure to identify salient stakeholders and relevant policy instruments capable of instilling greater ESG commitments among corporate organizations.

Literature Review

The Concept of ESG Disclosure

Corporate disclosure refers to the communication of information by people inside the public companies to external parties, specifically with the aim of communicating the performance and governance of the company to outside investors (Healy, Palepu, 2001). Traditionally, an annual financial report serves as the most informative public company document for stakeholder groups seeking to understand the risks and opportunities that corporate leaders are considering, planning, and managing (Ullmann, 1985; Hummel, Szekely, 2021). In recent times, ESG disclosure became the latest acronym to emerge alongside integrated reporting, which was considered a progression from earlier forms of corporate reporting to reveal environmental and social policies and impacts of an organization (Buhr et al., 2014). In essence, these corporate accounting reports

[1] https://www.carrotsandsticks.net/media/zirbzabv/carrots-and-sticks-2020-june2020.pdf, accessed 18.12.2022.

are considered economic documents that could influence economic and political arrangements and may even pique the general interests of a given organization (Mahmud, 2020). Similar to the earlier dominance of social reporting, ESG reporting is another form of communication over management has complete editorial control to minimize the risk of journalistic interpretations and distortions (Guthrie, Parker, 1989). As such, companies can exploit the potentially subversive nature and biased role of corporate disclosure to distract attention of their stakeholders from pursuing ESG issues and disclosure laws (Deegan, 2017).

The Concept of External Stakeholders

Freeman (1984, p. 25) defined *stakholder*s as "any group or individual who can affect or is affected by the achievement of the organization's objectives." Harrison and St. John (1997) further categorized this entity into internal stakeholders who have formal ties to the corporate organization (i.e., managers and employees), and the rest as external stakeholders who could influence the corporate organization. The authors asserted that priority should be given to external stakeholders based on their ability to influence the environmental uncertainty faced by the corporate organization. Mitchell et al. (1997) developed a stakeholder identification model for corporate management to better serve the narrower interests of stakeholders based on the following attributes: 1) the stakeholder's power to influence the company; 2) the urgency of the stakeholder's claim on the company; and 3) the legitimacy of the stakeholder's relationship with the company. Mitchell's fundamental proposition was empirically tested by Parent and Deephouse (2007), which reported that stakeholder's power has the most significant effect on salience – the degree to which management give priority to competing stakeholder claims. Accordingly, corporate management will likely prioritize demands from stakeholders who have the power to reward or punish them (Mitchell et al., 1997; Agle et al., 1999).

Stakeholder Theory

The central tenet of stakeholder theory posits that "a company has a responsibility to develop relationships and create as much value as possible for stakeholders, without resorting to trade-offs" (Freeman et al., 2010). The early works by stakeholder theorists led to the divergence of stakeholder literature into two branches - moral and strategic (Goodpaster, 1991; Frooman, 1999). The moral (or ethical) branch proponents embraced normative perspectives about how the organization should act, advocating that the organization should strive to balance the interests of different stakeholders (Mainardes et al., 2011). For example, Chelliah et al. (2017) investigated the motivational factors that influence the managers of Malaysian small and medium enterprises (SMEs) in adopting corporate social responsibility (henceforth, CSR) practices. The authors confirmed that employees are generally driven internally to implement CSR practices due to the moral obligations embraced by their managers or owners. Correspondingly, Ullah et al. (2022) examined the Pakistani manufacturing sector and concluded that the ethical leadership of CEOs could stimulate businesses to accept corporate social obligations. Their findings corresponded with the growing prevalence of *marketplace morality* which is driven by perceived corporate morality in choices made by investors and consumers (Branco, Rodrigues, 2006). Examples of marketplace morality include the recent study by Saxton et al. (2021) which examined the Fortune 200 companies' Twitter accounts on CSR-related responses. The authors demonstrated that major companies are more likely to respond to selected CSR-focused issues due to the moral persuasiveness imposed by their influential stakeholders on social media platforms.

In contrast, the strategic (or managerial) branch provides a useful framework to analyze ESG disclosure in an organization-centered perspective (Van der Laan, 2009), by which companies may exploit ESG disclosure as a strategic reporting tool to manipulate the attitudes of their external stakeholders to achieve their goals (Guthrie, Parker, 1989). This raises concerns about *greenwashing*, a form of an impression management mechanism often employed by companies as a communication strategy to publicize their sustainability efforts that do not reflect actual performance (Suryani, Jumaida, 2022; Ngu, Amran, 2021). Specifically, companies with poor corporate social and environmental performance will avoid disclosing sustainability information to mitigate stakeholder attention and scrutiny (Rudyanto, Pirzada, 2021; Stacchezzini et al., 2016). Ruiz-Blanco et al. (2021) analyzed the sustainability disclosures of S&P top 100 companies and observed that industries with closer proximity and greater visibility to stakeholders are likely to greenwash their ESG performance to maintain reputations and reduce reporting costs. The authors postulated that this phenomenon could be attributed to: 1) the companies' ability to manipulate their stakeholders' perceptions and 2) the fact that the financial benefits of cost saving (through less accurate reporting) outweigh the potential reputational cost of greenwashing.

In general, scholars contend that stakeholder theory is eminently suitable for evaluating ESG through disclosure activities noting the influence of stakeholder-organization relations (Zarzycka, Krasodomska, 2021). However, some were careful to point out the insufficient explanatory power of this singular theory for corporate disclosure behavior, especially in the context of developing economies that are largely influenced by external market forces (Appiah *et al*., 2016; Duran, Rodrigo, 2018).

Legitimacy Theory

Suchman (1995, p.574) defined *legitimacy* as "a generalised perception or assumption that actions of an entity are desirable, proper or appropriate within some socially constructed system of norms, values, beliefs, and definitions." Legitimacy theory is premised on the concept of social contract between an organization and society that constitutes a multitude of implicit and explicit expectations that society has about how an organization should conduct its operations (Patten, 1992; Deegan, 2017). A social contract may contain explicit (legal requirement), implicit (non-legislated), or hypothetical agreements among members of an organized society that defines and limits the rights and duties of each party to that agreement (Gray et al., 1996. In today's business context, the legitimacy of a corporate entity remains intact as long as it meets the social and ethical criteria of the social contract, failing which would result in the withdrawal of stakeholder support that could become the source of reputational risk (Branco, Rodrigues, 2006). Pursuant to the perception-centric legitimacy theory, managers will implement remedial strategies when they perceive the business organization's operations do not meet the terms of the social contract. These remedial strategies must include corporate disclosure processes to effectively change the perceptions of external parties of the organization's social and environmental impact (Deegan, 2002; Magness, 2006). In sum, companies disclose ESG information as a legitimacy tool to better manage capital costs, attract additional resources, and influence the public policy process (Patten, 1992; Maama, Mkhize, 2020).

Resource-Based Theory

The seminal work by Barney (1991) is pivotal for the emergence of resource-based theory that asserts that sustained competitive advantages, growth, and profits of an organization are affected by the availability of resources and capabilities. The basic premise of the theory is that the performance difference among businesses can be attributed to the existence of specific resources and capabilities that are valuable, rare, inimitable (difficult to be imitated by competitors), and non-substitutable. As outlined in Galbreath's typology (2005), resources and capabilities can be tangible (i.e., financial and physical assets) or intangible (i.e., intellectual property, organizational, and reputational assets).

Resource-based theory is useful in ESG analysis studies due to two applications. First, the theory emphasized the intangible resources and capabilities as the most important differentiator for an organization in achieving corporate success (Branco, Rodrigues, 2006). Barney (2001) postulated that companies which developed their sustainability strategies on path dependent, causally ambiguous, socially complex, and intangible assets are likely to outperform companies that developed their strategies based solely only on tangible assets. These sources of competitive advantage are referred to as *dynamic capability* – defined as an organization's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments (Teece et al., 1997). The authors classified dynamic capability into three categories: 1) coordination/integration capacity which involves the efficient coordination of internal activities (i.e., effective communication within the company) and external activities (i.e., strategic alliance or technology transfer with external partners); 2) learning capacity which refers to the process of improving task performance through repetition/experimentation; 3) reconfiguration/transformation capacity that reflects the ability of a company to assess market conditions and competitors before making timely adjustments to maintain its competitive edge. In other words, dynamic capability can alter the broader resource base of a company, which ultimately leads to a change in performance in terms of sales, profitability, market entry/shares, and survival (Laaksonen, Peltoniemi, 2018). Under the resource-based view, companies adopt a proactive ESG strategy as dynamic capability by leveraging their unique resources and capabilities to remain ahead of their competitors (Hart, 1995; Aragón-Correa, Sharma, 2003; Busch, Hoffmann, 2011). For example, Song et al. (2017) assert that green procurement process management is a form of dynamic capability, whereby companies are required to process resources initiated from green design for procurement planning with suppliers, production processes, and distribution. The authors posit that companies adopting green procurement practice will likely foster closer relationships with their suppliers, which in turn will reduce transaction costs, promote mutual development, and achieve competitiveness advantage.

Second, Pfeffer and Salancik (1978) explained that the effectiveness of an organization is measured by its efficiency in managing the demands of different interest groups, upon which the organization depends for support and resources such as monetary and physical resources, information, and social legitimacy. If managed effectively, corporate organizations could take advantage of the resources and capabilities embedded in the relationship network constructed by their stakeholders to obtain more resources for the implementation of planned strategies (Song et al., 2017). Ullmann (1985) wrote that this dependency allows stakeholders to demand certain actions from the focal organizations. In return, the resource-dependent organizations discreetly formulate and disclose ESG activities as part of the strategic means to maintain and optimize their relationship with stakeholders.

Slack Resource Theory

The principle of slack resource theory refers to an organization's ability to carry out its activities, which depend on the resources owned by the organization that allow it to adapt to internal pressure for adjustment or

external pressures for change (Buchholtz et al., 2016). Nohria and Gulati (1996, p.1246) defined *slack* as the "pool of resources in an organization that is in excess of the minimum necessary to produce a given level of organisational output." Bowen (2002) illustrated the six distinct functions of slack in facilitating corporate greening: 1) encouraging employees with an affinity for environmental activities to remain in an environmentally sound organization, 2) approving environmental pet projects, 3) buffering the workflow from the changes in the external environment, 4) developing new products/processes, 5) searching for optimal initiatives that are beneficial both environmentally and economically, and 6) participating in external politics to compete for newly available resources. Accordingly, organizational slack is considered a prerequisite for firms' efforts and commitment to ESG reporting (Kim et al., 2019). Specifically, slack resource theory proposes that superior corporate performance is regarded as a precondition for a company's ability to devote more resources to manage future ESG issues (Waddock, Graves, 1997; Bansal, 2005). On the contrary, less profitable firms may have fewer slack resources to continue funding future ESG initiatives.

Conceptual Framework Development

Camp (2001) described conceptual framework as a structure of what has been learned to best explain the natural progression of a phenomenon that is being studied. There has been an ongoing scholarly effort to develop a conceptual framework to provide theoretical coherence to the organizational adoption of CSR, the precursor to ESG. For example, Lee (2011) combined both institutional and stakeholder theories to explain how the configuration of external influences – comprised of institutional force and stakeholder pressure – could affect the emergence of and divergence from CSR strategy. Fernando and Lawrence (2014) integrated legitimacy, stakeholder, and institutional theories to provide a holistic perspective on the predictive motivations of CSR practices.

Similarly, recent literature showed that ESG scholars are utilizing multiple theories to develop a conceptual framework for cohesive and systematic ESG disclosure. Baldini et al. (2018) proposed a conceptual framework to investigate the extent to which social structures (grounded in institutional theory) and social legitimization (grounded in legitimacy theory) could influence ESG disclosure practices in over 20 developed countries. Ruiz et al. (2021) applied legitimacy, stakeholder, and institutional theory to investigate the effect of investors' pressure on the quality of sustainability information published by US and Spanish companies. Based on institutional theory and legitimacy theory, Hammami and Hendijani Zadeh (2020) explained that Canadian companies' motivations for ESG information disclosure are affected by both institutional monitoring mechanisms and legitimacy motivations.

While the prevailing scholarly efforts are commendable for using more than one theory in advancing ESG knowledge, extant literature generally overlook the fact that sustainability initiative adoption in developing countries may be hampered by resource limitations. On that note, Sandhu (2013) provided an intriguing take on corporate sustainability by proposing that the adoption of sustainability practices in developing countries is mainly affected by a combination of resource dependence (arising from stakeholder pressure) and resource-based motivations (internal organizational competencies). However, Sandhu's conceptual model has yet to fully address the theoretical underpinnings for the contributing roles of strategic consideration and financial prowess in shaping an organization's ESG outcome. This delineation is crucial as sustainability initiative adoptions, particularly in developing countries, may have legitimacy explanations (regulatory pressures or media scrutiny) and slack-based explanations (financial means to pursue sustainability initiatives). Nevertheless, Sandhu's pioneering work provided an impetus for this study to integrate multiple theories in reconceptualizing the Ullmann model.

First Dimension of Ullmann Model: External Stakeholder Power

The first dimension of Ullmann model proposes that stakeholder power in relation to the organization is a factor influencing disclosure (Kent, Chan, 2009). Wartick (1994) suggested companies recognize and monitor relationships with the stakeholders holding the greatest power. Stakeholder theory provides a starting point for an organization to identify powerful stakeholders (i.e. investors, creditors, board of directors) and the extent to which they can leverage resource control when pressuring an organization to incorporate ESG activities (Sandhu, 2013; Ullmann, 1985). Consequently, powerful stakeholders are more likely to have their sustainability information needs satisfied by the organization (Zarzycka, Krasodomska, 2021). Appropriately, legitimacy theory gave credence to the fact that external stakeholders without direct control of such resources could compel companies to disclose more ESG information based on the institutional legitimacy of their claim and normative authority. For example, the source of power for news media and NGOs is rooted in legitimacy theory, which leads to the theory being incorporated into the framework. In essence, both stakeholder theory and legitimacy theory enrich the understandings of ESG disclosure practices by offering an interpretation of unique factors at different levels of resolution (Gray et al., 1996). In that sense, the measurement of stakeholder power depends on their control over resources and the institutional power to set norms and values with which the organization must comply (Gomes, Gomes, 2007).

Second Dimension of the Ullmann Model: Strategic Posture

The second element, strategic posture, was incorporated into Ullmann model to define how an organization is likely to respond to ESG demands from stakeholders. As expectations and power relativities of different stakeholder groups shift over time, corporate organizations are required to adapt their disclosure strategies to manage stakeholders – either by gaining their support or distracting their opposition (Deegan, 2014). First, it is crucial to understand how the increasing heterogeneity of stakeholders shapes an organization's choice of strategic orientation toward ESG disclosure. Corporate organizations facing greater pressure from external stakeholders are likely to adopt proactive ESG practices (Darnall *et al*., 2010; Henriques, Sadorsky, 1999). Both stakeholder theory and legitimacy theory support this perspective. According to stakeholder theory, companies integrate stakeholder interests and concerns into the business process when undertaking strategic planning (Minoja, 2012). Freeman et al. (2010) noted that the establishment of strategic direction (posture) is the element of the strategic management process most strongly associated with stakeholder perspective (power). In other words, the organization will have to adjust its strategic direction from time to time to balance the interests of different stakeholders to ensure continuous survival. From a legitimacy perspective, companies facing strong stakeholder pressure will choose a proactive strategy to preserve legitimacy by minimizing the uncertainty stemming from possible hostile actions by stakeholders (Lee, 2011). Therefore, stakeholders play a key role in shaping the strategic orientation of an organization toward ESG issues.

The points mentioned above lead to the next discussion concerning the influence of strategic posture on ESG disclosure. Generally, ESG related decisions are associated with strategic decisions on the business and/or corporate level of an organization (McWilliams, Siegel, 2011). This implies that ESG performance, before being affected by various temporal internal factors or stakeholder pressure, would have already been shaped by the organization's business strategy (Yuan et al., 2020). This includes the formulation of a strategic posture which reflects the overall perspective of the organization on ESG issues. Ullmann (1985) posits that resource-dependent managers adopting a proactive posture will likely increase ESG disclosure to improve their organization's relationship with powerful stakeholders that control vital resources. Previous literature provided robust empirical evidence of which companies exhibiting a proactive posture toward sustainability disclosed more ESG information than those assuming a passive posture (see Roberts, 1992; Kent, Chan, 2009; Lahouel et al., 2014; Bhatia, Makkar, 2020). In short, the ESG disclosure decision of an organization is facilitated (hindered) by its proactive (passive) strategic stance in the presence of powerful stakeholders.

Thus far, the theoretical underpinning and empirical illustrations were able to establish the influence of external stakeholders on strategic posture, which in turn, affects ESG disclosure decisions. More importantly, this proposition highlights the mediating effect of strategic posture on the relationship between external stakeholder power and ESG disclosure. The question now becomes how a proactive strategic posture would mediate such a relationship. The resource-dependence theory provides a theoretical explanation in which an organization's competitive advantage is the outcome of the development of valuable capabilities and resources (Barney, 1991; Wernerfelt, 1984). According to Minoja (2012), the implementation of a specific strategy may sacrifice short-term gains, which translates to possible trade-offs for certain stakeholders. The external stakeholders, in return, may restrict the organization's access to the resources, either by reducing capital or imposing more ESG requirements with additional proprietary costs. Thus, the feasibility of a given strategy, including strategic posture toward ESG, is compromised due to the changes in resources (Aragón-Correa, Sharma, 2003). Similarly, the strategic posture adopted by an organization could mediate the relationship between organizational resources (as provided by external stakeholders) and ESG capabilities. Scholars in recent times were able to successfully operationalize this theoretical concept (see Shwairef et al., 2021). Hence, strategic posture was repositioned from an explanatory variable to a mediating variable for the conceptual framework.

Third Dimension of the Ullmann Model: Corporate Financial Performance

The last element, corporate financial performance (henceforth, CFP) refers as the degree to which a firm is able to achieve its economic or financial, goals (Venkatraman, Ramanujam, 1986). In recent times, scholars have been positioning CFP as a moderating variable in ESG research (see Dakhli, 2021; Moreno, Duarte-Atoche, 2019). The slack resource theory provides a theoretical perspective on this issue. Slack refers to any free and available financial and organization resources that are used to attain a goal (Jensen, 1986), including in the pursuit of long-term ESG performance (Chams et al., 2021; Waddock, Graves, 1997). Thus, CFP as organizational slack is considered a "prerequisite" for any corporate effort and commitment to ESG reporting (Kim et al., 2019). Likewise, organizations with higher financial performance can afford to devote more resources to manage future ESG issues (Bansal, 2005). In other words, companies with strong financial performance are more likely to dedicate more resources to comprehensively addressing various ESG issues that are raised by powerful and influential stakeholders.

There is empirical evidence for this theoretical proposition. Scholars successfully operationalized this concept by investigating the moderating role of CFP in the relationship between specific stakeholders (i.e., inves-

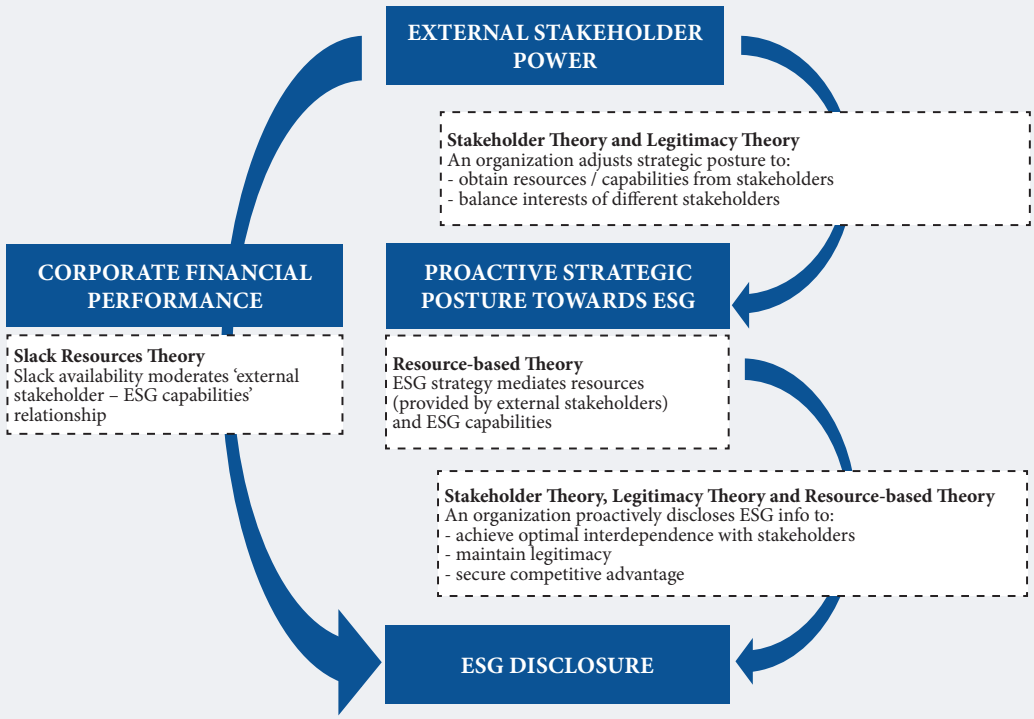
tors, state-owned enterprises, environmental and social interest groups) and ESG performance (see Dakhli, 2021; Moreno, Duarte-Atoche, 2019; Xiao et al., 2018). Furthermore, current scholarly work has yet to theoretically explore, much less empirically prove, the direct effect of external stakeholders on CFP. This effectively rules out the possibility of a reverse interaction effect in which external stakeholder power affects the relationship between CFP and ESG disclosure (Andersson et al., 2014). To these ends, it would be reasonable to assume that CFP moderates the relationship between the influence of external stakeholders and the disclosure of ESG. Otherwise, the strength and sense of this relationship may vary depending on the company's financial result. Thus, CFP was selected as the moderating variable, instead of the explanatory variable, for the conceptual framework. Based on the discussed rationale, the conceptual framework is illustrated in Figure 1.

Future Research

The article presents a conceptual framework for future empirical research on both the mediating effect of strategic posture and the moderating effect of CFP in accentuating the influence of eternal stakeholders on ESG disclosures. This article recommends future longitudinal studies to test and validate the framework in different contextual settings. As noted by Mooi et al. (2017, p .47), the "strength of samples comes from selecting samples accurately rather than their sizes." Researchers are recommended to investigate ESG-focused companies in trying to validate the conceptual framework for two reasons. First, the constituents of the ESG index are typically screened according to transparent and defined ESG criteria based on publicly available data sources and therefore seen to have published high-quality data on their sustainability practices[2] (Bursa Malaysia, 2018). Second, ESG-compliant companies demonstrate the 'catching up' effect of harmonizing non-financial disclosures within the industry and could inspire others to tackle ESG challenges (Fiechter *et al.*, 2020). This purposive sampling approach, focusing on ESG index constituents, was adopted in recent ESG literature (see Broadstock et al., 2020; Aksoy et al., 2020).

Scholars generally use two approaches to ascertain ESG disclosure. The first approach leverages a sustainability score/index provided by third-party ESG rating agencies such as Bloomberg, EIKON, or CSR Hub. However, Larcker et al. (2022) reported that there are significant shortcomings in the objectives, methodologies, and incentives of these ESG rating providers which detract from the informativeness of their sustainability assessments. Alternatively, researchers could conduct a content analysis of annual financial or sustainability reports to develop ESG score/indexes. Nonetheless, a self-constructed proxy is based on the perceptions and

Figure 1. **Conceptual Framework Using Multi-Theoretical Perspectives**



Source: authors.

[2] https://bursasustain.bursamalaysia.com/droplet-details/resources/ftse4good-bursa-malaysia-index, accessed 12.11.2022.

interpretation of researchers which may render their findings difficult to replicate (Healy, Palepu, 2001). Taken together, researchers should understand the strengths and limitations of each approach when testing the conceptual framework.

The above conundrum further illustrates that ESG disclosure remains a highly subjective exercise, where the lack of a standardized reporting framework deters the meaningful comparability of sustainability achievements in different industries. As a result, organizations may often treat ESG disclosure as a formal box-ticking task by reporting output instead of meaningful outcome (Christensen et al., 2021; Michelon et al., 2020) or resort to green washing by providing only boilerplate information (Caputo et al., 2021; Pizzi et al., 2021). Considering that a uniform global non-financial disclosure framework is unlikely to emerge in the near term (Carter et al., 2022; Filosa et al., 2021), organizations are recommended to objectively measure and report their ESG achievements that are aligned with the values of their key stakeholders (Freeman, Dmytriyev, 2020). Consequently, the "integrated value model of ESG" developed by Sugai et al. (2020) represents another promising area for future research, as the model directly measures, assesses, monitors, and reports on the impacts of value creation (or destruction) that organizations make on their stakeholders. In addition, future researchers could consider using Computer-Aided Text Analyses (CATA) to derive aggregated ESG scores by coding annual corporate reports in a reproducible manner (Lueg, Lueg, 2020).

Lastly and crucially, the external stakeholder could play a pivotal role in deterring the greenwashing phenomenon (Ruiz-Blanco et al., 2021). As proclaimed by Barnett et al. (2018), the "sustainability issues tend to be wicked problems that require cooperation across parties and over time to define and resolve (p. 122)." This is exemplified by the growing influence of the media and NGOs in proactively investigating and exposing corporate malpractice, thereby improving ESG disclosure (UNEP, WBCSD, 2010). Companies also face growing scrutiny from their investors, customers, and suppliers to improve the quality of ESG reporting (Velte, 2021; Serafeim, 2020). Likewise, the demand for credible ESG data corresponded to the increased number of companies obtaining independent assurance reports issued by external auditors (Bartels et al., 2016). These insightful findings offer plausible solutions where policymakers could leverage the distinctive contextual pressure exerted by different external stakeholders to induce the disclosure of more substantive and verifiable ESG information among corporate organizations. Future research should illuminate which external stakeholders are influential in dictating the current discourse of ESG, where robust empirical evidence would assist decision makers in developing a salient stakeholder networking instrument to collectively promote greater ESG commitment among corporate organizations (Lu et al., 2019).

Conclusions

This article reconceptualizes the Ullmann model and proposes a conceptual framework to illustrate the relationship between external stakeholders and ESG disclosures. Stakeholder theory, legitimacy theory, resource-based theory, and slack resource theory are integrated into a single conceptual framework for ESG disclosure. Although stakeholder and legitimacy theories could explain organizational motivation to accept socially endorsed sustainability norms, both theories were not sufficient to explain the different levels of ESG reporting in industries when facing similar pressure from stakeholders. The inclusion of resource-based theory and slack resource theory sheds further insight into this conundrum, as the adoption of sustainability initiatives may have underlying resource-based explanations. The theoretical underpinnings and robust empirical evidence of the extant literature suggest the under researched effects of both strategic posture and CFP in accentuating the relationship between external stakeholders and ESG disclosures. Beyond this, this article provides a novel research direction and advocates for future researchers to empirically explain and advance the reliability of the proposed framework.

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Corporate Strategy for Sustainability: Reflections of Prospective Entrepreneurs

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Abstract

Universities play a crucial role in training and educating future businesspeople to help them comprehend sustainable thinking holistically. This demonstrates the importance of preparing the future businesspeople about students' factual knowledge, practical skills, and responsibility toward sustainability. The aim of this research is to identify economic students, think about corporate strategy planning toward sustainability, and understand and reconcile the different sustainability perspectives. This study examined 534 economic students' ideas in Can Tho City, Vietnam, and 102 scholars' opinions (international and local scholars and transporter/logistics) about sustainable business practices. It was revealed that students in general are highly aware of the principles of sustainable development, ready to implement them in practice during business planning, and some aspects are even more important than experts. With the help of matrices of factor analysis four alternative realistic patterns of corporate strategies for sustainable development, with appropriate recommendations for their implementation were compiled. They can serve as a basis for decision-making by current and future entrepreneurs in the formation of their own business plans.

Keywords: business strategy; green supply chain management; sustainability perspectives; internal factors; external factors; strategic matrix

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Introduction and literature review

Eco-efficiency and remanufacturing are becoming increasingly vital for enhancing routine operations (Ashley, 1993; Srivastava, 2007). Porter and Van der Linde (1995) explain "greening" as a "competitive endeavor". They believe that green actions to save resources, reduce waste, and enhance productivity may boost corporate competitiveness[1]. Hence, "greening" may reduce firms' environmental impacts, increase productivity, and provide new ways to compete (Hajikhani et al., 2012). Consumer expectations and regulatory restraints drive sustainable business practices (Guide, Srivastava, 1998). Owing to government legislation and public environmental responsibility, strategic planners have had to address environmental issues and adopt many green initiatives (Mutingi, 2013).

"Green supply chain management" (GSCM) has evolved as environmental consciousness grows (Srivastava, 2007). Recently, academic and industry interest in cross-disciplinary GSCM has increased (Sarkis et al., 2011). Air pollution, solid waste disposal, and natural resource use must be monitored and managed throughout the development (Zhu et al., 2007). Product control trumps environmental effects in GSCM manufacturing and delivery. A company must be lucrative and environmentally friendly (Ho et al., 2009; Luthra et al., 2013). Green supply chains contribute to sustainability and provide firms with a competitive edge in cost reduction, revenue growth, risk management, employee motivation, and environmental compliance (Tekin et al., 2020).

The success of the sustainability initiative is analyzed from a variety of perspectives, including economic, environmental, and social aspects.

Economic performance, which refers to total profitability, is a significant reason why organizations use GSCM procedures. Economic performance refers to an organization's ability to save expenses through smart purchasing decisions, waste management, energy use, waste disposal methods, and penalties for environmental damage (Zhu et al., 2008; Nishitani et al., 2016). Therefore, we categorized the GSCM practice-economic performance relationship studies that evaluated economic performance using objective or perceived sales, profit, and market share increases (Chan et al., 2012; Lee et al., 2013; Kuei, Lu, 2013; Abdullah, Yaakub, 2014).

Environmental performance usually incorporates energy savings, waste reduction, and emission reduction. Environmental performance includes reducing air emissions, water waste, and solid wastes, and reducing hazardous product usage. Energy conservation, waste, pollution, and emission reduction are environmental performance criteria (Rao, 2002; Zhu et al., 2005; Chiou et al., 2011; Lee et al., 2012).

Social performance is used to measure the impact of GSCM practices on product and company image, employee health and safety, and customer loyalty and satisfaction (Zailani et al., 2012; Ashby et al., 2012).

The concept of a sustainable business model has been embraced by a wide range of industries and businesses in an effort to simultaneously meet economic, environmental, and social objectives (Saeed et al., 2019). Sustainable business models are different from conventional ones since they try to strike a fair balance between environmental, social, and economic concerns (Lewandowski, 2016). Sustainable performance is defined as the integration of economic, social, and ecological considerations into the daily running of a company. It's how well a company does across the board in terms of sustainability metrics. Long-term success for SMEs (Small and Medium-sized Enterprises) depends on their capacity to maintain sustainable performance (Muhammad et al., 2019). Sustainability in business practices is being more adopted by contemporary companies as a result of technological advancements[2]. The social audit (Gray, 2002), reverse logistics (Dong et al., 2020; Jermsittiparsert et al., 2019) are some examples of new sustainable practice models that have emerged as a consequence (for more details see Table 1).

Our study evaluates the student economists' awareness of the criteria governing the development of comprehensive corporate sustainability strategies, including the formation of green supply chains. Internal factors (strengths and weaknesses) and external factors (opportunities and threats) are analyzed. This helps the respondents to understand the nature of sustainability and give an objective opinion on such strategic course. The opinion of economics students is relevant in the context of their potential role as future entrepreneurs. The discourse space regarding sustainable development is enriched, there is additional "information for reflection" on possible directions of adjustment efforts for human capital formation.

Sampling technique and empirical model of the study

The primary data used in this study were used in two questionnaires to conduct the survey. Each questionnaire is suitable for research subjects in the green supply chain and sustainable development, such as economics students (international business, business administration, marketing digital, hospitality management, multimedia communication) and experts with masters and doctoral degrees in various field, in which survey questionnaires for students and in-depth interviews and survey questionnaires for experts. The survey started from November 01, 2022, to January 15, 2023, obtaining 534 economic students (Google form survey questionnaire), and 102 scholars (in-depth in-

[1] «Green» is sometimes used interchangeably with «sustainable,» which emphasizes environmental, social, and economic impact. This article uses both terms.

[2] https://www.aeologic.com/blog/role-of-technology-in-sustainable-development/

Table 1. **Selected Works on Sustainable Corporate Strategies**

Source	Description / Findings
Young, Tilley, 2006	To evaluate sustainability degree of businesses, an integrated structural model has been proposed, that includes six criteria - eco-effectiveness, socio-effectiveness eco-efficiency, socio-efficiency, sufficiency of undertaken efforts towards sustainability, as well as ecological equity, i.e. sharing ecological risks with partners and stakeholders.
Shahid et al., 2020; Owusu et al., 2021	Companies with an environmental management program were more successful in keeping their economic, social, and environmental footings stable over time.
Tekin et al., 2020	Strategy management helps firms profit from green measures. Companies gain benefits from contributing to the development of GSCM. Thus, the GSCM strategy indirectly enhanced firm's economic and environmental performance via cost reduction and innovation
Fahad, Iffat, 2018	According to Unilever's GSCM strategy, a sustainable supply chain requires collaboration, integration of key players, operations, distribution, redesign, purchase, and the ability to execute sustainability initiatives
Laurin, Fantazy, 2017	Considers the evidence from IKEA that makes durable, high-quality furniture using as little material as possible to reduce shipping, petrol, and labor expenses
Malti, 2021; Daddi et al., 2016; Pryshlakivsky, Searcy, 2015	GSCM solutions such as green purchasing, manufacturing, distribution, packaging, marketing, environmental education, environmental certification, internal environmental management, and return on investment may increase competitiveness and save money. Green operations improve efficiency and competitiveness. Green purchasing, manufacturing, distribution, packaging, marketing, environmental education, internal environmental management, and ROI (return on investment) are important. Managers should include employees, suppliers, and customers in GSCM. Administrators should establish a thorough set of rules, processes, and duties for all personnel involved in integration. ISO 14001 is required to fulfill global emissions, waste, resources, and environmental protection standards.
Shih-Fang, 2010	Following a sustainable model does not mean that a company must act altruistically and choose between profit and environmental responsibility. Adopting this new approach encourages innovation, which, in turn, increases efficiency, promotes product diversification and strategic advantage.
Lüdeke-Freund, 2010	Discusses business concepts that provide consumer value while growing the organization and society
Haanaes et al., 2012; Kron et al., 2013	Companies benefit from addressing sustainability in a number of ways, both directly and indirectly Direct benefits include lower costs and lower risk of doing business. Indirect benefits include increased brand reputation, attractiveness to talent, and competitiveness.
Gray, 2002	An overview of social audit practices is presented, which is understood as an expert assessment of a company's activities, its management procedures and approaches, and corporate codes with respect to social responsibility and impact on society. Ideally, companies should maintain a balance between profitability and social responsibility.
Dong et al., 2020; Jermsittiparsert et al., 2019	The principles and best practices of "reverse logistics" – the return of products by consumers to the manufacturer due to damage, loss of performance, or end-of-life disposal are examined. By investing time and effort in mastering different types of reverse logistics and their associated supply chain management challenges, companies can reap the benefits of cost optimization and customer image enhancement.

Source: compiled by the authors using the mentioned works.

terviews and Google form survey questionnaire). The sampling observation structure of scholars are domestic scholars (57), foreign scholars (23), and transporter/logistics (22). Experts who have had at least 10 experience years in their sector.

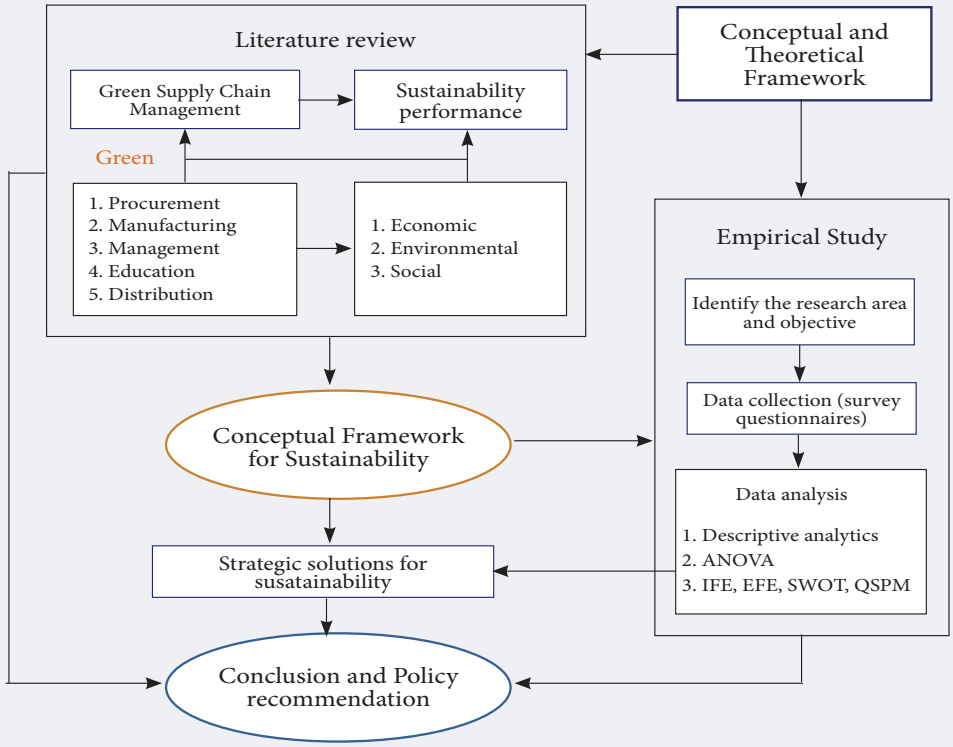
Based on the analysis of the existing literature (scientific reports, articles in scientific journals and documents of government agencies) on green supply chains and sustainable development indicators, a structural model of the study was developed, as shown in Figure 1. On its basis, the scope, potential participants, sample size were determined. The initial version of the questionnaire was tested on a pilot sample of respondents. Based on their comments, the questionnaire was refined, after which a full-scale collection of primary data was conducted. The study of respondents' opinions and their comparison with conclusions from previously published literature allowed to develop a number of general recommendations for green supply chain management.

Matrixes for strategic analysis

In this study, four matrices, namely IFE (Internal Factor Evaluation), EFE (External Factor Evaluation), SWOT, and QSPM, were used to determine feasible strategies. The study used SWOT (Strength, Weakness, Opportunity, Threat) and Quantitative Strategic Planning Matrix (QSPM) frameworks for strategic planning. External factors affect product development, market segmentation and positioning, service offerings, and company acquisition and sales. Internal analysis assesses operational capabilities and performance. Comparing and analyzing prior firm performance, significant rivals, and industry may help determine internal strategic variables. Internal and external factors for sustainable business strategies are summarized in Tables 2 and 3 accordingly. SWOT matrix allows to match firm's strengths and weaknesses with emerging threats and opportunities.

The synthesis of IFE, EFE and SWOT matrices forms the ground for applying QSPM matrix. It objectively compares plausible strategies and actions. It uses management tools to objectively choose an optimal plan. It helps organize and prioritize critical internal, external, and competitor data for strategic planning. QSPM ranks plans by how well they help businesses capitalize on strengths and opportunities, address weaknesses, and avoid or reduce external risks (Abratt, 1993; Dibb, 1995; David, 2016). The QSPM now includes Attractiveness Scores (AS), Total Attractiveness Scores (TAS),

Figure 1. **Research Framework**



Source: authors.

Table 2. **Internal Factors for Sustainable Business Strategies**

No.	Aspects	Code	Literature
	Strength factors		
	Economic		
1	Reduce the cost for environmentally friendly input procurement	SE1	Hervani et al. (2005); Zhu et al. (2007b); Azevedo et al. (2011); Chardine-Baumann (2011); Ageron et al. (2012)
2	Reduce cost of delivery and inventory	SE2	
3	Reduce fee to waste discharge	SE3	
4	Reduce fines for environmental accidents	SE4	
5	Increase demand flexibility, delivery flexibility, and production flexibility	SE5	
6	Ensure procurement and delivery on time	SE6	
	Environmental		
7	Optimize processes for waste and emission reduction, pollution control	SEN1	Beamon (1999); Hervani et al. (2005); Zhu et al. (2007a); Azevedo et al. (2011); Deif (2011)
8	Recognize products of eco-labeling, recycled material, and design-for-assembly	SEN2	
9	Save energy consumption and recycling process	SEN3	
10	Encourage green and clean technologies used	SEN4	
	Social		
11	Increase social and environmental responsibility	SS1	Gunasekaran et al. (2004); Zhu et al. (2007b); Markley, Davis (2007); Pochampally et al. (2009); Azevedo et al. (2011)
12	Increase organizational capability	SS2	
13	Increase employees' motivation, health, and Safety	SS3	
14	Increase customer interest and satisfaction with green products	SS4	
	Weakness factors		
	Economic aspect		
15	Constrained finance/capital	WE1	Rogers, Tibben-Lembke (1998); AlKhidir, Zailani (2009); Ravi, Shankar (2005); Mclaren et al. (2004)
16	Lack of organizational encouragement	WE2	
17	Lack of IT implementation	WE3	
18	Hesitate to convert to new systems	WE4	
	Environmental aspect		
19	Hesitate to change GSCM from supplier	WEN1	Ravi, Shankar (2005); Hsu, Hu (2008); Chien, Shih (2007a)
20	Lack of sustainable guidance	WEN2	
21	Lack of sustainability training courses/consultancy/mentor	WEN3	
	Social aspect		
22	Lack of corporate social responsibility	WS1	Digalwar, Metri (2004); Hamel, Prahalad (1989); Sarkis (2012); Mudgal et al. (2009); Mudgal et al. (2010); Ravi, Shankar (2005); Zhu et al. (2007b)
23	Lack of top management commitment	WS2	
24	Do not want technology advancement adoption	WS3	

Source: Authors' synthesis.

Table 3. **External Factors for Sustainable Business Strategies**

No.	Aspects	Code	Sources
Opportunity			
Economic aspect			
1	Promote green image, global marketing, and competitiveness	OE1	Hervani et al., 2005; Zhu et al. 2007b; Chardine-Baumann 2011; Azevedo et al. 2011; Ageron et al., 2012
2	Capture demand for environmentally friendly product market	OE2	
3	Obtain certificates for the green product warranty	OE3	
4	Attract investors and shareholders	OE4	
Environmental aspect			
5	Increase green business strategies	OEN1	Beamon, 1999; Hervani et al., 2005; Zhu et al., 2007a; Azevedo et al., 2011; Deif, 2011
6	Increase efficiency in scarcity of Resources, higher waste generation and waste disposal problem	OEN2	
7	Adapt to global climate pressure and ecological change	OEN3	
8	Contribute to government rules and legislation systems related to sustainability	OEN4	
Social aspect			
9	Support from green movement activism by non-government organizations	OS1	Gunasekaran et al., 2004; Zhu et al., 2007b; Markley, Davis, 2007; Pochampally et al., 2009; Azevedo et al., 2011
10	Create trust in society or public	OS2	
11	Get government support for enforcement	OS2	
Threat			
Economic aspect			
12	Impact economic uncertainty	TE1	Hosseini, 2007; Mudgal et al., 2009, 2010; Shankar, 2005; AlKhidir, Zailani, 2009
13	Impact market competition	TE2	
14	Need for big investment	TE3	
Environmental aspect			
15	Poor legislation related to sustainability	TEN1	Hosseini 2007; Hsu, Hu 2008; Mudgal et al. 2009; Mudgal et al., 2010; Srivastava, 2007
16	Lack of effective environmental measures	TEN2	
17	Lack of government support system	TEN3	
Social aspect			
18	Weak pressure from society	TS1	Hsu, Hu, 2008; Chien et al., 2007b; Rao, Holt, 2005; Perron, 2005
19	Lack of quality human resources	TS2	

Source: Author' synthesis.

and TAS Sum (Felicia et al., 2019). The use of QSPM in general increases the likelihood that the final strategic decisions are optimal for the organization.

The IFE, EFE, SWOT and QSPM matrices were based on 19 external and 24 internal factors (Tables 2 and 3). The variables were measured and evaluated as follows. A coefficient weight was assigned to each element to represent the importance of that factor in comparison with the others. After the variables were identified, a weighted score was assigned based on the economic literacy level of the respondents (534 students, questionnaires), and a rating score was assigned based on the consensus of the academic community (102 scholars, key informant panels). From a score of 0.0 (which indicates that the factor is not essential) to a value of 1.0 (which indicates that the item is very important), the goal is to assign the most weight to the element that has the greatest influence on the organization (very important). It is expected that the total of these coefficients will be 1. The final total score for each factor is calculated first, followed by computation of the overall weighted score for the factor as a whole.

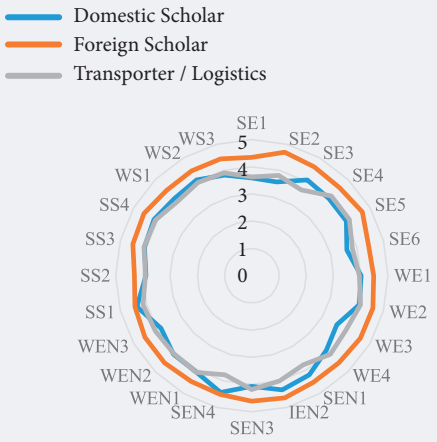
Using the tools listed above, a set of management strategies has been compiled that will allow future startups to improve their decision-making process in achieving their sustainability goals. Strategists may build and assess different strategies by making modest judgments in the input matrices regarding the relative relevance of external and internal components (David, 2011).

Results and Discussions

In assessing internal factors, it is seen from 14 strengths of three aspects (six strengths of the economic aspect (SE), four strengths of the environmental aspect (SEN), and four strengths of the social aspect (SS)). Similarly, there are 10 weaknesses in three aspects (four weaknesses in the economic aspect (WE), three weaknesses in the environmental aspect (WEN), and three weaknesses in the social aspect (WS)). All the participating respondents agreed with each statement.

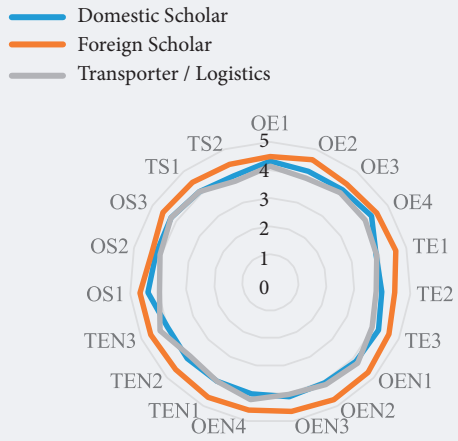
External factors also focus on three main dimensions of sustainability with eleven opportunity components (four opportunities of the economic category (OE), four opportunities of the environmental category (OEN)), three opportunities of the social category (OS)), and eight threat components (three threats of the economic aspect (TE), three threats of the environmental aspect (TEN), and two threats of the social aspect (TS).

Figure 2. **Scholars' Share about Internal Factors of Sustainability**



Source: authors.

Figure 3. **Scholars' Share about External Factors of Sustainability**



Source: authors.

Perception of scholars and economic students about sustainability

Scholars generally agreed with the core components, but their views shifted when asked about long-term viability. It is noteworthy that students from a broad range of scholarly backgrounds were able to incorporate the idea of sustainability into their projects. All the scholars said that they appreciated the internal components. The difference in the selection trend based on the internal variables of sustainable performance is shown in Figure 2. If the value of the selection criteria exceeds 2.5 on a scale of 0 to 5, the evaluation is good; otherwise, the assessment is poor. The three fundamental pillars of sustainability (economic, environmental, and social aspects) have received extraordinary attention from international researchers. The trend of picking components by foreign scholars is relatively similar, with values greater than 4.5. The concepts of domestic scholars and Transporter/Losgictics groups are similar in that they share around 4.0.

The radar chart (Figure 3) shows the differences in the selection trends of the internal factors of sustainable performance. The results show that the group of foreign scholars has the highest value and tends to be similar to each factor, but prominently shows in factors OS1, TEN3, TEN1, OE2, TE1, and TE3 with values above 4.5. For the logistics/transporter group, the trend was in favor of TEN3, OEN4, and the domestic scholar group was OS1.

ANOVA was used to compare the differences in opinions and perceptions of scholars and economic student groups on the internal factors affecting sustainable performance. Levene Sig = 0.003 for environmental performance, 0.006 for social, and 0.319 for economic performance. In particular, the average value of foreign scholars has always reached its highest value (Table 4). Analysis of differences in the perception and opinion of each item with each internal factor of sustainable performance showed significant differences. Specifically, when analyzing economic performance, the foreign scholar group has a significant disparity in opinion with others. For the analysis of environmental and social performance, there is a remarkable difference in the awareness of foreign scholars compared to the IB/BA group.

The ANOVA findings (Table 5) show substantial variations in sustainability awareness between economic students and scholars. There was a statistically significant difference among economic performance (Levene Sig = 0.006), environmental performance (Levene Sig= 0.001), and social performance (Levene Sig = 0.364) in terms of sustainable performance. A comparison of the perspectives of these three categories reveals that foreign scholars have the most positive outlook on economic success (4.52), followed by MC students (4.25). Both environmental and social performance were lower in the foreign scholar group (4.65 and 4.50).

Analysis of internal and external factors in sustainability

Table 6 shows that when analyzing the identified strengths, the main strengths SE3, SE4, SE5, SEN1, SEN1, SEN4, SS1, SS3, and SS4 showed similar average scores, that is, between 0.1668 and 0.1708 each, while SE1, SE2, SE6, and SS2 ranged between 0.1230 and 0.1290. In analyzing the weaknesses, the most outstanding feature is that WS3 is the most common weakness at 0.0824, whereas the opposite is true for WE2 (0.0410). WE3 ranked second in terms of weakness (0.0818), followed by WE1 (0.0418). Notably, WE2, WE4, WEN1, WS1, WS2, WEN2, and WEN3 had similar levels, that is, between 0.0410 and 0.0416, respectively. The results of the analysis of IFEM obtained a number of strengths of 2.1799 and 0.4952 weaknesses

Table 4. **The Scholars and Economic Students' Opinion about Internal Factor of Sustainability**

	Performance type		
	Economics (EP)	***Environmental (ENP)***	***Social (SP)***
Dometic Scholar (n=57)	3.84^{bc}	4.15^{a}	4.05^{a}
Foreign Scholar (n=23)	4.55^{d}	4.54^{c}	4.44^{bc}
Transporter (n=22)	3.93^{ac}	3.99^{a}	3.99^{a}
IB/BA (n=393)	4.09^{ac}	4.04^{a}	4.12^{a}
HM (n=45)	3.93^{abc}	3.97^{ab}	4.10^{ab}
MC (n=96)	4.18^{ac}	4.23^{bc}	4.22^{ac}
ANOVA Sig.F ≤0.05	***		**
Robust Test Sig.Welch ≤0.05		***	

Note: *, p-value < 0.1; **, p-value < 0.05; ***, p-value < 0.001. Significant at the 0.05 level. If the value of Levene is less than 0.05, the Rrobust test is used. If the value of Levene is more than 0.05, the Anova test is used. The numbers in the same row followed by different letters are significant at the 5% level via the statistical Anova or Robust test.

Source: authors.

Table 5. **The Scholars and Economic Students' Opinion about External Factor of Sustainability**

	Performance type		
	Economics (EP)	***Environmental (ENP)***	***Social (SP)***
Dometic Scholar (n=57)	4.15^{ac}	4.04^{a}	4.17^{ac}
Foreign Scholar (n=23)	4.52^{bc}	4.65^{b}	4.50^{bc}
Transporter (n=22)	3.96^{a}	4.11^{a}	4.02^{a}
IB/BA (n=393)	4.17^{a}	4.13^{a}	4.13^{a}
HM (n=45)	4.02^{a}	4.09^{a}	4.12^{a}
MC (n=96)	4.25^{ab}	4.31^{ab}	4.29^{ab}
ANOVA Sig.F ≤0.05			***
Robust Test Sig.Welch ≤0.05	***	***	

Note: *, p-value < 0.1; **, p-value < 0.05; ***, p-value < 0.001. Significant at the 0.05 level. If the value of Levene is less than 0.05, the Rrobust test is used. If the value of Levene is more than 0.05, the Anova test is used. The numbers in the same row followed by different letters are significant at the 5% level via the statistical Anova or Robust test.

Source: authors.

Table 6. **The Internal Factor Evaluation Matrix (IFEM)**

Code	Internal Factor	Weight	Rating*	Score
	Strengths			
SE1	Reduce cost for environmentally friendly input procurement	0.0424	3	0.1272
SE2	Reduce the cost of delivery and inventory	0.0417	3	0.1251
SE3	Reduce fee to waste discharge	0.0421	4	0.1684
SE4	Reduce fines for environmental accidents	0.0417	4	0.1668
SE5	Increase demand, delivery, and production flexibility	0.0421	4	0.1684
SE6	Ensure procurement and delivery on time	0.0410	3	0.1230
SEN1	Optimize processes for waste and emission reduction, pollution control	0.0423	4	0.1692
SEN2	Recognize products of ecolabeling, recycled material, and design-for-assembly	0.0403	4	0.1612
SEN3	Save energy consumption and recycling process	0.0410	4	0.1640
SEN4	Encourage green and clean technologies used	0.0417	4	0.1668
SS1	Increase social and environmental responsibility	0.0424	4	0.1696
SS2	Increase organizational capability	0.0430	3	0.1290
SS3	Increase employees' motivation, health, and Safety	0.0427	4	0.1708
SS4	Increase customer interest and satisfaction with green products	0.0426	4	0.1704
	Total	**0.587**		**2.1799**
	Weaknesses			
WE1	Constraining finance/capital	0.0418	1	0.0418
WE2	Lack of organizational encouragement	0.0410	1	0.0410
WE3	Lack of IT implementation	0.0409	2	0.0818
WE4	Hesitate to convert to new systems	0.0412	1	0.0412
WEN1	Hesitate to change GSCM from supplier	0.0412	1	0.0412
WEN2	Lack of sustainable guidance	0.0416	1	0.0416
WEN3	Lack of sustainability training courses/consultancy/mentor	0.0416	1	0.0416
WS1	Lack of corporate social responsibility	0.0413	1	0.0413
WS2	Lack of top management commitment	0.0413	1	0.0413
WS3	Do not want technology advancement adoption	0.0412	2	0.0824
	Total	**0.4131**		**0.4952**
	Total weighted score			**2.6751**

Source: authors.

and a total weighted final score of 2.6751. In light of these findings, organizations may use the power factor to mitigate the disadvantages experienced by sustainable businesses and boost competitive advantage.

Internal characteristics such as strengths and weaknesses impact the IFEM analysis. The investigation found three key parameters that determine the green sustainability performance dynamics. The highest-scoring qualities of this strategy are employee motivation, health, and safety (SE1). This suggests that a corporation may provide a safe working environment and excellent remuneration, and top managers can assist their people in embracing the idea and fully comprehending green sustainability performance, making it simpler to execute the sustainability plan.

Consumer satisfaction with green goods was the second-most important aspect of this survey (SS4). This suggests that buyers are more interested in environmentally friendly goods and want to know their environmental information, which encourages GSCM and sustainable performance by increasing competition from manufacturers of green products.

Enhanced social and environmental responsibility was next found (SS1). Thus, socially responsible companies help corporations recruit, develop, and manage people as investments. Environmental social responsibility considers people, environment, and profits for long-term competitive advantage. Socially responsible and sustainable employment strategies help organizations satisfy their present and future needs.

Internal sustainability factor (weakness). This study discovered three primary elements that determine sustained output performance. WS3 was initially discovered. This suggests that it is difficult to transform a company's fundamental technology will be tough. Hence, technological skepticism hinders GSCM implementation. The absence of IT implementation is another performance obstacle (WE3). Businesses struggle to adapt technology to green supply chains. Constraining finance/capital prevents sustainable performance (WE1). This indicates that green supply chain implementation requires capital and financial resources.

Table 7 shows an analysis of the external variables (opportunities and threats). In analyzing opportunities, the key point to take advantage of in the matrix is (OE4) in sustainable development, with an average score of 0.2188. The second and most important level is (OE1), which builds a company's image of the environment and increases its international competitiveness, with an average score of 0.2176. Next, non-governmental organizations (OS1) support for green movement advocacy is crucial, averaging 0.2168. When examining the opportunity, the lowest score may assist the organization in running more effectively in the context of finite natural resources, pollution, and emissions challenges (OEN2). The average score increased from 0.2016. For instance, economics learners and scholars have argued that ineffective environmental policies hurt sustainable green performance. (TE3) and (TEN3) had the

Table 7. **The External Factor Evaluation Matrix (EFEM)**

Code	External Factor	Weight	Rating	Score
	Opportunities			
OE1	Promote green image, global marketing, and competitiveness	0.0544	4	0.2176
OE2	Capture demand for environmentally friendly product market	0.0536	4	0.2144
OE3	Obtain a certificate for a green product warranty	0.0525	4	0.2100
OE4	Attract investors and shareholders	0.0547	4	0.2188
OEN1	Increase green business strategies	0.0529	4	0.2116
OEN2	Increase efficiency in scarcity of resources, higher waste generation and waste disposal problem	0.0504	4	0.2016
OEN3	Adapt to global climate pressure and ecological change	0.0513	4	0.2052
OEN4	Contribute to government rules and legislation systems related to sustainability	0.0522	4	0.2088
OS1	Support from green movement activism by non-government organizations	0.0542	4	0.2168
OS2	Create trust in society or public	0.0525	4	0.2100
OS3	Get government support for enforcement	0.0533	4	0.2132
	Total	**0.5820**		**2.3280**
	Weaknesses			
TE1	Impact economic uncertainty	0.0519	3	0.1557
TE2	Impact market competition	0.0522	3	0.1566
TE3	Need for big investment	0.0526	4	0.2104
TEN1	Poor legislation related to sustainability	0.0522	4	0.2088
TEN2	Lack of effective environmental measures	0.0518	3	0.1554
TEN3	Lack of government support system	0.0526	4	0.2104
TS1	Weak pressure from society	0.0522	4	0.2088
TS2	Lack of quality human resources	0.0525	3	0.1575
	Total	**0.4180**		**1.4636**
	Total weighted score			**3.7916**

Note: The rating for the EFE Matrix is as follows: 1= low response, 2=average response, 3= good response, and 4= high response.

Source: authors.

Table 8. **SWOT Matrix**

SO Strategies	**WO Strategies**
• $SE_{1234}OE_{12}$: Advertising image of eco-brand for smart consumers **(SO_1)** • $SE_{12345}OE_4$: Investing a synchronic process of GSCM in organizations **(SO_2)** • SE_4OEN_{123}: Enhancing enterprise production for ecology **(SO_3)** • $SE_{56}OEN_4$: Fortifying role and position of enterprises **(SO_4)** • $SEN_{1234}OS_{123}$: Approaching green fund with priority loan **(SO_5)** • $SS_{1234}OE_{1234}$: Increasing domestic and international competition by environmental and social responsibility actions **(SO_6)**	• $WE_{1234}OE_4$: Appealing investor for GSCM **(WO_1)** • $WEN_{123}OS_{13}$: Improving GSCM knowledge for human resource in enterprises by training program of government and non-government **(WO_2)** • WS_3OEN_2: Applying advanced technology in production and management to increase efficiency **(WO_3)**
ST Strategies	**WT Strategies**
• $SE_{1234}TE_{12}$: Establishing risk fund for unexpected situations **(ST_1)** • $SS_{1234}TS_{12}$: Building a green association comprises Enterprise-Government-Consumer **(ST_2)**	• $WEN_{123}TEN_{123}$: Inviting foreign consultancy and using international criteria related to sustainability **(WT_1)** • $WS_{12}TS_{12}$: Conducting campaign smart consumer and manufacturer for a green planet **(WT_2)**

Source: authors.

highest average values of 0.2014. This yields 2.3280 dominant elements of opportunity, 1.4636 threats, and a difference of 0.8644. This indicates that corporate sustainability strategies have the potential to combat danger and improve companies.

EFEM analysis determines external elements such as opportunity and threat. External factor analysis makes the three main drivers of sustainable performance manageable and discussable. The top element was attracting investors and stockholders (OE4). This study matches those of (Peijia, Siqi, 2013; Roychowdhury et al., 2019; Bansah et al., 2018). Maintaining good supplier connections is crucial to GSCM's long-term success of GSCM. Long-term supplier relationships may encourage suppliers and investors to work with businesses to achieve green buying and sustainability objectives.

Green image, worldwide marketing, and competitiveness promote sustainable performance (OE1). This indicates that companies advertise eco-friendly items. Green goods boost a company's reputation and revenue. Environmental organizations may compete for and export globally. If a company learns that its competitors are exporting, it may be motivated to develop more sustainable manufacturing practices.

The sustainability promotion study showed that NGO green movement action support was the final component (OS1). Meanwhile these groups have designed environmental and competitiveness policies for industrial companies, and encourage global green production and consumption among the national governments. Full government support is required to promote GSCM in industry.

This study discovered two important external challenges for sustained success. (TE3) and (TEN3) scored the highest scores. This means that to adopt GSCM, firms must invest in green techniques, including green procurement, green design, green manufacturing, green distribution, and green labeling for packaging. They must also pay environmental management expenses. Hence, the biggest obstacle to GSCM adoption is the lack of financial backing. According to Luthra et al. (2011), the absence of a government support system (TEN3) reveals that governments do not exert pressure on non-compliant enterprises regarding environmental performance and regulatory punishment policies.

SWOT and QSPM analyses for strategic solutions in sustainability

The SWOT analysis generates viable alternatives. The SWOT analysis provides four possible strategies: expansion (SO), stability (WO), incentive (WT), and ST diversification, with each of the four zones displaying a distinct set of tactics (Table 8,9). Expansion Strategy (SO) plan boosts sustainability by attracting investments. Stability Strategy (WO) aims at increasing innovation in order to overcome weaknesses by addressing emerging opportunities. Diversification Strategy (ST) is a resource-based approach to sustainability issues. The ST strategy addresses the vulnerabilities and threats. Considering these outcomes, sustainability requires considerable investment resources and government support. Defensive Strategy (WT) reduces internal vulnerabilities and avoids external threats.

The QSPM helps to analyze and prioritize internal, external, and competitor data for strategic planning. This method impartially selects the firm's best strategy. QSPM matrix is provided within Table 9. QSPM's left column of the QSPM includes the IFE and EFE matrix factors. The attractiveness Score (AS) reflects the factor's significance to other approaches. AS is (1-4) or (not attractive – highly attractive). The total attractiveness score (TAS) ranks strategies by significance. The QSPM sum of the total attractiveness scores shows the strategy choices.

A score of 2.6751 for internal variables and 3.7916 for external factors showed that corporations had significant sustainability potential. The SWOT analysis shows that economic students' sustainability awareness is positive. The SWOT matrix with 13 sustainable business strategy solutions revealed SO (Expansion), WO (Stability), ST (Diversification), and WT (Defen-

Table 9. **QSPM Matrix**

No.	Strategic solutions	Code	Score	Rank/ Priority
	SO Strategies			
1	SO_2: Investing a synchronic process of GSCM in the organization	$SE_{12345}OE_4$	6.8185	I
2	SO_4: Fortifying role and position of enterprise	$SE_{56}OEN_{123}$	6.6388	II
3	SO_3: Enhancing enterprise production for ecology	$SE_{56}OEN_4$	6.5705	III
4	SO_6: Increasing domestic and international competition through environmental and social responsibility actions	$SS_{1234}OE_{1234}$	6.5295	IV
5	SO_1: Advertising image of eco-brand for smart consumers	$SE_{1234}OE_{12}$	6.4004	V
6	SO_5: Approaching green fund with priority loan	$SEN_{1234}OS_{123}$	6.3102	VI
	WO Strategies			
7	WO_3: Applying advanced technology in production and management to increase efficiency	WS_3OEN_2	6.5662	I
8	WO_1: Appealing to investors for GSCM	$WE_{1234}OE_4$	6.5318	II
9	WO_2: Improving GSCM knowledge for human resource in the enterprise by training programs of government and non-government	$WEN_{123}OS_{13}$	6.4345	III
	ST Strategies			
10	ST_2: Building a green association comprising Enterprise-Government-Consumer	$SS_{1234}TS_{12}$	6.1904	I
11	ST_1: Establishing risk fund for unexpected situations	$SE_{1234}TE_{12}$	6.1062	II
	WT Strategies			
12	WT_2: Conducting a campaign for smart consumers and manufacturers for a green planet	$WS_{12}TS_{12}$	6.4423	I
13	WT_1: Inviting foreign consultancy and using international criteria related to sustainability	$WEN_{123}TEN_{123}$	6.3777	II

Source: authors.

Table 10. **Proposed Activities of Four Strategy Groups toward Sustainable Business Operations for Prospective Entrepreneurs**

Strategy Code	Activity
Expansion Strategy (SO)	
SO_1: Advertising image of eco-brand for smart consumers	1. To convey environmentally friendly messages to the minds of consumers. 2. To carry out green advertising by holding a company campaign related to environmental responsibility
SO_2: Investing a synchronic process of GSCM in the organization	3. To consult GSCM processes in the international organization
SO_3: Enhancing enterprise production for ecology	4. Invest in friendly technological innovation in line with environmental changes.
SO_4: Fortifying role and position of enterprise	5. Businesses should have action programs to protect the environment and improve social responsibility. 6. Capturing customers' feelings and needs in connecting with customers. 7. Train loyal and effective staff in the process of creating a brand image
SO_5: Approaching green fund with priority loan	8. To make detailed plans to appeal for green funds organizations to consider, approve and receive support packages for green development programs.
SO_6: Increasing domestic and international competition	9. To improve reputation to enhance competitiveness.
Diversification Strategy (ST)	
ST_1: Establishing risk fund for unexpected situations	10. To extract 5-10% enterprise's annual profit for risk fund
ST_2: Building a green development association comprising Enterprise-Government-Consumer	11. To collect and analyze green data related to circular economy, green growth and sustainable development. 12. To consult sustainability policies with Enterprise-Government-Consumer
Stability Strategy (WO)	
WO_1: Appealing investors for GSCM	13. To introduce organization's green planning and strategies for medium and long periods to investors, and green financial institutions. 14. To participate in environmental improvement, and sustainable development campaigns that NGOs, government carry out.
WO_2: Improving GSCM knowledge for human resources of enterprise by training programs of government and non-government	15. To participate actively in sustainable courses and training to upgrade human resources.
WO_3: Applying advanced technology in production and management to increase efficiency	16. To approach GSCM for stakeholders in supply chain towards a synchronic and green technology system. 17. To establish budgets for green technology exchange.
Defensive Strategy (WT)	
WT1: Inviting foreign consultancy and using international criteria related to sustainability	18. To approach evaluating, monitoring criteria and production, management standardlization towards international regulation.
WT_2: Conducting smart consumers and manufacturers' campaigns for the green planet	19. To carry out the advertisement and public relationship benefits from green products and manufacturing.

Source: Authors' proposal.

sive). After reaching this level, the QSPM matrix was expected to provide a more accurate analysis. Based on the analysis, SO (Expansion) "Investing a synchronic process of GSCM in the organization" with TAS of 6.8185, WO (Stability) "Applying advanced technology in production and management to increase efficiency" with TAS of 6.5662, ST (Diversification) "Building a green association comprising Enterprise-Government-Consumer" with TAS of 6.1904, and WT (Defensive) "Conducting a campaign for the smart consumer and manufacturer were prioritized business strategies to carry out.

As a result, this paper suggests 19 activities of four strategy groups toward sustainable business operations for prospective entrepreneurs (Table 10).

Conclusion and Recommendations

Education plays an important role in providing sustainable business knowledge for business learners. Universities have the ability to contribute to a world that is healthier and more sustainable. The establishment of business people and businesses toward social responsibility, community involvement, and eco-friendly manufacturing for sustainability depends heavily on raising economic learners' understanding. Today's economics students are tomorrow's managers and entrepreneurs. Their understanding of sustainable business is an important tool to help guide business decisions that care about the environment, and social responsibility, in addition to the profit goals of the business. Even if they are just employees at the company, they can share sustainable business knowledge with their colleagues and managers. These bring a sense of business responsibility towards the value of sustainability.

This study assessed the awareness and perception of respondents - future entrepreneurs of the principles underlying successful strategies for sustainable development. A total of 534 students studying economics in the city of Can Tho (Vietnam) were interviewed. For comparison, 102 professionals with a master's or PhD degree in fields related to the subject of the study were interviewed. In general, the students showed a high awareness of all the considered factors determining the success of corporate sustainability strategies and demonstrated their willingness to consider them in their academic and qualification projects (and later on in their professional activities). Some of the analyzed aspects were given even higher importance by students than by the group of "professionals".

Based on the results of the survey, matrices of internal factors (strengths and weaknesses of the company, which it is able to influence) and external factors (opportunities and threats) were compiled. On their basis the SWOT-matrix was synthesized, which allowed to outline four alternative realistic variants of corporate sustainable development strategy (expansionary, stabilization, diversification, protective). The subsequent application of the QSPM matrix allowed to rank these strategies and their constituent measures by priority. Finally, for each of the four strategic directions a total of 19 strategic initiatives were proposed, which can be used by current and future entrepreneurs to form their own corporate sustainability strategy.

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Appendix. **Contents of the Block of Questionnaire to Assess the Factors Determining the Success of Business Strategies for Sustainable Development**

Please read the following statement and indicate your opinion. Please only mark X in the one column that you have chosen for each statement (1 = totally disagree; 2 = disagree; 3 = no idea; 4 = agree; 5 = completely agree)

Why should enterprises carry out their business strategy towards sustainability?

1. Reduce cost for environmentally friendly input procurement
2. Reduce cost of delivery and inventory
3. Reduce fee to waste discharge
4. Reduce fine for environment accidents
5. Increase demand flexibility, delivery flexibility, and production flexibility
6. Ensure procurement and delivery on time
7. Optimize process for waste and emission reduction, pollution control
8. Recognize products of eco-labeling, recycled material, and design-for-assembly
9. Save energy consumption and recycling process
10. Encourage green and clean technologies use
11. Increase social and environmental responsibility
12. Increase organizational capability
13. Increase employees' motivation, health and safety
14. Increase customer interest and satisfaction from green products
15. Promote green image, global marketing and competitiveness
16. Capture demand for environmentally friendly product market
17. Obtain certificate for green product warranty
18. Attract investors and shareholder
19. Increase green business strategies
20. Increase efficiency in scarcity of resources, higher waste generation and waste disposal problem
21. Adapt to global climate pressure and ecological change
22. Contribute to government rules and legislation system related to sustainability
23. Support from green movement activism by non-government organization
24. Create trust to society or public
25. Get government support for enforcement

Which main barriers must enterprises confront with when they conduct business strategy towards sustainability?

26. Constrain finance/capital
27. Lack organization encouragement
28. Lack IT implementation
29. Hesitate to convert to new systems
30. Hesitate to change GSCM from supplier
31. Lack sustainable guidance
32. Lack sustainability training courses/consultancy/mentor
33. Lack corporate social responsibility
34. Lack top management commitment
35. Do not want technology advancement adoption
36. Impact economic uncertainty
37. Impact market competition
38. Need big investment
39. Poor legislation related to sustainability
40. Lack effective environmental measures
41. Lack government support system
42. Weak pressure from society
43. Lack quality human resources

Source: authors.

Do Incentives Matter in Persuading Companies to Embrace Advanced Reporting Standards Voluntarily?

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Abstract

Using the evidence from Malaysia this study aims to investigate how incentives for Extensible Business Reporting Language (XBRL) affect the relationship between the intention to use and user behavior when it comes to filing submissions. In this regard a survey was implemented among company employees who are involved in the preparation and submission of filings to Suruhanjaya Syarikat Malaysia (SSM). Results indicate that incentives strengthen the positive relationship between XBRL filing intention to use and usage behavior. The study also discovered that intent to use significantly impacts XBRL filing behavior. Compared to perceived usefulness, perceived ease of use was found to have a greater influence on XBRL filing intention. Perceived ease of use was also found to be a significant indicator of XBRL filing perceived usefulness. The result of this study provides guidelines for incorporating XBRL technology into the practices of government authorities and policymakers. The study's findings can also be used to develop strategies to encourage filers to submit voluntary filings using the XBRL platform.

Keywords: business reporting standards; technology acceptance model; usage behaviour; intention to use technology; incentives; XBRL; MBRS

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Introduction

Financial reporting is a written document that communicates the company's financial position. Financial fraud or misleading information in financial reporting has always been a major concern among users. To monitor this wrongdoing scenario, many countries have introduced standards for reporting to regulatory bodies have been introduced, guaranteeing transparency of companies and compliance with established rules (Christopher, Ong, 2019). A business report is traditionally prepared in an electronic format such as Microsoft Word or PDF (Ghani et al., 2014). Traditional electronic formats often have restricted functionality and will indicate copying and pasting errors. This issue can be remedied by utilizing the Extensible Business Reporting Language (XBRL) format, an open standard language (Hoffman, 2006; Uyob et al., 2022; Bai et al., 2014; Chong et al., 2017; Liu et al., 2017). Many countries such as the United Kingdom, the United States, Denmark, Germany, Peru, Japan, Spain, Singapore, South Korea, and Chile employ XBRL in their filing submission systems for business registration and attracting potential business investors and financial experts from around the world (XBRL International, 2021).

In Malaysia, XBRL reporting has been acknowledged in terms of implementation, but adoption has been difficult to gain traction. Only 3.6% of Malaysian audited companies use XBRL for online filing submission reports (SSM, 2019). The authorities have invested heavily in promoting the use of XBRL-based filing platforms by offering incentives such as free training, consulting, and technical support (SSM 2019). Therefore, it is critical to examine filers' usage behaviour in response to the incentives provided.

No empirical studies have yet been conducted (at least in Malaysia) to investigate the moderating effects of incentives, particularly in XBRL studies[1].

This study attempts to fill in the gap by investigating the moderating effects of incentives. To achieve the study's objective, XBRL filing in Malaysian settings was investigated. Different cultures influence acceptance or rejection of a new system (Huang et al., 2019), and as such, usage behaviour in Malaysia may differ from that of other countries[2]. Although prior XBRL studies have shed light on the factors influencing XBRL filing adoption, there are still many other factors that need to be explored given the uniqueness of the Malaysian environment. Understanding the current situation is important as the country works hard to strengthen its technologically advanced economy[3]. Besides, Malaysia has one of Asia's fastest economic growth rates; thus, an investigation of the Malaysian setting can serve as a model for other emerging countries adopting XBRL. Thus the study's findings are expected to provide useful information to authorities, particularly regarding incentives for XBRL, allowing authorities to plan and develop strategies to encourage filers to use XBRL for voluntary filing.

Literature review

XBRL in the Malaysian Business Reporting System (MBRS)

Previously, business registrar filings were frequently submitted over the counter via the manual handling system, where the company had to print all relevant documents. However, issues such as limited physical storage capacity, lengthy processes, human error, submission delays, and missing physical papers/documents have always arisen due to the limitations of this system (Uyob et al., 2019a). Electronic filing can potentially improve filing efficiency while addressing the issue with manual handling systems. Another issue is transferring and converting data to multiple digital platforms. The majority of basic electronic formats have limited functionality and will indicate a copying and pasting issue. Transferring and converting data to a new digital platform will require considerable clerical work, money, and time (Choi, 2016).

XBRL is tagged to financial and non-financial data relevant to business reporting and decision-making in an XML-based framework (Hoffman, 2006). Thus, the XBRL format is more user-friendly, popular, and unique (Dong et al., 2016). Financial reporting users can extract, use, and analyse financial information from organizations' in minutes, thanks to a technology known as "barcode for reporting" (Uyob et al., 2019b). It also improves the quality, precision, and trustworthiness of financial data, making the operating process more effective and efficient, particularly in the filing preparation and submission process (Ib et al., 2015).

Suruhanjaya Syarikat Malaysia (SSM) developed the MBRS platform for online XBRL filing submission to capitalise on the uniqueness of the XBRL format and improve the Malaysian business filing procedure[4]. Com-

[1] According to recent studies on the use of e-filing systems and food safety in Malaysia, there is no evidence that incentives affect moderate users (Aziz, Idris, 2016; Fernando et al., 2015)

[2] For example, the Malaysian Business Reporting System (MBRS) is voluntary in comparison to other countries such as Singapore.

[3] To achieve this goal, Malaysia Digital Economy Blueprint is implemented, and efforts to improve public services are undertaken (https://www.malaysia.gov.my/, accessed 14.02.2023).

[4] The SSMXT, the MTOOL, and the MPORTAL are the three key components of MBRS (SSM, 2021). SSMXT is an XBRL taxonomy-based dictionary of financial and non-financial reporting elements. The second version of the SSM taxonomy, i.e., SSMXT-2017, was utilised for the MBRS to comply with the new Malaysian Companies Act 2016 and Malaysia accounting standards. This component of XBRL used to generate XBRL file/document that meet MBRS criteria. MTOOL, on the other hand, is a Microsoft Excel-based application that allows filers to generate XBRL file/documents that already embedded in SSMXT. The MTOOL is a ready-to-use template for those without an XBRL that is integrated with SSMXT. MTOOL can also convert different reporting files types into XBRL file format, either online or offline. SSM offers a free download of MTOOL as an incentive to encourage the adoption of the XBRL platform. The third component is the MPORTAL, which is an online web portal where filers can submit and lodge all filing requirements with the SSM in the form of XBRL files. Filers can use MPORTAL to make inquiries, verify status, and make all necessary payments online (SSM, 2021). MBRS-related training session have been held on a constant basis to ensure the filers are ready to use MBRS. As of 2018, over 4,000 financial filers have received training to improve their understanding and skills in updating information and exchanging data via MBRS (https://www.nst.com.my/news/nation/2018/09/415468/mandatory-companies-submit-their-documents-ssm-new-platform-soon, accessed 12.02.2023).

panies in Malaysia can use MBRS to submit annual filings such as financial reporting statements (FS), annual returns (AR), and all exemption applications related to the FS and AR electronically (SSM, 2021).

Incentive as a Motivational Element

An incentive, according to Locke (1968), is "an event or object external to the individual which can incite action". It was intended to stimulate behavior by rewarding a specific behavior and was strongly tied to the individual's actions (Roumani et al., 2015). Skinner (1956) argued that human behavior is based on the principle of reinforcement. He further asserts that long-term behaviors occur as human actions and behaviors are reinforced by incentives. This is supported by the theory of expectancy, which states that "an individual will act or behave in a certain way because they are motivated to select a specific behavior over others due to what they expect the result of the selected behavior will be (Oliver, 1974; Deci, 1971; Kohn, 1997). By comparing subjects who received and did not receive financial performance incentives, Camerer and Hogarth (1999) predicted the effect of financial incentives on human behavior. Their study found that extrinsic incentives had a substantial effect on judgment tasks. This finding supports Milgrom and Robert's (1995) finding that incentives have a significant effect on behavior. In information systems studies, an incentive has also been used as a mechanism to enhance technology adoption. According to Ba et al. (2001), an incentive can influence user behavior and system communication. Furthermore, when incentives are employed, overall decision-makers have a more positive stance about the behavior of adopting new technologies (Roumani et al., 2015).

Prior studies have been conducted to examine the influence of incentives on technology adoption (Aziz et al., 2016; Fernando et al., 2015; Roumani et al., 2015). Not all studies on incentives provide positive outcomes, depending on the scope of the study (see Aziz et al., 2016; Fernando et al., 2015). For example, research on the effects of incentives yielded inconclusive or unfavourable results (Aziz et al., 2016; Ba et al., 2001). These investigations ensure that the incentives provided align with the users' interests and the system's characteristics and potential ability to achieve goals. In order to influence users' behavioural intentions to accept and use certain technologies, incentive alignment is important and should be considered (Aziz et al., 2016; Ba et al., 2001). This is also to ensure that users perceive the incentives that can persuade them to perform a behavior.

To encourage filers to utilize MBRS, SSM is also providing incentives. Filers who attend an MBRS course conducted by SSM or one of its training partners, receive continuing professional education (CPE) points (SSM, 2019). SSM also provides extra filing time if filers prefer to submit through MBRS, free consultation and support assistance, and free installation of MTOOL to facilitate MBRS use. Despite the aforementioned incentives, no study has empirically proven the interaction effect of incentives on the relationship between the intention to use and the usage behaviour of XBRL filing via MBRS.

Technology Acceptance Model (TAM) as Underpinning theory

Davis introduced TAM in 1989 to predict user behaviour when using a computer system. TAM, which evolved from the theory-reasoned action (TRA) concept, introduced perceived usefulness and perceived ease of use in predicting individual computer behaviour. According to TAM, three factors (attitude, perceived usefulness, and perceived ease of use) will significantly influence the intention to use, which is highly capable of translating into actual usage behaviour of actions (Davis, 1989). TAM, which has been empirically proven to predict individual behaviour toward technology acceptance, has been employed by several information systems researchers. This theory has now been widely used in a variety of disciplines, including psychology, sociology, and management, in predicting users' intentions to implement technologies (Agrebi, Jallais, 2015; Gangwar et al., 2015).

Since this study examines filers' voluntary usage of XBRL filing, which is more oriented to the perspective of individuals than organizations, TAM theory is the most appropriate underpinning theory.

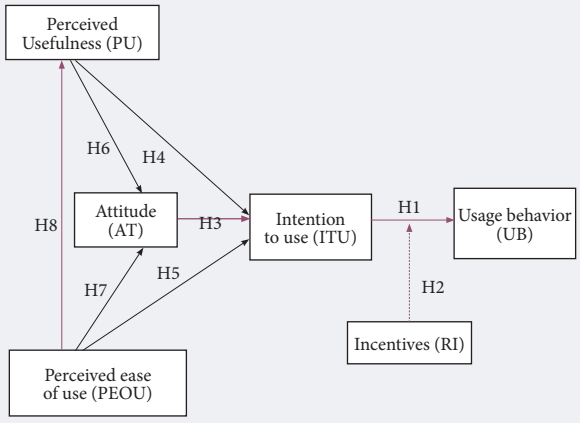
It should be noted, that the application of TAM has evolved throughout time, and has its extended version - the unified theory of acceptance and use of technology (UTAUT) that examines the similarities and differences of previous models, including TAM, TRA (Fishbein, Ajzen, 1980), and TPB (Ajzen, 1985). Among the main concepts discussed are expected performance, expected effort, social influence, and facilitating conditions, as well as four significant variables that predict technology use behavior, including gender, experience, age, and voluntariness of use (Venkatesh et al., 2003). Despite the fact that UTAUT has a simple structure and a high explanatory power, there is not always agreement on the nature of interactions between UTAUT components, particularly when used in different contexts (Alshammari, Rosli, 2020). Furthermore, due to issues of homogeneity and professionalism characteristics in this study's unit of analysis, some of the main constructs proposed in UTAUT, such as gender and social influence, do not appear to fit the context of this study. Thus, the original TAM construct, i.e. perceived ease of use, perceived usefulness, and attitude is utilized to determine the causal relationship between the intention to use XBRL for file submission.

Hypotheses Development and Justification

The hypotheses of our study regarding the use of XBRL for reporting through the MBRS system (Figure 1) are formulated as follows:

H_1: Intention to use (ITU) significantly influences usage behavior (UB) of XBRL filing through MBRS.

Figure 1. **Research Model and Hypothesis**



Source: authors.

H_2: Incentives (RI) moderate the relationship between intention to use (ITU) and usage behavior (UB) of XBRL filing through MBRS.

H_3: Attitude (AT) significantly influences intention to use (ITU) XBRL filing through MBRS.

H_4: Perceived usefulness (PU) significantly influences intention to use (ITU) XBRL filing through MBRS.

H_5: Perceived ease of use (PEOU) significantly influences intention to use (ITU) XBRL filing through MBRS.

H_6: Perceived usefulness (PU) has a significant influence on attitude (AT) of XBRL filing through MBRS.

H_7: Perceived ease of use (PEOU) has a significant influence on attitude (AT) of XBRL filing through MBRS.

H_8: Perceived ease of use (PEOU) significantly influences perceived usefulness (PU) of XBRL filing through MBRS.

Below is a brief review of the literature on the relevant factors that served as the basis for their formulation.*Intention to use (Hypothesis H1).* Ajzen (1991) defines intention as a mental image that expresses a person's level of readiness to engage in a particular behaviour, and acts as the behavior's immediate precursor. Many previous behaviour studies have concluded that intentions have strong positive relationship with actual behaviour and accurately predict various action tendencies. Popular psychological theories such as theory reasoned action (TRA) and theory of planned behaviour (TPB) supported this conclusion. TAM also proposed in the information system studies discipline that high user intention to use might lead to actual technology utilization. This is evidenced by studies in numerous domains of information systems, such as m-banking (Hjiyev, Chang, 2017) and e-banking services (Ahmad et al., 2020), which discovered that the intention to use certain technologies has a major influence on user behaviour. However, because the intention is not static and can change depending on specific circumstances such as new information, individual differences, or unforeseen factors, it is not an accurate proxy for defining usage behaviour. Furthermore, according to e-commerce studies, online customers/shoppers frequently decline purchases, even if they are strongly drawn to the product (Jung, Jae, 2015).*The incentives (Hypothesis H2).* A moderating variable affects or moderates the relationship between two other variables, resulting in an interaction effect. Incentives have been used by many organizations, including governments, to encourage or persuade people to embrace and use specific technologies. According to Roumani et al. (2015), incentives are an effective way to moderate and improve user's intentions to adopt new technologies. Nonetheless, Aziz and Idris (2016) and Fernando et al. (2015), found no evidence to support the moderating effect of incentives to accept e-filing tax and Malaysian food safety systems in their respective study on taxes and food safety. They also suggest that the major criteria for authorizing any new technological application should not be based solely on incentives. *The attitude to technology (Hypothesis H3).* The perceived degree of positive and negative sentiments about performing the target behaviour is described as "attitude" (Ajzen, 1991). Davis and Venkatesh found that perceived usefulness and ease of use directly influenced intention to use the final TAM model, thereby eliminating attitudes from the original TAM framework (Taherdoost, 2018). However, empirical studies in the area of information systems, such as e-learning (Yoon, 2016) m-commerce (Khoi et al., 2018) and m-banking (Muñoz-Leiva et al., 2017), have come to the conclusion that attitudes have a significant influence on technology use intention. In XBRL studies, the effect of attitude on intention to use has yielded inconclusive results. For example, (Chouhan, Goswami, 2015) discovered no effect on practitioners' attitude toward XBRL in North India. However, Ilias et al., (2020) found disparities in their study on 12 secretaries' practitioners in Malaysia. The study revealed that one of the primary hurdles for the organization's intention to adopt XBRL was the preparer's attitude, which reflects the conflicting findings of previous studies. This study is needed to confirm this hypothesis based on the disparities in results.*The perceived usefulness (Hypothesis 4).* According to TAM, perceived usefulness factors are one of the main indicators in technology usage studies. Perceived usefulness refers to individuals' perceptions of improving tasks completed when using the system in question (Davis, 1989). In addition, most studies have found that perceived usefulness is the most significant factor that influence the intention to use technology (Elkaseh et al., 2016; Yu et al., 2018). Elissavet et al. (2013) discovered that perceived usefulness was a crucial factor driving XBRL intention in their XBRL study. According to the study's findings, increasing the perceived usefulness factors by 1% increased the intention of European companies to embrace XBRL by 0.647%. Rawashdeh and Selamat, (2013), on the other hand, observed that perceived usefulness had no effect on the intention to implement XBRL in Saudi Arabia. This indicated that, despite their awareness of the benefits of XBRL, they do not express an interest in using it. However, the factors affecting the XBRL adoption in Saudi Arabia differ from those encouraging widespread XBRL adoption in developed

countries. *The perceived ease of use (Hypothesis H5).* TAM suggests that when deciding how to use technology, most users aim to reduce the amount of effort required to complete their tasks. Thus, the simpler the technology is to be used, the greater the intention to use the technology (Davis, 1989). The idea of "perceived ease of use" in TAM represents an assessment of the degree to which a user's interaction with a system or a specific information technology is free of mental effort. Most previous XBRL studies have shown that perceived ease of use factors positively influence the intention to use XBRL. This is supported by the findings of Elissavet et al. (2013), Rawashdeh and Selamat (2013) and Ogundeji et al., (2014), who demonstrated that perceptions of XBRL's ease of use and complexity reflect its intention to be used. However, since XBRL was introduced more than two decades ago and has grown in favour among organizations and regulators, the complexity of its application does not appear to be a major concern. This is because these organizations actively provide intensive training to users to improve their understanding of XBRL (XBRL international, 2021). *The influence of perceived usefulness (PU) and perceived ease of use (PEOU) on attitude (AT) (Hypotheses 6 and 7).* Chouhan and Goswami (2015) discovered that perceived usefulness and ease of use significantly positively impact attitudes for using XBRL in India. Furthermore, Chouhan and Goswami (2015) found that combined perceived usefulness and perceived ease of use factors explained 73% of the attitude factor to use XBRL. This is supported by Uyob et al. (2019a) which revealed that perceived usefulness and ease of use significantly positively influence attitude toward using MBRS. This study however, was conducted prior to the establishment of MBRS. Because of the different timeline, the findings may change after the official implementation of MBRS.

The influence of perceived ease of use (PEOU) on perceived usefulness (PU) (Hypothesis 8). Although preparers recognize that using XBRL will improve the quality of their job, the difficulties and lengthy process of matching financial data with a given set of taxonomies make the XBRL system less appealing to embrace, resulting in poor XBRL adoption in India. Therefore, Chouhan and Goswami (2015) contend that perceived ease of use is an important factor in determining XBRL's perceived usefulness. However, the complexities and taxonomies in India differ from those in XBRL filings under the MBRS scope. Nevertheless, this study posits that perceived ease of use influences the perceived usefulness of XBRL filing through MBRS.

Methodology

Target Respondent, Population and Sample Size

To analyse the scenario of XBRL filing through MBRS usage behaviour, the response from the filers was needed in this study. Filers in this study refer to the representative officer responsible for preparing and submitting company filing to SSM. To file a filing with the SSM in Malaysia, the individual must be a qualified professional secretary who is registered licenced by the SSM. Before submitting files via MBRS, secretaries must first register as a "LODGER" (only "LODGER" can submit filings to SSM). However, SSM approval is not required for the role of "MAKER". The "MAKER" is the person involved in preparing and filing the report, which the company's accountant normally does. The Malaysian Institute of Accountants (MIA) members are qualified to practise as both professional secretaries and accountants, which may reflect the overall scenario of MBRS. Thus, the MIA members who are involved in preparing and submitting financial reporting filings to SSM are the target respondents for this study.

MIA members are categorized into four sectors: commerce and industry, public practice, public sector, and academician (MIA, 2020). Only MIA members from commerce, industry, and public practises are active in real business activities. As a result, the population of this study is limited to MIA members from commerce and industry, as well as public practices. According to MIA website, there were 28,206 MIA members from commerce industry and public practise as of January 13, 2021. 379 respondents were suggested as the sample size based on Krejcie and Morgan's (1970) estimation table.

Data Collection Procedure

Since the MIA has a policy of not disclosing member details (which is also restricted under the Malaysian Personal Data Protection Act 2010), the probability sampling technique cannot be used (due to the lack of a sampling frame). As a result, the questionnaire was distributed using a convenience sampling method utilizing a non-probability sampling technique. Despite its limitations, the convenience sampling method has been employed in a variety of studies, including finance (Krische, 2019), science (Cooper, Farid, 2016), and marketing (Sanne, Wiese, 2018). However, this study adopted two strategies to increase the response rate and reduce response bias during the data collection process.

The first strategy was to identify accurate potential respondents, and the SSM website was used to download a list of registered business secretaries' names. These names on the list were filtered using information obtained from the MIA membership directory (only information regarding the status of membership and names can be viewed on the MIA website). Following the comparison and screening, Internet searches, like those on Google and social networks, are conducted to confirm potential respondents and obtain their contact details and email addresses so that the questionnaire link (the Google form link) can be sent to them to be completed. Before distributing the questionnaire link, the author obtained consent from the potential respondent. From January to June 2022, the data collection process for this strategy took around six months. Throughout the process, respondents were given friendly reminders to complete and submit the online survey.

The second strategy is for SSM to assist with the data collection process. SSM organises MBRS application training on a regular basis. The SSM assisted this study by distributing questionnaire links to training participants or practitioners during training sessions. Throughout six online MBRS training sessions from January to June 2022, participants are provided links and asked to fill out an online questionnaire.

A total of 261 questionnaires were successfully collected at the end of the data collection process. However, only 237 (62.3%) responses could be used for further analysis after screening and cleaning, which included removing outliers and incomplete responses. Although it is less than Krejcie and Morgan's (1970) suggested sample size, it is still considered adequate because the minimum sample size according to the rule of thumb is 60 (the total number of study variables multiplied by 10) (Roscoe, 1975). Nevertheless, other statistical scholars such as Hair et al., (2019), claimed that the minimum number of sample size required for multiple regression and structural equation modeling (SEM) analysis is at least 200 samples. Therefore, it is deemed adequate since a total response rate of 30% or above is considered satisfactory for social science researchers (Sekaran, Baougie, 2016).

Survey Instrument

To achieve the study's objective, a questionnaire was developed to elicit responses from the target respondents. There are two sections to the questionnaire. The first sections asked questions about the respondent's profile, such as age, gender, organizations, and years of working experience. This section also contains screening questions to ensure that respondents are MIA members involved in preparing and submitting SSM filings. Those who do not meet the study's eligibility requirements will be excluded. These sections were measured using a nominal scale and a ratio scale.

Following that, a questionnaire related to the construct measurement of the constructs was administered. Items and questions for each construct were adapted from previous studies using a 5-point Likert scale. Seven items adapted from Isaac et al., (2018) and Riskinanto et al., (2017) were used to assess the usage behaviour construct. Five items adapted from Yoon (2016) were used to assess construct intention to use. Six items adapted from Fernando et al., (2015) and SSM (2019) measured the incentives construct. Six items adapted from Uyob et al. (2019a) measured the attitude construct. Five items adapted from Chouhan and Goswami (2015) measure the perceived usefulness construct. Finally, six items adapted from Muñoz-Leiva et al. (2017) and Nagy (2018) measured perceived ease of use. Table 1 below shows the detailed questionnaire item used to measure each construct. To ensure the validity and reliability of the survey instruments, pre-test and pilot study analyses were performed prior to final distribution, and the findings validated the measurements' reliability and validity.

Results

Respondent Profile

The majority of the respondents (68.4%) were adults between the ages of 41 and 50, with more than half of them female (57.8%). Furthermore, the vast majority of respondents (71.7%) worked in small practices, as opposed to mid-tier (25%), and big four (2.5%). In terms of experience, more than half of the respondents (68.4%) had more than 16 years of work experience. The descriptive data for the respondent's profile are shown in Table 2 below.

Measurement Model Assessment

The purpose of assessing the measurement model is to confirm that the items measure the same construct as intended, reflecting the instrument's reliability and validity. The measurement model was evaluated using individual item reliability, internal consistency reliability, convergent validity, and discriminant validity, as indicated by Henseler et al. (2009) and Hair et al. (2017).

Individual Item Reliability Test. The reliability of each individual item is evaluated using the construct's outer loadings as the first criterion for measuring the measurement model (Duarte, Raposo, 2010; Hair et al., 2017). According to Chan (2003), item loading less than 0.3 is poor, 0.3–0.50 is fair, 0.51–0.60 is moderate, 0.61–0.80 is fairly strong, and more than 0.81 is very strong. Hair et al. (2017) advise that outer loadings between 0.40 and 0.70 should be carefully examined and should only be removed if doing so increases the values of composite reliability (CR) and average variance extracted (AVE). Based on Hair et al. (2017) recommendations, two items (PI1 and PI6) have been removed. The item loading for all construct outer loadings is between 0.715 and 0.969, which indicates strong item loading.

Internal Consistency Reliability. According to Bijttebier et al. (2000), "internal consistency reliability" refers to the extent to which all components are measuring the same notion. Hair et al. (2017) proposed Cronbach Alpha (CA) or composite reliability (CR) for assessing internal consistency dependability. In this study, the researcher determined the CR to assess internal consistency reliability because the CR has less estimation bias than Cronbach's alpha. Furthermore, the CA coefficient's dependability assumes that all components contribute equally to the construct without taking into account the actual contributions of each factor loading (Hair et al., 2019). To evaluate the CR coefficient, a value of 0.70 or above must be used (Hair et al., 2017). Table 3 showed that all of the investigation's components had CR values greater than 0.70, which denotes the presence of internal consistency.

Convergent Validity. Convergent validity refers to the extent to which two or more measurements of the construct developed are interrelated as proposed in the theory or research model (Hair et al., 2011). Chin (1998) proposed that in order to attain acceptable convergent

Table 1. **Details Questionnaire Item for Each Construct and Underlying Literature**

Usage behaviour (UB) (Isaac et al., 2018; Riskinanto et al., 2017)
"I use MBRS for submitting financial reporting filings as required by SSM"
"I use MBRS for the process of preparing of financial reporting filings to SSM"
"I use online submission to SSM to submit financial reporting filings"
"I regularly use MBRS to check the financial reporting filing status after submitting it to SSM"
"I use MBRS to make payments to SSM for financial reporting filings"
"I consider using MBRS every time I submit financial reporting filings to SSM"
"I would prefer to use MBRS to manage financial reporting filings for SSM"
Intention to use (ITU) (Yoon, 2016)
"I think I will use MBRS more often for submitting financial reporting filings to SSM"
"If I have a chance, I intend to use MBRS as much as possible"
"I chose to use MBRS for the process of preparing of financial reporting filings to SSM"
"I highly recommend using MBRS for financial reporting filings"
"In the future, I plan to use MBRS for submitting online financial reporting filings to SSM"
Incentives (RI) (Fernando et al., 2015; SSM, 2019)
"Receiving sufficient continuing professional education (CPE) hours on each training inspires me to use MBRS"
"SSM provided a free MTOOL download that persuade me to use MBRS"
"SSM provided a free MBRS template to generate XBRL files for MBRS submission, which convinced me to use MBRS"
"Extra extension time for submission of financial reporting filings using MBRS convinces me to use MBRS"
"SSM provides free consultation without charge, which motivates me to use MBRS"
"I felt the SSM incentive given to us to use MBRS aligned with my interest"
Attitude (AT) (Uyob et al., 2019a)
"I think using MBRS for submitting online financial reporting filings to SSM is such a wonderful idea"
"I have positive feelings toward MBRS in general"
"It is easier for me to use MBRS for the preparation of financial reporting filing submissions"
"It is better for me to use MBRS, for submitting online financial reporting filings to SSM"
"I think nowadays, a digital platform such as MBRS is a must"
"I am in favour of using MBRS for the process of submission of financial reporting filings to SSM"
Perceived usefulness (PU) (Chouhan, Goswami, 2015)
"Using MBRS can save my time when submitting financial reporting filings to SSM"
"Using MBRS allows me to manage my work more efficiently related to the preparation of financial reporting filings"
"Using MBRS improves the quality of the financial reporting filings I do"
"MBRS enables me to accomplish tasks related to the preparation of financial reporting filings more quickly"
"I think MBRS is useful for managing the submission of financial reporting filings to SSM"
Perceived ease of use (PEOU) (Muñoz-Leiva et al., 2017; Nagy, 2018)
"I believe that interacting with MBRS for the preparation of financial reporting filings does not require a lot of mental effort"
"I find it easy to access the MBRS platform to submit financial reporting filings when and where I want"
"My interaction with MBRS is clear"
"I find MBRS is not too complex to use it"
"I find the procedure of using MBRS for the submission of financial reporting filings understandable"
"I find MBRS easy to use"
Note: For usage behaviour, construct a Likert scale measurement range from 1 to 5, with 1 = "never" to 5 = "always." Whereas for other constructs, 1 to 5 Likert scale anchored by 1 = "strongly disagree" to 5 = "strongly agree".
Source: authors.

validity, the AVE for each variable should be at least 0.50 or higher. Based on Table III above, the value of the AVE for this study is above 0.5. Therefore, there is no convergent validity problem in this study.

Discriminant Validity. The goal of discriminant validity is to guarantee that the constructs in the measurement model are independent of one another and to check its validity. A construct's discriminant validity measures how truly different it is from other constructs by implying that each scale is more closely related to its construct than to other scales (Hair et al., 2019). Henseler et al. (2015) proposed an alternative method known as the Heterotrait-Monotrait Ratio (HTMT) approach, which is based on the multitrait-multimethod matrix to determine discriminant validity. When the HTMT results exceed the predetermined threshold level, the issue of discriminant validity arises. The threshold value of 0.90 was proposed by Henseler et al. (2015). However, Hair et al. (2019) recommended 0.85 as the highest acceptable value of HTMT. Based on the results shown in Table 4, the HTMT value for this study is within the acceptable range.

Structural Model Assessment.

Based on Kock (2015) suggestion, the full collinearity inflation factor variance test (VIF) was used to examine the common method bias problem. All VIF values (intention to use 1.240; incentives 1.201; attitude 1.390; perceived usefulness 1.587; and perceived ease of use 1.826; moderating effect (ITU*RI_UB) 1.046) were less than 3.3 indicated no issue on common method bias.

Table 2. **Descriptive Statistics for Respondent Profiles**

Item	Number of respondents	Share (%)
Age		
20 - 30 years	1	0.4
31 - 40 years	41	17.3
41 - 50 years	162	68.4
Above 50 years	33	13.9
Gender		
Male	100	42.2
Female	137	57.8
Organization size		
Big Four	6	2.5
Mid-Tier practice	61	25.7
Small practice	170	71.7
Work experience		
Less than 5 years	1	0.4
5-10 years	15	6.3
10-15 years	59	24.9
More than 16 years	162	68.4
Source: authors.		

The evaluation of data in PLS-SEM using the structural model is the next step after establishing the validity and reliability of the measurement model. In PLS, the evaluation of the structural model informs the researcher how much the empirical data set supports the hypothesis or theory under consideration. Consequently, the structural model displays the directionality between the constructs as well as the t-values and route coefficients that are associated with them (Hair et al., 2019). To analyse the idea links in the research model, path coefficients in PLS are used. The bootstrapping approach with at least 5000 bootstrapping samples is advised to be used for testing the structural model (Hair et al., 2017). Therefore, the evaluation of the structural model for this study was tested by running a 5000-bootstrapping sample of 237 cases to obtain the significance of the path coefficients for the structural model. Figure II below shows the results of the bootstrap structural model for this study.

In regard to the statistical estimation of the hypothesis testing coefficient path model, the findings display the t-value and p-value. Hair et al. (2019) state that the two-tailed test's critical value for significance is 1.96 at a significance level of 5%. The results indicate that H1, H2, H4, and H5 were accepted, while H3 was rejected. Table 5 below shows the results of study hypothesis testing.

Evaluation of the Moderating effect strength

As stated in table V, the results of hypothesis testing for the moderating effect (H2) were empirically supported. Besides, the results of these study hypotheses are also proved by changing the R^2 value when it is measured with other study constructs. The R^2 value for the usage behaviour (UB) construct has been found to increase from 0.385 to 0.397. Table VI below shows the detailed results of the R^2 value for the usage behaviour (UB) construct with and without a moderating construct.

According to Cohen (1988), the moderating effect size (f^2) values are considered weak if 0.02, moderate if 0.15, and strong if above 0.35 (Henseler, Fassott, 2010). For this study, the value of the moderating effect is 0.009, which indicates a weak effect size. Even though the moderating effect strength has a weak impact size, it does not necessarily suggest that the effect is unimportant (Chin et al., 2003).

Assessment of Prediction Relevance (Q^2)

In Smart PLS software 3.2.9, the predictive relevance of a model can be estimated by using the blindfolding technique with an omission distance of 7. Hair et al. (2019) proposed three-level criteria for evaluating Q^2, with 0.35 regarded as big, 0.15 as medium, and 0.02 as small predictive importance for a specific endogenous construct. The Q^2 test result was 0.354, indicating that the model has a big predictive significance (Hair et al., 2019). Besides, the standardised root mean square residual (SRMR) value is 0.085, which is below 0.10, indicating the model has a good model fit (Hu, Bentler, 1998).

Table 3. **Cronbach Alpha and Composite Reliability (CR) Results for This Study**

Construct	Cronbach alpha (CA)	Composite reliability (CR)	Average variance extract (AVE)
AT	0.909	0.929	0.687
ITU	0.927	0.945	0.775
Moderating Effect (ITU*RI_UB)	1.000	1.000	1.000
PEOU	0.916	0.935	0.709
PU	0.972	0.978	0.899
RI	0.878	0.914	0.726
UB	0.983	0.985	0.906
Source: authors.			

Table 4. **Discriminant Validity by Heterotrait-Monotrait Ratio (HTMT)**

	AT	ITU	Mod	PEOU	PU	RI
ITU	0.497					
Moderating Effect (ITU*RI_UB)	0.113	0.184				
PEOU	0.550	0.749	0.198			
PU	0.408	0.649	0.184	0.630		
RI	0.601	0.437	0.035	0.249	0.263	
UB	0.192	0.638	0.173	0.463	0.405	0.334
Source: authors.						

Table 5. **Hypothesis Testing Results**

Hypothesis	Relation	Original Sample	Standard Deviation	T Statistics	P Values	Results
H1	ITU → UB	0.566	0.050	11.335	0.000	Accepted
H2	Moderating Effect (ITU*RI_UB) → UB	0.082	0.040	2.023	0.043	Accepted
H3	AT → ITU	0.111	0.062	1.778	0.075	Rejected
H4	PU → TU	0.293	0.071	4.132	0.000	Accepted
H5	PEOU → ITU	0.468	0.081	5.787	0.000	Accepted
H6	PU → AT	0.136	0.070	1.930	0.054	Rejected
H7	PEOU → AT	0.437	0.071	6.155	0.000	Accepted
H8	PEOU → PU	0.599	0.079	7.625	0.000	Accepted

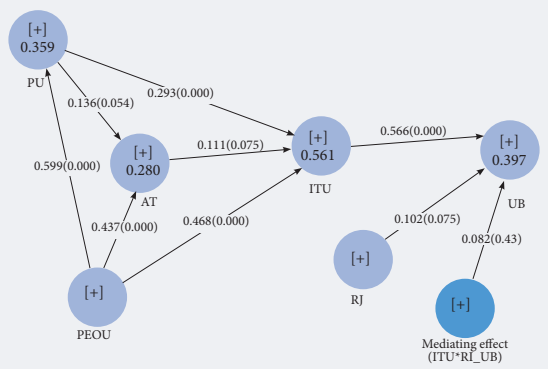
Source: authors.

Discussion

According to Ajzen (1985), intention alone cannot be directly translated into actual behavior in action; however, XBRL usage behaviour can be predicted based on the filer's intention to use XBRL filings. It has been empirically proven by the findings of this study, which found that intention to use has a significant influence on the behavior of using XBRL filing through MBRS and supporting H1. The data analysis also shows that changing the intention to use by 1% can increase 0.566% of the usage behaviour, indicating a strong influence. This is consistent with the TRA, TPB, and TAM theories, according to which intention is a strong predictor of behaviour.

Despite the fact that the results of the moderating effect for incentives indicate a small and too weak effect size (0.009), the importance of this factor in explaining the usage behaviour of XBRL filing cannot be ignored because the results according to H2 were statistically significant. The increased in R^2 value when the moderating variable is present suggest that incentives strengthen the positive relationship between XBRL filing through MBRS and usage behaviour. However, since the effect size was determined to be too weak, there may be other or additional factors, such as moderating or mediating factors, that can influence R^2, which are beyond the scope of this study. Consequently, it is proposed that future studies investigate these intervening factors. From the authority's responsibility, particularly SSM, it is proposed to implement a strengthening strategy to encourage XBRL filing by improving the current incentives.

Figure 2. **Bootstrap Structural Model Results**



Source: authors.

Although Ilias et al.'s (2020a) studies suggest that one factor influencing intention to adopt XBRL is attitude, this study showed little indication that attitude has a significant influence on intention to file XBRL. According to the results of H3, while attitude was found to have a positive relationship with intention to use, it did not significantly influence intention to use XBRL filings via MBRS. Nonetheless, the outcomes of this study were in line with the finding of Chouhan and Goswami (2015), who discovered no effect of financial reporting preparers' attitudes on the intention to use XBRL in North India. The insignificant effect of attitude towards intention to use XBRL filings using MBRS in this study could be attributed to comfort factors. Since the majority of respondents in this study have more than ten years of experience, they are believed to be knowledgeable and at ease with previous systems. As a result, even though they recognize the benefits of XBRL filings, their intention to utilize them has not increased. For the effect of perceived usefulness and perceived ease of use on attitude, only the latter was found to have a significant influence, whereas perceived usefulness did not match the results of H6 and H7. This can be said that filers in Malaysia are skeptical about the usefulness and actual benefits of XBRL filing through MBRS usage. Thus, an effort must be made, notably by SSM, to prove that MBRS was a better system over the preceding system.

In terms of perceived usefulness, this study found that perceived usefulness significantly influences the intention to use XBRL filing through MBRS, hence supporting H4. According to data analysis, changing the perceived usefulness by 1% can increase the intention

Table 6. **R^2 size for ITU to UB Path with and without Moderator Construct**

Path (ITU → UB)	R^2
Without moderator construct	0.385
With moderator construct	0.397

Source: authors.

to adopt XBRL filings by 0.293%. This is aligned with TAM theory, which claims that perceived usefulness has a major impact on intention to use. Nevertheless, the significant effect of perceived usefulness on intention to use in this study (29.3%) was lower than the study finding of Elissavet et al. (2013) (64.7%). This could be because developing countries, such as Malaysia, are less aware of the potential benefits of XBRL than developed countries, such as Europe.

Finally, the findings of this study revealed that perceived ease of use significantly influences the intention to use XBRL filing through MBRS, thus supporting H5. This fits with TAM theory and is supported by previous XBRL research (see Elissavet et al., 2013; Rawashdeh, Selamat, 2013; Ogundeji et al., 2014), which found that perceptions of ease of use and complexity describe XBRL intention. Moreover, this study also found that perceived ease of use considerably influences the intention to adopt XBRL filings. According to data analysis, changing the perceived ease of use by 1% can increase the intention to use XBRL filings by 0.468%. Thus, perceived ease of use was an important indicator of increased intention to use XBRL filings. Moreover, enhancing perceived ease of use will significantly improve the perceived usefulness of XBRL filings. As shown in H5, a 1% increase in perceived ease of use factor can increase the usefulness of XBRL filings via MBRS by 0.599%.

Conclusion

Conclusively, this study achieves its objective by empirically demonstrating the moderating effects of incentives on the relationship between intention and usage behaviour to use XBRL for filing purposes. According to the findings of this study, incentives strengthen the positive relationship between XBRL filing through MBRS, intention to use, and usage behaviour. The study also demonstrated that intention to use significantly influences XBRL filing through MBRS usage behaviour. Furthermore, only perceived usefulness and perceived ease of use significantly influence the XBRL filing intention, whereas attitude does not. Regarding the effect of perceived usefulness and perceived ease of use on attitude, only perceived ease of use has a significant influence, but not perceived usefulness. Finally, perceived ease of use was found to have a major influence on perceived usefulness of XBRL filing through MBRS.

The study's findings reveal a number of theoretical applications that contribute to the body of knowledge. This study provides implications by explaining filers' XBRL usage behavior from the user (individual) rather than business (organizational) perspectives. Even though there have been a few XBRL studies conducted on user viewpoints, they appear to be restricted compared to organizational perspectives. Moreover, to the best of the author's knowledge, this is the first study that examines the moderating effect of incentives in XBRL adoption studies. Second, in contrast to previous research that focused solely on intention behaviour, this study, on the other hand, improves understanding by providing empirical evidence to explain usage behaviour for XBRL filings. Third, since this study was conducted in Malaysian settings (XBRL through MBRS), this increases the overall understanding of XBRL adoption studies. Fourth, as far as the author is concerned, only a few XBRL studies have used TAM theory in XBRL adoption studies. This study improves understanding by conducting empirical investigations from the perspectives of filers who use XBRL and employing TAM theory.

Aside from adding to the existing body of knowledge, the findings of this study have policy implications for authorities seeking to develop effective plans. First, it was empirically proven in this study that the intention to use significantly influences the usage behaviour of XBRL filing through MBRS. Therefore, it is recommended that authorities develop an adequate plan to enhance filers' intentions to use XBRL, such as ensuring the system itself receives good and continuous system maintenance and providing outstanding support services. Second, despite the fact that the moderating effects of the incentives indicate a weak effect size, it has been empirically demonstrated that the incentives strengthen the positive relationship between XBRL filing through MBRS's intention to use it and usage behaviour. As a result, it provides a general idea for authorities and policymakers that want to integrate XBRL technology into their systems and provide incentives to persuade users to use it. In addition, incentives can also increase users' intentions to try out newly deployed technology (Roumani et al., 2015). Thus, providing incentives is a suitable strategy during the first installation of new XBRL systems. Nevertheless, the incentives must be linked with the users' interest and the features and capabilities of the potential system to accomplish the goal (Aziz, Idris, 2016; Ba et al., 2001). This is done to ensure that the users perceive the incentive and are motivated to engage in a behavior. Third, the study found that only perceived usefulness and perceived ease of use significantly influence the intention to use XBRL filings, whereas attitude does not. However, as compared to perceived usefulness, the perceived ease of use factor was found to have a greater influence on XBRL filing intention. Furthermore, perceived ease of use also has a significant influence on attitude and is a key predictor of the perceived usefulness of XBRL filings. Hence, boosting the perceived ease of use factor is crucial for growing the adoption of XBRL filings. Authorities should guarantee that the procedure for submitting XBRL filings is consistent and less com-

plex. Moreover, it is a good approach if different authorities can collaborate by offering single-stop submission using the same platform. This increases its perceived usefulness, which may attract filers to use XBRL for filing submissions.

This study has several limitations since the sample was selected using convenience sampling (due to restrictions in obtaining MIA members' detailed information). As a result, author judgment exists, which may involve bias in distributing questionnaires to respondents. It is suggested that future studies use the systematic probability sampling method to increase data collection if the information can be gathered. This study also focuses on XBRL research in developing countries (in Malaysian contexts). Therefore, future research should focus on other countries, including developed countries, to enhance the understanding of regulatory incentives in XBRL study contexts.

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Middle Management's Resistance to Digital Change

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Abstract

This paper investigates middle managers' resistance to digital transformation initiatives and suggests strategies for overcoming such resistance using the example of a major Russian transportation company. This study employed a mixed-methods approach to assess middle managers' values and to identify patterns of resistance behavior. The case studies further illustrate the resistance of middle managers and how the company under study responded to these incidents.

The findings reveal a significant relationship between employees' attitudes toward routine and their resistance to digital transformation. Managers with high scores in tradition, conformity, security, and power values, as well as a strong positive attitude toward routine, were more resistant to change. Conversely, those with high scores in universalism, self-direction, and stimulation values were more open to change.

By addressing the values and concerns driving middle managers' attitudes, organizations can better support them in overcoming resistance to digital transformation. The study also offers practical strategies for aligning digital transformation efforts with middle managers' values, thereby fostering a more positive attitude toward change and facilitating successful implementation.

Keywords: resistance to change; digitalization; digital business model; leadership; transportation

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Introduction

The transition to a digital business model has the potential to unlock significant financial rewards and growth opportunities for organizations. Despite the expanding literature on the management, marketing, and operation of digital businesses (Parker et al., 2016; Evans, Gawer, 2016), the process of converting an organization into a digital enterprise requires further investigation (Ivančić et al., 2019; Warner, Wäger, 2019). This complex change process relies on the involvement and support of a firm's staff at all levels, particularly middle management. However, middle managers often exhibit resistance to change, with reasons for this resistance varying widely and manifesting in numerous ways.

The scarcity of case studies on how digital transformation is managed in practice stems from the theoretical underpinnings of digital change, which may not always translate to practical implementation (Schwarzmüller et al., 2018). Moreover, the complexity of organizational change, particularly when adapting global digital transformation experiences to local contexts, presents significant challenges. This necessitates a thorough examination of the formal and informal institutions that shape a local space.

The significance of research on resistance to digital transformation spans across various industries, such as logistics, higher education and healthcare. Digital transformation is a crucial process that facilitates the adoption of new technologies and business models to enhance efficiency, productivity, and competitiveness. However, organizations often encounter resistance to change from employees, middle management, and other stakeholders. This resistance can impede the successful implementation of digital transformation initiatives, ultimately affecting the overall performance and adaptability of these organizations (Armenakis et al., 1993; Bagrationi et al., 2021). Understanding the reasons behind resistance to digital transformation and how it unfolds across different industries is essential to develop strategies that can effectively mitigate such resistance and promote the successful implementation of digital transformation initiatives (Burnes, 2015; Coch, French, 1948).

Logistics and healthcare are two sectors that exhibit striking similarities with regard to digital transformation: investigating resistance to digital transformation is especially vital within service-oriented industries, including healthcare, education, and logistics, as the digitalization process may encounter greater obstacles in these domains when contrasted with traditional industries such as the manufacturing, medical, and pharmaceutical industries. Both industries are heavily reliant on the efficient and accurate flow of information, as well as the synchronization of processes between multiple stakeholders (Agarwal et al., 2010; Ghanbari et al., 2017). Digital transformation initiatives in these industries can lead to significant improvements in service delivery, cost reduction, and enhanced overall performance (Bhavnani et al., 2017; Awad et al., 2018). However, the successful implementation of digital transformation initiatives in logistics and healthcare depends on the extent to which employees and management are willing to embrace change and adapt to new ways of working (Battilana et al., 2010; Blake et al., 2020).

Investigating resistance to digital transformation in various industries, particularly logistics and healthcare, is vital for improving the successful implementation of digital transformation initiatives. By recognizing the similarities between these industries and identifying the factors that contribute to resistance, researchers can contribute to the development of strategies that can effectively address and mitigate such resistance, ultimately promoting the seamless adoption of digital transformation initiatives across these sectors.

A key factor in facilitating change processes is the role of top management in selecting change methods and communication strategies. The literature emphasizes the importance of vertical change agents, opinion leaders, and visible management personnel in fostering change (Rafferty, Simons, 2006; Bouckenooghe et al., 2008). Trust in leadership is also highlighted as a crucial internal context enabler. As digital transformation renders leadership roles increasingly complex, top management must set the framework for change while also defining its means and objectives. In contrast, middle managers serve as the face of the firm for most employees, translating top management directives into actionable orders.

This paper aims to address the need for more real-life studies by analyzing a multi-regional transportation service provider that successfully overcame middle management resistance to digital change. We examine the factors contributing to resistance and the manifestations of this resistance, with a focus on understanding individual responses as attempts to protect oneself from negative influences (Jaffe, Scott, 1998; Dent, Goldberg, 1999; Burnes, 2015). By doing so, we aim to provide insights into the organizational transitions toward digital business models and demonstrate how the presentation, negotiation, and acceptance of new business principles occur within local contexts (Lamb, Currie, 2012).

The case company, a Russian transportation service provider, adopted a digital business model in an effort to improve efficiency and regain market share. The transportation industry is well-suited for studying the organizational impacts of digitalization, as companies often pursue growth through real-time data-driven efficiency gains, reduced environmental impacts (Ghanbari et al., 2017), and improved transportation management decisions (Porter, Heppelmann, 2015).

In this paper, we present a comprehensive study of the company's regional divisions, considering both quantitative and qualitative data to better understand middle managers' resistance to digital transformation. We also classify the forms and causes of this resistance to de-

velop more targeted approaches for overcoming these obstacles. Moreover, we update the literature review to include recent sources that better capture the current state of digital transformation in companies. By implementing these revisions, we aim to provide a more robust and insightful analysis of middle management resistance to digital transformation and strategies for overcoming this resistance in practice.

By presenting this comprehensive analysis of middle management's resistance to digital transformation in a multi-regional transportation service provider, we contribute to the literature on organizational change and digital business models. Our findings not only provide valuable insights for companies undergoing digital transformation but also help pave the way for future research in this important area of study.

Literature Review

Resistance to Digital Transformation

The study of resistance to change has evolved over time, with early research focusing on the social aspects of organizational change and more recent literature shifting toward the interplay between technologies and organizations, including digital transformation (Sony, Naik, 2020). Historically, resistance to change was viewed as a deviation from the expected mindset of employees, with roots in prevailing group norms (Lewin, 1947; Coch, French, 1948). However, more recent research has recognized that resistance can be a product of the social context in which it takes place and may even stem from good intentions (Dent, Goldberg, 1999; Hauschildt, 1999; Jansen, 2000). Studies have shown that employees might support investments in new machinery but resist organizational changes (Dunican, 2015; Daniel, Hogarth, 1990). Moreover, resistance has been linked to organizational factors, such as poorly planned and executed change processes, inadequate human resource management, or a lack of competence or commitment.

The study of resistance to change has evolved over time, moving from a focus on the social aspects of organizational change to exploring the complex interplay between technologies, organizations, and individuals (Sony, Naik, 2020). Resistance to digital transformation – on the other hand – has been identified as a multifaceted phenomenon, encompassing various aspects such as individual, organizational, and technological factors.

Individual-level resistance. This research stream focuses on the personality traits, emotions, and cognitive processes that influence how employees perceive and respond to digital transformation initiatives (Oreg, 2006; Nov, Ye, 2009). By identifying and addressing individual-level factors, organizations can facilitate acceptance of digital transformation efforts.

Organizational-level resistance. This stream examines how organizational culture, leadership styles, communication, and the nature of the change process itself contribute to employees' resistance (Armenakis et al., 1993; Kirkman, Shapiro, 1997; Gstraunthaler, 2010). Understanding and addressing these organizational factors can help mitigate resistance and ensure a smoother digital transformation process.

Technological-level resistance. This research stream investigates the role of technology itself in shaping employees' resistance to digital transformation. Factors such as the complexity of the technology, the degree of disruption it brings to existing processes, and the perceived usefulness and ease of use of new digital tools can significantly influence employees' attitudes toward digital transformation (Davis, 1989; Venkatesh et al., 2003). By carefully selecting, implementing, and supporting the appropriate technologies, organizations can minimize resistance and ensure a more effective digital transformation process.

In this paper, we focus on resistance against digital transformation of middle managers. While this focus incorporates aspects of individual-level, organizational-level, and technological-level research streams, we argue that middle managers present a unique perspective that merits a dedicated research stream (Bagrationi et al., 2021; Bagrationi et al., 2022). As they bridge the gap between top-level executives and frontline employees, middle managers play a crucial role in shaping the success of digital transformation initiatives. By examining the specific challenges, opportunities, and values of middle managers in the context of digital transformation, we contribute to a more nuanced understanding of resistance and provide advice for organizations seeking to overcome barriers to change.

The Role of Middle Management in Digital Transformation

Middle managers occupy a unique position within organizations, bridging the gap between top-level executives and frontline employees. As a result, they play a critical role in the implementation and success of digital transformation initiatives. This section explores the specific challenges middle managers face in driving digital transformation and the opportunities they have to overcome resistance and facilitate change by aligning with their values.

Middle managers have a dual responsibility in digital transformation efforts: they must understand and embrace the strategic goals of the organization while simultaneously managing the day-to-day operations and concerns of their subordinates. As change agents, middle managers can effectively communicate the benefits of digital transformation, promote a culture of innovation, and support their teams through the change process (Wooldridge et al., 2008).

However, middle managers may face several challenges when acting as change agents, including a lack of understanding of the digital transformation strategy and its implications (Balogun, Johnson, 2004), limited access to resources and support from top management

(Battilana et al., 2010) and resistance from their own subordinates, who may perceive digital transformation as a threat to job security or organizational identity (Dent, Goldberg, 1999)

Yet, in some cases, middle managers may themselves exhibit resistance to digital transformation, due to various factors such as fear of job loss, perceived loss of power, or a lack of understanding of the strategic objectives (Bagrationi et al., 2021). This resistance can create a ripple effect, as middle managers transmit their own resistance to their subordinates, thereby hindering the overall digital transformation process.

Understanding the connection between middle managers' values and their resistance during digital transformation is a critical area of research for several reasons. As key players in organizational change processes, middle managers have a significant impact on the success or failure of digital transformation efforts. By examining their values, we can gain insights into their behavior and decision-making, which can help organizations better navigate the challenges associated with digital transformation.

First, middle managers' values serve as the foundation for their attitudes and behaviors during digital transformation. These values guide their decision-making and shape their responses to new technologies and processes (Hitt et al., 1990; Meglino, Ravlin, 1998). By understanding the values that middle managers hold, organizations can identify potential sources of resistance and develop strategies to address these challenges.

Second, given their position within the organizational hierarchy, middle managers play a crucial role in bridging the gap between top management and employees (Floyd, Wooldridge, 1992). Their values can influence how they communicate and implement digital transformation initiatives, potentially affecting employee buy-in and the overall success of the transformation. Researching middle managers' values can shed light on the factors that contribute to their support or resistance to change, enabling organizations to develop targeted interventions and communication strategies.

Third, although the group of middle managers all perform comparable tasks, their personality setup and their behavioral choices differ from one another. Hence, in order to produce a tangible outcome, we apply a cluster analysis to study middle managers' values and their resistance during digital transformation. By examining patterns and relationships among values, this approach can identify distinct groups of middle managers who may respond differently to digital transformation efforts (Hair et al., 2010). These insights can help organizations tailor their change management strategies to address the specific needs and concerns of different clusters of middle managers, improving the likelihood of successful digital transformation.

Taking the aforementioned points into account, this research provides valuable insights for organizations undergoing digital transformation, enabling them to develop more effective strategies to address resistance and facilitate a smoother transition to digital processes.

Company and Organizational Change

The company, a leading freight forwarding organization in Russia, has been operating for 14 years. Recognizing the growing demand for small-scale transportation and an increase in online purchases, the company sought to transition from its traditional freight forwarding model to a platform business that directly connects clients and hauliers. This required a significant reengineering of existing business processes, changes in organizational structure, and the development of new competencies. To facilitate this transformation, a new Organizational Development Department was established, comprising experienced employees and industry specialists to form a project management team.

The company's branches were geographically dispersed across various regions in the Russian Federation, with each branch's structure and organizational culture shaped by its regional manager. The implementation of a new information system was intended to streamline business processes throughout the entire organization and enforce workflow standards, necessitating a unified approach to communication and marketing with customers and hauliers.

To standardize communication and training, the project management team created units within regional divisions, reporting directly to the head of the project management team. This shift led to a redistribution of the hauliers base, assigning hauliers to orders for uninterrupted order flow. The new performance measurement system and KPIs encouraged employees to increase the number of transactions to maintain their previous monetary rewards.

Initially, these changes were met with resistance, as some managers experienced a decline in their monthly salaries. The project management team provided continuous explanations and support to help employees adapt and eventually increase their productivity and remuneration. Despite some initial attrition, most employees eventually adapted to the changes.

Regional directors were replaced with regional managers who assumed greater responsibilities, and regular conferences and training sessions were held to support them in managing the new business processes. While the new system showed significant growth in some areas, other areas experienced minimal growth due to the coexistence of new rules and old practices.

To address the resistance to innovation and ensure the success of the digital transformation, the project management team conducted training sessions and case studies during joint conferences, aiming to reduce tensions between central and regional divisions and improve the effectiveness of joint actions. By adopting a more structured approach and integrating qualitative analysis, the updated article can provide a better

understanding of the challenges and opportunities associated with middle managers' resistance to digital change in the context of the company's digital transformation.

Methodology and Research Approach

This study employs a mixed-methods approach, combining quantitative cluster analysis with qualitative interviews to explore the relationship between middle managers' values and their resistance during digital transformation.

To gain a comprehensive understanding of the company's activities and the change process execution plan, the authors started by reviewing internal documents and conducting in-depth interviews with various stakeholders, including the CEO and project management team leader. These interviews aimed at exploring how resistance to change manifested through social interactions (Humphreys, Brown, 2002). Using purposeful sampling (Gilmore, Gilson, 2007), the authors selected interviewees who could provide valuable insights into resistance behavior, social dynamics during the change process, and strategies to overcome resistance. In total, twelve members of the organization were interviewed. The interviews were framed around the change process events, implementation, intragroup structured antagonism, and resistance behavior. The second author led the analysis process, identifying underlying forces that triggered resistance to change36 and organizing the collected statements in relation to the change process. An expert panel of sociologists and organizational psychologists reviewed the original data and provided feedback on the conclusions drawn.

The quantitative component of this research, conducted by the first author, focuses on two aspects: the analysis of middle managers' attitudes toward change using an Attitudes Toward Change Questionnaire and the assessment of their values using the Schwartz Values Questionnaire (SVQ). The Attitudes Toward Change Questionnaire was developed based on expert input, resulting in four factors: (1) Attitude toward routine (Smith, Hitt, 2005; Oreg, 2006), (2) Attitude toward status quo (Samuelson, Zeckhauser, 1988), (3) Attitude toward the difficulty of mastering innovation (Davis, 1989; Venkatesh et al., 2003), and (4) Attitude toward the inevitability of innovation (Ford et al., 2008). The questionnaire contained 12 items that were validated through principal component analysis and confirmatory factor analysis.

The SVQ measures 10 basic human values: power, achievement, hedonism, stimulation, self-direction, universalism, benevolence, tradition, conformity, and security. The SVQ was used to test additional hypotheses regarding the relationship between employee values and their resistance to change.

We used k-means to cluster the analysis results of the Attitudes Toward Change Questionnaire. Thereby, we aimed for higher classification quality by maximizing the distances between clusters and minimizing the distance between observations within each cluster. An analysis of variance (ANOVA) validated the obtained cluster results.

To ensure the validity and reliability of the findings, the study employed data triangulation by collecting information from multiple sources. This approach enabled the researchers to compare and contrast different perspectives on the change process and resistance behavior, enhancing the credibility of the study's conclusions.

Findings

Cluster 1. The "Bystanders" (N=36).

The Bystanders display a low average score (M=0.10, SD=0.10) on routine seeking and a relatively high average score for attitude toward the Status Quo (M=0.47, SD=0.10), indicating that they are generally comfortable with the current state of affairs. The process of adopting new technologies or practices is seen as challenging (M=0.50, SD=0.12). This cluster comprises the oldest managers (M=35.10, SD=6.70).

As for their values assessed by the SVQ, the bystanders display a moderate preference for Conformity (M=0.47, SD=0.12), indicating a tendency to adhere to social norms and rules. Their high scores for Self-Direction (M=0.57, SD=0.12), Achievement (M=0.52, SD=0.13), and Security (M=0.58, SD=0.13) reveal middle managers that value personal autonomy, creativity, and success in their work while prioritizing stability, safety, and predictability in their work environment.

These findings suggest that this group may be less inclined to actively resist or promote digital change, but rather adopt a more passive stance in the face of organizational transformation. A good example of a manager of cluster one came to our attention at one of the first meetings with the project management team. The head of the logistic department in the central region managed a department with good performance, and the manager was in good standing with the company's top management. She was building trusting relationships both with representatives of clients and with representatives of hauliers, which allowed her, within the framework of the old system, to use these relationships, both in the interests of the company, as well as for her personal interests. Often, these interests coincided, that is, she could agree with clients to receive orders outside the standard distribution schemes. She supported the change process and shared top management's view on the potential efficiency gains. Though she favored a rather cautious policy of small steps as she was worried about the department's overall rating in the company. "Change is good, but in small steps", she frequently said during our interview. The process was rolled out though not at all in the manner she had favored. As a consequence, the performance of her unit was lowered and the manager started to initiate and orchestrate resistance among her team members as she felt responsible for them. This quickly resulted

in a generally negative attitude toward the change project throughout her entire department. The lady – who spoke with a loud and authoritative voice – worked in an open plan office, which ensured every team member could hear her opinion. Additionally, she would use the company email system to spread her opinion. The negative attitude toward change traveled quickly into other regional divisions to which she had personal ties. Top management took notice of the resistance but decided against any action, especially as the manager never scaled her actions up or adopted active resistance. In the eyes of top management, she never really posed a threat to the change process toward a new strategy. In her team, however, she held a lead position and when she voiced her dissatisfaction, her colleagues showed her loyalty and adopted her mindset. Due to her experience and standing within the company, a lot of time and training was directed to discuss with and to convince her that after all, she and her team will master the new system. As time progressed, the overall rating of the unit increased even above the previous rating. Once the success of the project became clearer and insecurity vanished, she used her influence to align her team back with the company's strategic vision and she became a central advocator for the firm's change process.

Cluster 2. The "Skeptics" (N=29)

The Skeptics display a moderate average score (M=0.38, SD=0.12) on the attitude toward routine and a high attitude toward Status Quo (M=0.60, SD=0.13). Their preference for maintaining their usual work routines and tendency to be content with the present state of affairs might trigger resistance to change. Still, the Skeptics display a moderately high preference for Conformity with social norms (M=0.53, SD=0.18), together with high scores for Self-Direction (M=0.57, SD=0.17) and Achievement (M=0.53, SD=0.15). These managers value personal autonomy, creativity, and success in their work. Therefore, their resistance would take place only in an acceptable range. The average score for Power (M=0.45, SD=0.15) is moderate, reflecting a balanced approach to asserting their authority and influence. Their average score for Security (M=0.57, SD=0.15) is relatively high, which shows that they prioritize stability, safety, and predictability in their work environment.

A manager from the central region with vast experience in the industry was supportive of the upcoming changes to stay competitive. Within his division, the majority of work procedures in place were developed by him as he led this division from the very moment of its foundation. The manager welcomed the push toward a digital platform, but only as long as it did not interfere with his established principles of work. The manager went a long way to ensure that everyone saw him as a change agent, while in fact trying to roll out his work procedures throughout the entire company. These procedures however contradicted some of the imposed changes intended by top management, which frequently led to heated debates in meetings. When his team members proposed to rearrange the workflow in line with top managements' orders, he resisted the change and insisted on his established procedures. The division's performance remained on a fairly high level (albeit the growth rate was lower than the company's average), and top management let him prevail. "He will have to follow the rules of the new information system anyway", the project management team marked on a meeting note. Not all activities were digitalized at the same time but rather were transferred to the new system step by step. Especially those processes that required action from the firms' partners were scheduled for a later stage. Hence, the communication processes between hauliers and managers were still done telephonically. In the second stage, however, the hauliers' communication was captured electronically and the information system-imposed selection criteria for hauliers was made mandatory. The manager, after approving the "non-priority haulier" (giving contracts to hauliers against the logics of the information system), was obliged to provide the prioritized haulier with another order within two days. He still circumvented the system and ensured that hauliers that were part of his network could still continue to do telephone conferences with the unit's head. The project management team flagged this fact as a major weakness and recorded numerous attempts of the manager to negotiate preferred conditions for a number of hauliers over the telephone. When confronted, the manager blamed the bad IT knowledge of the haulier. The manager was able to span networks and bring in experiences from other organizations with the company's hauliers in his region. He saw these connections as his major asset – which he said would benefit the firm. His attempts to fence off the control through the IS could no longer be ignored and the manager was asked to explain why he deviated from the company's processes. His true intentions to reestablish his way of doing business was revealed and trust in him vanished.

Cluster 3. The "Passive Powerholders" (N=48).

The Passive Powerholders display a low average score (M=0.10, SD=0.14) toward Routine seeking, suggesting that they are relatively open to abandoning their usual work routines in favor of change. They perceive the process of adopting new technologies or practices as quite challenging (M=0.67, SD=0.08), but they are not particularly concerned about the choice to adapt the innovation.

The Passive Powerholders display a high preference for Conformity (M=0.58, SD=0.18), indicating a strong tendency to adhere to social norms and rules. Their scores for Self-Direction (M=0.58, SD=0.15) and Achievement (M=0.60, SD=0.18) are also high, suggesting that they value personal autonomy, creativity, and success in their work. The average score for Power (M=0.43, SD=0.20) is moderate, reflecting a balanced

approach to asserting their authority and influence. Their average score for Security (M=0.67, SD=0.17) is notably high, indicating that they prioritize stability, safety, and predictability in their work environment.

A regional manager (Case 7) had mastered the craft to optimize the performance indicators and was hence doing exceptionally well for herself. She grounded her success in the collaboration with "special treatment" hauliers. The introduction of a new information system was consequently a threat which she expressed at each meeting with her peer regional managers. The statements made were however abstract and not built on factual arguments. When the project management team asked her to provide evidence for her claims, she refused to collaborate. In order to alleviate the situation, the manager opened another branch. Striped of her personal connections with hauliers and forced to deliver results, the manager adopted the rules of the new system. Losing her established environment resulted in a loss of security. In order to reconnect, she adopted the new paradigm and accepted the new policies.

Cluster 4. The "Open-Minded" (N=21).

The Open-Minded cluster shows a low average score (M=0.17, SD=0.16) toward Routine seeking, together with a low average score toward Status Quo (M=0.20, SD=0.10). They perceive the process of adopting new technologies or practices as moderately challenging (M=0.45, SD=0.20) but not overly daunting and are not very concerned with the opportunity to opt out of the change process. The Open-Minded cluster displays a moderate preference for Conformity (M=0.45, SD=0.17), indicating a balanced approach to adhering to social norms and rules. Their scores for Self-Direction (M=0.63, SD=0.13) and Achievement (M=0.57, SD=0.13) are high, suggesting that they value personal autonomy, creativity, and success in their work. The average score for Power (M=0.48, SD=0.15) is indicative of a balanced approach to asserting their authority and influence. Their average score for Security (M=0.62, SD=0.10) shows their priority for stability, safety, and predictability in their work environment, albeit to a lesser extent than the more resistant clusters.

Their open mind allows them to see opportunities and act accordingly. A manager with great standing in her unit – all inter-department activities were established by her – as was a set of work principles that most other departments adopted – operated in a region with a very strong competitor. This kept the development of her division down, as the majority of the customers and hauliers worked with the company's competitor. Under the established business model, it was not possible to change the situation for the better, and hence she became an active supporter of the digital platform. She believed the new system would break the close connection between potential clients and the company's main competitor in the region by offering clients much more favorable conditions through a greater choice of hauliers and more competitive pricing. Moreover, she supported the implementation of a new system in her branch and arranged training for her team. Thanks to her activity, the implementation of changes in the branch was made easy and the branch received a new impetus for development. The division's position in the region's market has subsequently strengthened. The division's elevated performance was well perceived by top management and the neighboring region's branch was added to the regional managers' portfolio (head of the division where she was head of the logistics department). The previous head of the neighboring branch who had resisted the change left the company.

Still, open mindedness can also lead to negative results as the opportunities ahead overshadow the one's own lacking contribution to success. A manager in a remote region saw the opportunity that the proposed changes offered. A manager in a region in the Far East (Case 3) felt incapable to qualitatively develop his branch, since his region is the region of the "last mile".[1] Competition for the few reliable hauliers was very high and incoming traffic was much lower than in the central regions. The new system allowed hauliers who have capacities on incoming trips to offer this opportunity through the company's platform. After the organizational change, the number of transports increased significantly. The division was unprepared to act accordingly and make use of this opportunity as the operational organization proved suboptimal. The manager acted from a peripheral position in the network and understood that this new opportunity would open up ways to improve his position in the social space and embraced the upcoming changes.

Cluster 5. The "Resisters" (N=24).

The Resisters show a moderate average score (M=0.25, SD=0.16) toward Routine seeking and an average Attitude toward the Status Quo (M=0.57, SD=0.12). They perceive the process of adopting new technologies or practices as highly challenging (M=0.72, SD=0.08) and want the option to reject innovation. Should they not have the possibility to continue their usual work processes, they are likely to show resistance.

As for their values assessed by the SVQ, the Resisters cluster displays a relatively high preference for Conformity with social norms and rules (M=0.55, SD=0.15). Their scores for Self-Direction (M=0.58, SD=0.15) and Achievement (M=0.55, SD=0.13) are high, while Power is moderate (M=0.43, SD=0.15). Their average score for Security (M=0.63, SD=0.17) is relatively high, indicating that they prioritize stability, safety, and predictability in their work environment. Instead of embracing innovations and organizational change, these

[1] A term used in supply chain management and transportation planning to describe the movement of people and goods from a transportation hub to a final destination. https://www.businessinsider.com/last-mile-delivery-shipping-explained?IR=T, accessed 08.04.2023.

members are rather cautious and fear unnecessary change.

Another manager from the central region with vast experience in the industry was supportive of the upcoming changes to stay competitive. Within his division, the majority of work procedures in place were developed by him as he led this division from the very moment of its foundation. The manager welcomed the push toward a digital platform, but only as long as they didn't interfere with his established principles of work. The manager went a long way to ensure that everyone perceived him as a change agent, while in fact trying to roll out his work procedures throughout the entire company. These procedures though contradicted some of the imposed changes as intended by top management, which frequently led to heated debates in meetings. When his team members proposed to rearrange the workflow in line with top managements' orders, he resisted the change and insisted on his established procedures. The division's performance though remained on a fairly high level (albeit the growth rate was lower than the company's average), and top management let him prevail. "He will have to follow the rules of new information system anyway", the project management team marked on a meeting note. Not all activities were digitalized at the same time though but rather were transferred to the new system step by step. Especially those processes that required action from the firms' partners were scheduled for a later stage. Hence, the communication processes between hauliers and managers were still done telephonically. In a second stage though, the hauliers' communication was captured electronically, and the information system-imposed selection criteria for hauliers was made mandatory. The manager, after approving the "non-priority haulier" (giving contracts to hauliers against the logics of the IS), was obliged to provide the prioritized haulier with another order within two days. He still circumvented the system and ensured that hauliers that were part of his network could still continue to do telephone conferences with the unit's head. The project management team flagged this fact as a major weakness and recorded numerous attempts of the manager to negotiate preferred conditions for a number of hauliers over the telephone line. When confronted, the manager blamed the bad IT knowledge of the haulier. The manager was able to span networks and bring in experiences from other organizations with the company's hauliers in his region. He saw these connections as his major asset – which he said would benefit the firm. His attempts to fence off the control through the IS could no longer be ignored, and the manager was asked to explain why he diverted from the company's processes. His true intentions to reestablish his way of doing business was revealed and trust in him vanished.

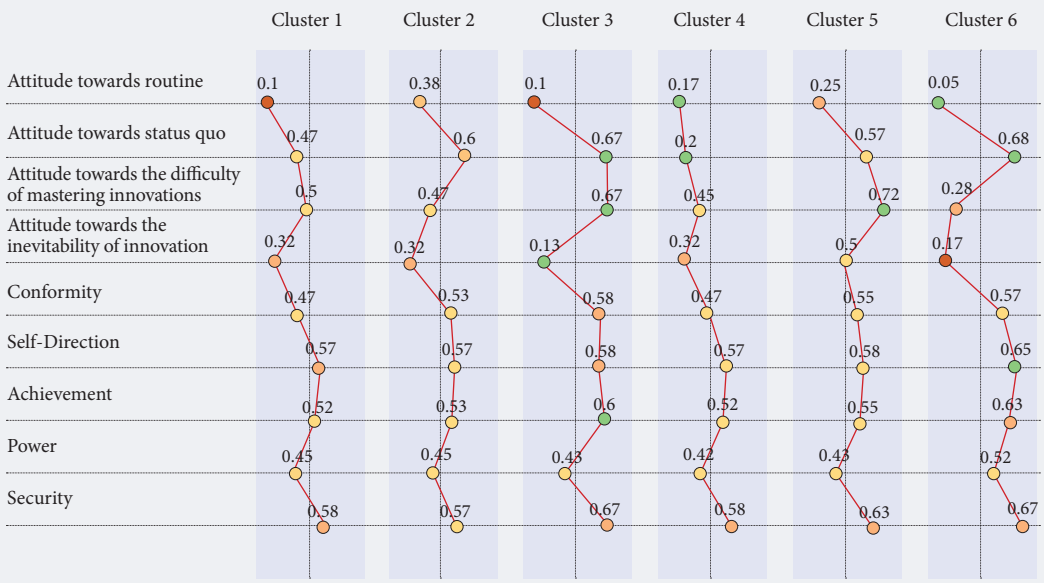
The head of a regional division in the south was acting in a very competitive environment and he had already informed top management that the position of his division in the regional transportation market was weakening. This manager's special relationships were built primarily with hauliers in his region, but also, to a lesser extent, with representatives of major clients. As the platform was rolled out, clients' ability to maintain special relationships began to decline. In addition, the implementation of the system was accompanied by the renegotiation of contracts with hauliers and finding new clients.

He suggested a new pricing policy and lower entry requirements to contract in new hauliers. At the same time, when the process of implementing changes began, the branch's indicators actually began to decline. At the regular meetings to discuss the changes, the manager gave contradictory explanations for the lack of development of his division, often referring to the bad implementation strategy of top management or to the unwillingness of team members to use it and the low motivation of employees in general. This raised red flags with the change management team. Over an extended period, the situation at the branch did not change for the better. The manager continued to blame the new IS, often with absurd requests like changing the font size of the website. The project management team recommended that the CEO replace the head of this division, which he did eventually (although the CEO resisted this move for a long time as this manager was his protégé in the past). After replacing both the regional manager and the head of the logistics department, the new management more consciously joined the updated processes. Four months later (after onsite training activities), the branch began to return to steady growth. A year later, the division's performance only marginally lagged behind the leading region.

In the best case, the energy that these resisters put into their actions can be used for the company's benefit as one example shows. A department manager was an informal leader and was highly influential as an opinion maker throughout the entire company. She opposed the change plans right from the start, but her opposition became fierce when her unit demonstrated really poor performance under the new regime. The manager invested a lot of time and energy to find various ways to circumvent the procedures of the information system, and she proudly shared her success stories among members of various regions. In fact, more and more employees started to follow her suggestions. The new platform limited her freedom to maintain her personal connections with the hauliers who demanded higher prices for the services they provided in exchange for their loyalty.

The change management team had to react, but it was unclear how to change her mind. Then, the IT department communicated that they closed the blind spots that she had revealed. In fact, the IT department was working alongside her multiple attempts and found it helpful to identify weaknesses of the system. The manager was subsequently promoted to search for weaknesses in the new electronic platform. She mentioned during the interview how important it was to see that the project management team and top management appreciated her work and took her comments seri-

Figure 1. **Results**



Source: authors.

ously. Thereby, she changed her perception and became a central promoter for the new business model. This gave her credibility, especially as top management started to appreciate the skills that she developed. She subsequently received a promotion.

Cluster 6. The "Active Powerholders" (N=26).

The Active Powerholders demonstrate a low average score (M=0.05, SD=0.10) on routine seeking and a high appreciation for the Status Quo (M=0.68, SD=0.12), while they show little fear of mastering an innovation (M=0.28, SD=0.12). Also, they do not insist on having the option to reject the innovation and are more open to organizational change. The Active Powerholders cluster displays a relatively high preference for Conformity to social norms and rules (M=0.57, SD=0.17). Their scores for Self-Direction (M=0.65, SD=0.15) and Achievement (M=0.63, SD=0.13) are high, suggesting that they highly value personal autonomy, creativity, and success in their work. These managers set a strong focus on asserting their authority and influence (M=0.52, SD=0.18), while they prioritize stability, safety, and predictability in their work environment (M=0.67, SD=0.10). These values suggest that this group is more likely to support digital change and actively participate in the implementation of new technologies and practices. These are middle managers who find ways around the implemented organizational change as they can play their powerful positions and are flexible in abandoning their established practices.

We found a good case to exemplify the cluster in a division head who did not see the need for any changes in the work of the branch. Under the old system she enjoyed a high standing as one of the most effective managers. The regional division was creating a majority of its revenue through one client and thanks to this client, she was the highest paid head among the regional division. The introduced organizational change processes now changed this advantage and the KPI system drastically reduced the manager's remuneration. Moreover, the transition to the digital platform and the change in the principles of work required this manager to develop relations with other clients of the region, which quickly revealed "bottlenecks" in the processes of her division. Realizing the importance of a key client for the company to which she had a very close connection, she frequently threatened to leave the company. As the top management did not give in to her threats, but actually approved her wish to leave, she decided to stay on. Nevertheless, she made a lot of efforts to maintain the previous work procedures. Due to her personal relationship with the CEO and her well-established relationship with a priority client, it was decided to increase this division's own fleet of vehicles in the region in order to keep the client. This approach also succeeded in ceasing the manager's resistance. Her refusal to take the final step and leave opened up new ways to discuss alternative options. And indeed, due to her connection with the main client, she could actually guarantee access to economic capital. In choosing a more amicable approach, she convinced top management to follow her suggestion and to give special status to her department.

Figure 1 summarizes the results for each cluster.

Discussion and Conclusion

This study aimed to explore the resistance to digital transformation among employees at a logistics company, focusing on their values and attitudes as assessed by the Schwartz Values Questionnaire (SVQ). Our analy-

sis revealed a significant relationship between employees' attitudes toward routine, the status quo, and the perceived difficulty of mastering innovation, and their resistance to digital transformation (Schwartz, 1992).

Employees who scored high on tradition and conformity values tended to have a more positive attitude toward routine and were more likely to resist digital transformation, as they preferred to maintain existing routines and work practices (Schwartz, 1992). Similarly, employees with a positive attitude toward the status quo were found to be more resistant to change, as they scored high on security and power values and preferred stability and control over their work environment (Bardi, Schwartz, 2003).

On the other hand, employees who believed that mastering innovation was difficult tended to be more resistant to change, as they scored high on hedonism and achievement values, indicating a desire for personal satisfaction and success in their work (Schwartz et al., 2012). Conversely, employees who acknowledged the inevitability of innovation and scored high on universalism, self-direction, and stimulation values were more open to change and more likely to embrace digital transformation initiatives (Schwartz, 1994).

The case examples provided further insight into the role of middle managers' values and attitudes in their resistance to digital transformation. The k-means clustering analysis revealed distinct groups of employees with differing attitudes toward change, including Passive Powerholders and Active Powerholders (Balogun, Johnson, 2004). This allowed us to identify specific patterns of resistance behavior among middle managers.

To support middle managers in overcoming resistance to digital transformation, organizations must address the values and concerns that drive middle managers' attitudes toward change. Aligning digital transformation initiatives with the values of middle managers can foster a more positive attitude with regard to change and empower middle managers to lead their teams effectively (Battilana et al., 2010).

Some strategies for value alignment include:

(1) Clearly communicating the strategic goals and benefits of digital transformation initiatives to middle managers, ensuring they understand their role in achieving these objectives and how they align with their values (Balogun, Johnson, 2004).

(2) Providing adequate resources, training, and support for middle managers to help them navigate the challenges of digital transformation while staying true to their core values (Battilana et al., 2010).

(3) Encouraging middle managers to engage in open dialogue with their subordinates, addressing concerns, and fostering a culture of innovation and collaboration that reflects the values of the organization (Dent, Goldberg, 1999).

Understanding the unique role and challenges of middle management in digital transformation, as well as the values that drive their attitudes toward change, is crucial for organizations seeking to overcome resistance and ensure successful digital transformation initiatives (Kotter, Schlesinger, 2008). By addressing the concerns of middle managers and providing them with the necessary support to align their values with the organization's goals, companies can cultivate a culture of innovation and resilience that is critical for navigating the digital era (Battilana et al., 2010).

The results of our research carry important implications for various other sectors, such as higher education and healthcare given that successfully implemented digital transformation initiatives are essential for organizations to deliver improved outcomes (Autor, 2015; Goldin, Kutarna, 2016). Understanding employees' values and their attitudes toward digital transformation and addressing resistance to change can significantly enhance the effectiveness of such initiatives.

For instance, in higher education, digital transformation has been transforming teaching and learning methods, fostering collaboration, and enhancing the accessibility of educational resources. As in logistics, employees in higher education institutions may display resistance to digital transformation due to their values and attitudes, which can hinder the successful implementation of innovative technologies and practices (Frey, Osborne, 2013). Our research findings can inform strategies to address this resistance, thus facilitating the adaptation of higher education institutions to the digital era.

Similarly, our research results are particularly relevant for the healthcare industries, as these sectors have been experiencing rapid digital transformation due to the emergence of digital health technologies, personalized medicine, telemedicine, and data-driven drug discovery (Agarwal et al., 2010; Topol, 2015). The identified clusters of middle managers in our study can provide valuable insights into the specific patterns of resistance behavior that may emerge in these industries as well.

Understanding the values and attitudes driving the resistance of larger groups of employees can help organizations tailor their change management strategies and facilitate the successful adoption of digital transformation initiatives. Building upon our research findings, the identified clusters of middle managers, such as Passive Powerholders and Active Powerholders, provide invaluable insights into the specific patterns of resistance behavior that may emerge during the digitalization of healthcare. To ensure the successful implementation of digital transformation initiatives in the healthcare sector, organizations must account for these diverse values and attitudes.

For instance, Passive Powerholders may be resistant to the adoption of digital health technologies due to their preference for established routines and a reluctance to take risks (Frey, Osborne, 2013). In this context, organizations can address the concerns of Passive Powerholders by providing comprehensive training programs, emphasizing the benefits of new tech-

nologies, and involving them in the decision-making process to ensure a smoother transition (Agarwal et al., 2010).

On the other hand, Active Powerholders may be more open to digital transformation but may still harbor concerns about potential job displacement or the ethical implications of digital health technologies (Topol, 2015; Hollis et al., 2015). To overcome resistance from Active Powerholders, organizations can focus on transparent communication, demonstrating how digital health technologies can complement rather than replace human expertise, and fostering an environment of trust and ethical responsibility (Susskind, Susskind, 2018).

Moreover, our research findings can play a significant role in addressing resistance to digital transformation in healthcare by promoting interdisciplinary collaboration, which is essential for navigating the complexities of digital health innovations (Liu et al., 2019; Bhavnani et al., 2017). By understanding the diverse values and attitudes of employees across various disciplines, healthcare organizations can foster an inclusive culture where all stakeholders contribute to the successful implementation of digital transformation initiatives.

For example, the integration of electronic health records and telemedicine platforms necessitates collaboration between healthcare providers, IT professionals, and regulatory authorities (Ma et al., 2020; Blake et al., 2020). Leveraging our research findings, organizations can identify potential areas of resistance and develop targeted strategies to facilitate effective interdisciplinary collaboration, ensuring the seamless adoption of digital health technologies and improved patient outcomes.

Furthermore, the healthcare sector faces unique challenges in the implementation of digital transformation, such as stringent regulations, patient privacy concerns, and the need for effective interdisciplinary collaboration (Ma et al., 2020; Liu et al., 2019; Hollis et al., 2015; Blake et al., 2020; Bhavnani et al., 2017). By understanding the concerns and values of employees in these industries, organizations can develop targeted strategies to address resistance and foster a culture of innovation and resilience, which is crucial for navigating the digital era (Srivastava, Shainesh, 2015).

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Governing Complexity for Sustainable Development

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Abstract

Good governance concepts and their components are crucial to project administration and implementation success. However, does understanding good governance concepts matter when implementing Malaysia's public projects? This paper seeks to investigate the understanding of good governance concepts and their delivery from the perspective of Penang Regional Development Authority (PERDA) management, one of the regional development authorities in Malaysia and their beneficiaries of a public project, affordable housing. The qualitative method was applied, and data were collected through a semi-structured interview. The retrieved information was analyzed using thematic analysis. The findings identified that most of them understood the concept of good governance and what constitutes it and were aware of the importance of good governance practices in public projects. This study verified that knowledge about good governance does matter in ensuring smooth project implementation and delivery within an organization and the public sphere. This study recommends that the government, through its authorities or agencies, continuously educates organizations and the public about good governance for smoother project administration and implementation for the growth of a whole nation

Keywords: good governance; complex project management; government projects; Malaysia; structured approach; organizational innovation; construction sector; communication

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Introduction

In order to improve the efficiency of public policy and adapt it to the changing environment, new concepts and tools were introduced at different stages of the management science development. In today's increasingly complex environment, with its high level of uncertainty, unpredictability, and the growing variety of factors of influence and stakeholder interests, the theme of the consistency of management practices with high standards finds expression in the model of "good governance". It is practiced by the governments of many countries and international organizations, among which are the UN, the World Bank, and the IMF (UN ESCAP, 2009; IMF, 2002; World Bank, 2005, 2008). With its help, inefficient business models and management structures are separated from viable ones. The expected effects of adhering to good governance principles are expressed in the optimization of resource costs and risk mitigation, increased productivity, the development of new opportunities and maintaining resilience in today's turbulent contexts (MOF, 2020). Currently, good governance is becoming a key driving force, providing order and synergy between resource flows, internal blocks of a given project, and external players. The concept of good governance as a complex dynamic system has many elements that influence each other. The cultural specificity of a particular country determines which of them will have priority and which arrangement of institutions is optimal for ensuring its implementation. For example, China and South Korea have experienced an stunningly high development despite the strong presence of corruption (Ahn, 2020; Kahn, 2002; Rodrik, 2007). Unleashing the potential of good governance largely depends on how it is perceived by stakeholders. When the players see good governance as a dynamic process that generates diverse creative effects for development, they are motivated to employ it to achieve high results (Rodrik, 2008).

Malaysia, in an effort to join the ranks of developed countries and contribute to the implementation of UN Sustainable Development Goals (SDGs), also relies on the concept of good governance. Over the past few decades, a number of reforms have been carried out in the country, development institutions have been created to implement socioeconomic programs and projects.[1] Over the past 20 years, Malaysia has ranked between 4th and 7th by the Asian Corporate Governance Association, and in 2020 it ranked 5th, ahead of Japan (Teen, 2021). However, these positions are at risk due to a resonant corruption scandal associated with the actions of the investment company 1Malaysian Development Berhad (1MDB), which was supervised by the former government.[2] This raises the question of to what extent are decision makers aware of the concept of good governance, how its various components are interpreted, and how consistently and intensively they are practiced. Since the approaches used by the aforementioned international organizations largely coincide with one another, our study is based on the UN classification as it is the most representative. Given the heterogeneity of country conditions in the implementation of the good governance concept, we limited ourselves to an analysis of the experience of its application in Malaysia. The assessment was based on a case study focused on the Penang Regional Development Authority (PERDA)[3], based on a survey of experts and beneficiaries of the PERDA project in the construction sector. This study contributes to the understanding of the concept of good governance and the effects of its application to stimulate economic growth.

Literature Review

Definition and Importance

As part of the good governance concept, two managerial dimensions are distinguished (Burn, Stalker, 1961; Gavriluță, Lotos, 2018). One of them – "mechanistic" is aimed at maintaining social order and the balance of market and public interests. Law enforcement practices serve as an indicator of its quality. The other, "organic," focuses on stimulus measures and the exploration of new development opportunities. Under the previous conditions, this combination worked optimally and it was not difficult to bring together in different areas. However, today this process is hampered by the growing diversity of organizational contexts and the effectiveness of this concept's implementation varies significantly (Gisselquist, 2012; Jamaiudin, 2019). Previously, the state could be limited to exercising its functions on a top-down basis while also being considered effective. In today's environment of complexity, uncertainty, and rapid change, this approach no longer works. To respond to large-scale challenges, it is necessary to expand cooperation between citizens and the authorities.

Good Governance in Public Project

The good governance principle applies to the management of all types of resources, the implementation of projects, and the increase in the activity of

[1] Particularly, the Anti-Corruption Agency, the Malaysian Institute for Integrity (IIM), the Network of Regional Development Agencies (RDAs), the "Code of Ethics", the "Client Charter", etc. have been established (Khalid et al., 2016; Rusnah et al., 2011; Siddiquee, 2009). Financial authorities have developed appropriate codes for investment companies. For the details see: https://www.perda.gov.my/index.php/profil- jabatan, accessed 16.08.2022.

[2] https://www.bbc.com/news/world-asia-44572106, accessed 03.10.2023.

the population (Juiz, Lera, 2014). However, for a number of non-obvious reasons, the effectiveness of project management often turns out to be lower than expected, in particular because of the difficulty in finding a balance between respect for the interests of different parties and legal norms (Flyvbjerg, 2014; Brunet, Aubry, 2016). As a possible tool to improve it, a structured approach to PM using hierarchies is often proposed (Becker, 2015). This facilitates the expanded coverage of a complex system, it becomes clear how to distribute different types of resources in a wide range of areas (Pinto, 2014; Turner, 2006).

Another difficult problem is the development of a difficult to acquire competence - the ability to coordinate the variety of interactions between the participants in the system. In developed countries, different tools are used to solve such problems. Thus, the UK and Norway have special management structures to optimize costs, adhere to the implementation schedule and increase the economic performance of government initiatives (Klakegg, Volden, 2016; Brunet, Aubry, 2016). Following such practices optimizes costs and risks, increases productivity, opens up new business opportunities, and ensures resilience during crises (MOF, 2022). As in other countries, in Malaysia, good governance is an important area for improving public policy. However, despite efforts to improve the quality of public services, their performance remains low.

The main reason is that the implementation of good governance methods is more of an art or skill that requires creative management, unique customization, and organizational innovation. For example, an erroneous interpretation of good governance principles prevents the effective implementation of government projects in the construction sector in Malaysia (Jatarona et al., 2016).

Despite significant allocations, some projects fall short of their targets, fall behind schedule, or overrun their budget, reflecting the poor performance of civil servants, problems with transparency, and poor coordination among agencies (Kamal et al., 2020; Latiff et al., 2020). The observations presented are supported by the findings of the study (Latiff et al., 2020). It has been established that the introduction into practice of the basic principles of PM increases the effectiveness of government initiatives in the construction sector in Malaysia. Our study assesses the degree of understanding of the concept of good governance by the management of the PERDA, its beneficiaries, and the practice of applying it in their work.

We hope that our findings will contribute to raising awareness of the nature of good governance, allowing for the correct interpretation of its rules, which will ultimately take the management of complex projects to a new level and stimulate economic growth.

Research Methodology

Primary data collection was carried out through semi-structured interviews (12 people) with respondents: experts from among the leaders of the PERDA involved in public housing projects, and the beneficiaries of these projects - residents of the state of Penang. Interviews were conducted face-to-face and online. For the purpose of confidentiality, the groups of respondents were designated by the corresponding codes. Respondents A1–A7 represent the group of PERDA managers, B1–B5 represent the beneficiaries. In accordance with the criteria proposed in (Galvin, 2015), the number of interviews was considered sufficient. Then their content was analyzed, which helped to understand how the concept of good governance is interpreted and used by the leadership of the PERDA.

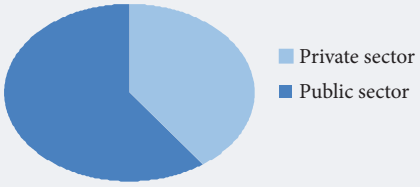
Description of the sample. The main demographic characteristics of the participants are presented in Figures 1-3. All of them are part of the main ethnic group of Malaysia (Malay race). Their ages were between 35 and 59 years, 58% are men. All respondents have at least a university specialty diploma, which indicates a high level of education and, potentially, income.

The public sector was represented by 59% of respondents with at least 10 years of work experience (Figures 1 and 2). The majority (66.7%) had an income of 5,001 to 10,000 Malaysian ringgits per month, 16.7% - less than 5,000, the rest (16.6%) - more than 10,000 (Fig. 3). The group of managers had extensive experience in organizing housing construction. The cohort of beneficiaries was made up of residents of the complexes built within the framework of the respective projects, who had lived there for at least seven years.

Respondents had experience of interacting with the public within the framework of PERDA activities. The presented characteristics serve as a justification for the quality of the sample. The distribution of respondents' answers for each of the aspects of good governance and literary sources confirming their theses are given in Table. 1.

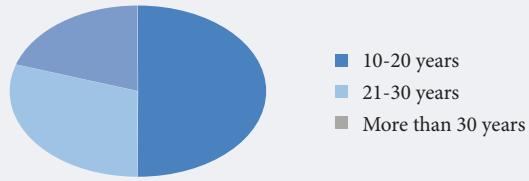
[3] The Penang state is geographically divided into five (5) districts: two in Penang Island (the northeast and southwest districts) include the island of the same name, where the capital George Town is located and the other three districts in another segment in the mainland, separated from the island by a narrow strait (World Bank, 2020). However, the scope of Penang Regional Development Authority covers the overall state of Penang, excluding the metropolitan area, gazetted city and small town, reserve land, river, forestry, water catchment area, cemetery reserve area, beaches, and islands (https://www.perda.gov.my/index.php/maklumat-kami/maklumat-korporat/kawasan-operasi, accessed 16.08.2022).

Figure 1. **Sector of Employment**



Source: authors.

Figure 2. **Years of Employment**



Source: authors.

Comprehension of Good Governance Concept

Good Administration. At all levels of the project management system, the respondents singled out as priorities - approaches to the selection and distribution of human, financial and material resources, technical aspects. The final performance criterion was the satisfaction of the "customers" as the end user of the services. Let us illustrate this with the statements of the respondents, of whom two (A2, A7) represented a group of managers who managed affordable housing projects, and one (B4) represented the beneficiaries (homebuyers).

A2: "Good governance is impossible without the efficient use of resources: human, financial, material, including the aspect of technology."

A7: "When applying good governance to a complex construction project, the main thing is a holistic approach: planning, financial management, that is, organizing the process from start to finish line, where everything will be evaluated by the end user."

B4: "Good governance encompasses many levels of decision-making and their interrelationships simultaneously, while being transparent."

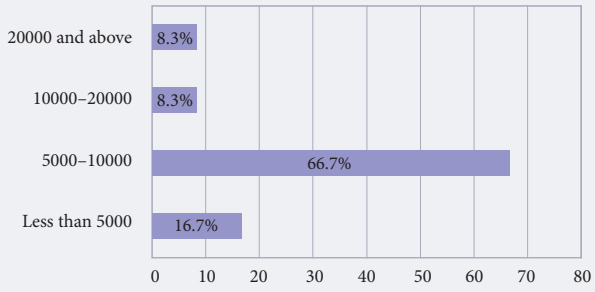
Adherence by all departments to the established rules as a prerequisite for achieving the effect of coordinated orchestration in the functioning of the PERDA.

In their answers, the respondents did not sufficiently disclose the content of what exactly is the effective organization of management. More explanations on this matter can be found in the documents of the European Commission and the Council of Europe. The first of these organizations approved the EU Charter of Fundamental Rights and Freedoms, which refers the effectiveness of public administration to the basic principles of law. It is emphasized that every person has the right to an objective, fair and timely consideration of his appeals by a variety of European institutions (Article 41). In turn, the Council of Europe considers the rule of law, impartiality, legal transparency, consideration of requests within a reasonable time, public involvement, compliance with regulatory standards (European Council, 2007).

Another fundamental good governance principle mentioned by respondents (A1, A2, A4, A6, B2 and B5) is ***the rule of law*** (procedures, norms, rules). The PERDA is a body of federal subordination, and in addition to internal regulations, it must comply with the requirements of the Ministries of Finance, Rural and Regional Development, the Department of Economic Planning, whose representatives are on the board of directors of the PERDA. Multi-layer subordination, on the one hand, is designed to ensure order and continuity of management mechanisms, but it also turns into a problem in conditions of political turbulence. We will return to this aspect in more detail below.

Representatives of the PERDA (A2, A6) pointed out the importance of drawing up the most detailed and open "passports" of construction projects. Home buyers (respondents B1, B3, B4) highly value a "transparent contract", including one that minimizes risks when buying a home (for example, so that the project does not turn out to be frozen). The head of one of the departments (A1) noted: "As a rule, already at the start there are all kinds of attempts to influence "outside" decisions on the project, so following the rules will help to avoid unwanted compli-

Figure 3. **Level of Income** ***(MYR)***



Source: authors.

cations." The opinions of respondents in this aspect are in line with the provisions of the UN (UN ESCAP, 2009) and previously published studies (Ayob, 2009; Schmidt, Wood, 2019). In the first case, the importance of distributing information to all interested parties in the most accessible form is emphasized, in the second, public awareness of how managers and technical performers comply with ethical standards and how much their activities correspond to their stated intentions.

Accountability in resource allocation. Proper financial management is one of the paramount factors for the successful implementation of highly complex projects, especially in the construction sector. Its absence leads to corruption, inefficient budget spending and other negative effects. This was pointed out by respondents (A1, A2 and A3), and mentioned responsibility and accountability for project managers for any action related to the use of public funds or the provision of services (Ebrahim, 2003; Keping, 2018). Such mechanisms are clearly spelled out in the PERDA (respondents A2, A3, A6). The effectiveness of each employee, the transparency of his activities, conscientiousness are evaluated, and in case of improper performance of duties, a system of sanctions is applied.

One of the defining forces of a multi-level socio-economic system, in particular sectoral — ***taking into account and establishing feedback,*** which guarantees the "healthy functioning" of the system in complex contexts. It is seen as a guarantee of public satisfaction with government policies and the level of services provided, a source of long-term benefits (Marzukhi, 2015; Nasir et al., 2013).

Table 1. **Distribution of Answers of Respondents in Relation to the Considered Components of Good Governance**

Criteria	Respondents	Supporting Literature
Major Views on Good Governance Concept		
Good Administration	A1, A3, A5, A6, B1, B2, B3	Patyi, 2016; Council of Europe, 2007
Law Abiding or Rule of Law	A1, A2, A4, A6, B2, B5	Nik, 2013, UN ESCAP, 2009; Bouckaert, Vand de Walle, 2003; Gavriluță, Lotos, 2018
Transparency and Integrity	A1, A2, B1, B3, B4	UN ESCAP, 2009; Ayob, 2009; Schmidt, Wood, 2019; Huberts, 2018; Karssing, 2007; Van Ryzin, 2011
Accountability	A1, A2, A3, A6	Ebrahim, 2003; Keping, 2018
Efficient and Effectiveness	A2, A3, A6	Keping, 2018
Public participation and Inclusiveness	A3, B4, A2, A5	Marzukhi, 2015; Nasir et al., 2013; Schmidt, 2013; Schmidt, Wood, 2019; Abrha, 2016
Other Views on Good Governance Concept		
Professionalism	A1, A2	Nor et al., 2021; Moenir, 2002
Guarantee for Economy and Political Stability	A5, A2	Kaufmann et al., 1999, 2009; Mengistu, Adhikary, 2011
Consensus Oriented and Responsiveness	A2	Mohiuddin, 2016; UN ESCAP, 2009; Buraey, 1985; Mohiuddin, 2016; Coles et al., 2001
Combatting Political Interference	A1	Carpintero, Siemiatycki, 2016; Khan et al., 2019; Crawford et al., 2003; Crawford, Helm, 2009

Source: authors.

According to the respondents, as a result of constant dialogue with the "customers", the state authorities have an incentive to revise the criteria for assessing their own effectiveness. There is an increasing flow of constructive ideas used in the development of development strategies. Here are the opinions of the respondents (A3, B4):

A3: "Good governance is ensured by community engagement, in the sense that bottom-up initiatives are brought to the attention of the PERDA leadership, evaluated and, if approved, taken into account both in our current activities and in the development of development plans."

B4: "The challenge of maintaining high standards is acute at various levels of management. For example, the PERDA achieves transparency by involving the most diverse stakeholders (developers, contractors, etc.) into its orbit."

Closely related to feedback is ***inclusiveness*** - the ability of the state to take into account the needs of different groups of the population to the maximum extent possible, which in Malaysia is considered as one of the fundamental elements of development strategies (respondents (A2, A5)). Inclusion and openness are realized through "mediation mechanisms" through which citizens organized into interest groups can influence policy development (Schmidt, 2013; Schmidt, Wood, 2019). In interviews with respondents A1 and A2, such a factor as professional competencies and their constant updating was mentioned as one of the key criteria for assessing the quality of public services.

Guarantees of economic and political stability also play a role significant role, as they improve the attractiveness of the country for foreign investors, which was noted by the respondent (A5). Another aspect of this factor noted by Respondent A2 is that in the face of political turbulence it would be difficult for the PERDA to carry out its tasks. This department has federal status, but operates on the territory of a particular region. If a different political grouping, rather than the ruling party, dominates its authorities, then conflicting instructions can come from different levels in the PERDA, which could be seen in the recent elections in Malaysia. Resolving these contradictions is a difficult task, but doable, because it depends on political will.

Consensus-oriented. Orientation towards achieving consensus and taking into account the interests of different parties is the basis of the national, cultural traditions of Malaysia (Mohiuddin, 2016), which was noted by respondent A2. Consensus is the result of a constant iterative dialogue between the parties (object and subject of management, manager and employer) (Buraey, 1985; Mohiuddin, 2016). When it is enabled, the speed of response to the requests of the population increases, which increases the satisfaction of the latter with the quality of public services (UN ESCAP, 2009).

Finally, one of the respondents (A1) pointed out the importance of such a component of good governance as ***opposition to outside political interference***, to avoid negative impact on the implementation of government projects. This aspect is inextricably linked with the careful observance of the rules.

"*This is due to the fact that, as a rule, from the very beginning there are various attempts to influence the content of the project and the direction of its implementation. For example, in the course of procurement tenders, construction customers seek to convince the tender commission to make a choice in favor of "their contractors. However, following the established rules is embedded in the very mission and strategy of the PERDA. As a federal executive agency, we are obligated to follow the rules approved by the government in everything. The good governance concept has been operating "at the top" for a long time and extends to all aspects of our activities. Therefore, any attempts at lobbying are successfully suppressed. If the proposal of the developer or contractor does not meet certain criteria, it will be rejected. To check the qualifications of applicants, their ability to implement the project, an in-depth examination is organized*".

The importance of resisting the lobbying of private interests is also noted by other researchers. For example, when implementing infrastructure projects, its negative effects are manifested in a non-optimal choice of route, modes of transport, classes of service, and procurement mechanisms. As a result, the new facility does not integrate well into the existing infrastructure network, which negatively affects the project efficiency and the environment (Carpintero, Siemiatycki, 2016; Khan et al., 2019).

Conclusion

Improving the quality of public administration is recognized as a key condition for the economic progress of countries and their contribution to the achievement of sustainable development goals. The article analyzes the perception and practice of applying the good governance concept by the management of the PERDA and project beneficiaries. The results show that the perception of good governance concepts by both parties does not have significant differences and is generally consistent with global perceptions of its best practices. Respondents most often named such an aspect as effective organization of management. At the bottom positions in the "mention rating" of the good governance components were the desire to reach consensus and take into account the interests of all parties, which, however, does not detract from their importance. This indicates that the concept of good governance is widespread in Malaysia and is actively used in the implementation of government projects, at least in the case of PERDA. It can be stated that the understanding of good governance principles by the staff of the organization and the public is important for the proper implementation of projects in the region under consideration. The concept of PERDA has successfully "taken root" here, both the authorities and the population as a whole have adapted to it. This picture needs to be further verified by analyzing the data of the audit reports in order to identify the dynamics of the decrease in the number of cases of bad governance.

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Consumers' Adoption of Electric Vehicles for Sustainability: Exploring the Role of Personality Traits

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Abstract

This study investigates the influence of the Big Five personality traits which include extraversion, agreeableness, conscientiousness, neuroticism, and openness in molding the adoption intention of consumers regarding electric vehicles (EVs) in India. This study also looks at Behavioral Economics as an explanatory theory on the diffusion of electric vehicles in India.

The study comprised two stages. In the first stage, 150 users and non-users of electric vehicles were surveyed. Results pointed to a significant effect of all Big Five personality traits on adoption intention, with the exception of the trait of neuroticism. There was no significant difference in the adoption intention based on the differences in personality traits between men and women. In the second stage, the study used an expert-opinion based survey that was conceptualized based on the Diffusion of Innovation theory combined with the idea of memetics in new product diffusion. The results from the first stage of the research were bolstered by the fact that the second stage indicated that product attributes influencing diffusion would have a negative influence on adoption intentions of persons with high neuroticism. The study provides useful insights into consumer behavior based on personality for marketers of electric vehicles and policymakers interested in bringing about sustainable consumption practices.

Keywords: electric vehicle; adoption intention; Big Five personality traits; sustainability; behaviour; pollution; diffusion of innovations

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Introduction

Globally, rapid economic growth, resource exploitation, and unsustainable consumption have had a huge negative impact on the environment (Liu et al., 2020). This has given rise to increased air and water pollution resulting in global warming (Sun et al., 2018). There is global concern related to rising sea levels due to global warming, which has put into question the survival of human beings on this planet (Perez-Castillo, Vera-Martinez, 2021). Globally, the transportation sector is a significant source of air pollution (US, EIA, 2017). Unless significant steps are taken to lower our dependence on non-renewable sources of energy, carbon dioxide emissions from this sector is expected to increase to 50% by 2030 (IEA, 2009). Road vehicles are the main contributors to greenhouse gas emissions accounting for approximately 75% of the worldwide carbon dioxide emissions and for three-quarters of the urban air pollution (IEA, 2020).

Electric vehicles form a category of green or sustainable products that help in solving the problem of air pollution by way of zero emissions of greenhouse gases. They are fuel efficient, easy to use, and also reduce noise pollution (Beaume, Midler, 2009). Despite the fact that electric vehicles offer a lot of benefits to consumers as well as the environment, attempts to commercialize them have met with little success so far (Beaume, Midler, 2009).

From a practical perspective in the context of China, The International Energy Agency estimates that motor vehicles produced about 25% of China's overall carbon emissions in 2015 and that their contribution will increase to 45% in 2030. The Chinese government has recently implemented a number of incentive policy measures to support the EV industry, including consumer subsidies, numerous tax exemptions, exemptions from road tolls, the development of charging infrastructure, and funding for research and development (R&D) for EV manufacturers (Du, Ouyang, 2017). Sales of EVs in China, however, have not increased at the rate that was anticipated. For instance, according to the China Association of Vehicle Manufacturers, just 3.7% of all vehicles sold in that year were electric vehicles (EVs), which amounted to about 972,000 units in 2019. Subsequently, the Chinese government gradually reduced the subsidies on EVs, finally leading to their complete elimination in 2019 (Liao, 2022). India, for example, pledged in the Paris Agreement to reduce the level of its emissions by 33% to 35% from 2005 levels by 2030 (UN, 2018). The Indian government has developed a number of strategies and initiatives to promote the penetration of electric vehicles, including subsidizing the original purchase price, rewarding electric vehicle owners, enhancing the necessary infrastructure, and establishing practical regulations (Bhat et al., 2022). Despite the fact that manufacturers and consumers are both given financial and non-financial incentives, the acceptability and adoption of electric vehicles remain quite low in India and as a result, the proportion of electric vehicles in all motor vehicles is quite low (Bhat et al., 2022).

It can be understood from the above country contexts that although the advantages of electric vehicles have widely been recognized, the pertinent question is why consumers are reluctant to purchase them (Pickett-Baker, Ozaki, 2008). Is there a relationship between personality traits and adoption intention toward electric vehicles? This is the question that this study has attempted to answer.

Society has been compelled to modify its traditional means of acquiring and using products to embrace sustainable consumption practices in an attempt to protect the environment (Jaiswal, Kant, 2018). The focus of government and policymakers across the globe has been to promote sustainable consumption practices to slow down global warming (Wu, Cheng, 2019). As a result, the concept of sustainable or green consumption has emerged as a novel means of consumption across the globe (Kumar et al., 2020) and has gained popularity among policymakers and consumers (Sun et al., 2021). Research interest has grown substantially in this area with studies emerging from developed and emerging economies on a large scale (Nguyen et al., 2019).

Most studies have explored the role of different behavioral antecedents such as values, culture, attitude, motivations, etc. on consumer adoption of sustainable consumption practices (Nguyen et al., 2019; Zaremohzzabieh et al., 2020). Most studies have considered only pro-environmental consumers and their consumption behavior (Nguyen et al., 2019). Such a view lacks universal appeal since consumers who are not environmentally minded in their consumption practices, also have to choose between sustainable and non-sustainable products and few may adopt green products (Dalvi-Esfahani et al., 2020). Therefore, researchers should try to include all consumers and not focus on self-proclaimed green consumers to study consumption behavior effectively (Nguyen et al., 2019).

Studies have also looked at the relationship between sustainable consumption behavior from the perspective of consumer personality, but there is a clear lack of exploration of purchase behavior concerning sustainable products and consumer personality traits (Lu et al., 2015; Dalvi-Esfahani et al., 2020). Few researchers have found a connection between the agreeableness trait and sustainable consumption (Hirsh, 2010), and few studies reported this relationship to be significant (Kvasova, 2015). In fact, studies have argued that personality traits of consumers act as motivators for pro-environmental behaviors (Kvasova, 2015). The role of Big Five personality traits on pro-environmental purchase behavior has also been explored in a few studies (Sun et al., 2018). For example, Duong (2021) found that the Big Five personality traits of extraversion, openness to experience, conscientiousness, and

neuroticism were positively associated with green consumption. Personality traits are defined as "the heritable characteristic patterns of thoughts, feelings, as well as behavior" (Wang et al., 2021) and they are key motivators of purchase behavior (Goldberg, 1990).

Parallely, there has been a growing interest in what is referred to as "Behavioral Economics" (Thaler, 2016). This field integrates insights from social sciences, mainly psychology, to enhance and strengthen standard "rationality-based" economic models. Thus, behavioral economics can study the drivers of values, "rational" as opposed to "irrational" choices, and so on that are antecedents to a society's environment-friendly outlook and related patterns of consumption.

Behavioral Economics is based on the idea that individuals are not endowed with boundless rationality and will power and that they are not typical "rational" decision makers in the standard economic theory of maximization of utility. Along with that, they possess limited cognitive and computational capabilities. Thus, they resort to heuristics or rules of thumb in making decisions. Heuristics, although useful, can lead to systematic biases in decision-making leading to suboptimal behaviors (Soofi et al., 2020).

Behavioral Economics can be extended to the domain of diffusion of new products as well: low conformity with certain value systems and types of thought processes influence the diffusion and adoption of a green consumer durable innovation, thereby fostering a pro-environmental culture in society. This article examines the diffusion of electric vehicles in India from this viewpoint.

The objective of the present study is to explore the influence of Big Five personality traits in consumers' intention to adopt electric vehicles and relate this to the literature on Diffusion of Innovation (DoI) theory (Rogers, 2003). Research has shown that men and women have diverse perspectives on their intentions to adopt any new innovation (Ilie et al., 2005). Studies have also found some fascinating distinctions between how men and women view information technology developments, for instance (Ilie et al., 2005). Similar variations are anticipated in their adoption of EVs. This study also attempts to find out if differences in the gender effect on the Big Five personality traits to influence adoption intentions toward electric vehicles.

This study has implications for both theory and practice. Theoretically, this study has looked at consumer behavior from the perspective of Big Five personality traits and has attempted to relate personality traits with behavior surrounding electric vehicles. Practically, it can guide marketers of electric vehicles in framing effective marketing and communication strategies to target the appropriate personality traits of consumers. This will lead to better adoption intentions toward electric vehicles.

Literature Review

Researchers have shown a great interest in analyzing and examining the behaviors of consumers purchasing sustainable goods. Jaiswal (2012) discusses green consumerism as a concept, which points to consumers who willingly purchase environment-friendly products/sustainable goods. Personality factors contribute a great deal to the willingness to purchase sustainable goods. Factors like health consciousness (Michaelidou, Hassan 2008), cultural or personal values, such as egoism and competence (De Pelsmacker et al., 2015), individualism and collectivism (Gregory et al., 2002), morals, moral attitude (Arvola et al. 2008), and ethical obligation (Shaw, Shui, 2002) are some of the major factors impacting the purchase of sustainable resources. When a person focuses on their moral attitude, they sense a feeling of doing the right thing, which forms their ethical identity. Adding value to nature and surroundings gives a sense of ecological, political, and religious identity to an individual (Honkanen et al. 2006). This reward influences the choice of sustainable consumption practices for an individual. Consumer behavior and personality characteristics play a major role in the intention to buy sustainable products and it further contributes to enhancing certain traits in an individual's personality (Kumar et al., 2020). Personality refers to a set of characteristics that distinguishes a person from others based on their thoughts, feelings, and actions (Kvasova, 2015). Personality refers to a person's individual characteristics that influence his or her decision-making and behavior (Cawvey et al., 2017). Many theories have been established by psychologists and psychiatrists over the years in an attempt to define personality and determine its traits (Lu et al., 2015; Kvasova, 2015; Duong, 2021).

From the standpoint of Behavioral Economics, there are certain "biases" that are introduced in human behavior from the consideration of behavioral economics, such as: Present Bias, Status-Quo Bias, Framing Effect, Optimization and Overconfidence, Affect Heuristic, Herding Behavior and Social Influence, Nudging, and so on (Lehner et al., 2015; Soofi et al., 2020). The Diffusion of Innovations literature observes that many technological innovations are adopted slowly (Rogers, 2003). It is surmised that the tardiness in diffusion may originate from the Status Quo bias and Social Influence Bias mentioned earlier (Mullainathan, 2007). Any endeavour to sway people's perception, decision, or conduct in a foreseeable manner is called a nudge. This is feasible due to cognitive biases in personal and communal decision-making, creating hindrances for individuals to behave in a logical manner. Nudges work by making use of these biases as an integral part of such attempts. A "nudge" can act as an influence in human decision-making. Nudges target the more intuitive of human thought processes, as opposed to the more deliberate and conscious (Kahneman, 2011; Lehner et al.,

2015). In the case of residential energy consumption, a green cause, nudge mechanisms were found to be effective. Some nudge mechanisms that were found to be effective were: simplification and framing of information, changes to the physical environment, changes to the default option, and use of descriptive social norms (Lehner et al., 2015). Carlsson and Johansson-Stenman (2012) conclude that Behavioral Economics has strong implications for environmental economics and related normative policy.

Many studies have analyzed the role of the Big Five personality traits on green consumer behavior, for example, Duong (2021) found that all the Big Five personality traits played a positive role. Kvasova (2015) confirmed this finding by observing that green consumer behavior is influenced by individuals' personality traits. These traits were first described by Goldberg (1990) and they influence the beliefs, attitudes, and motivations of individuals (Wang et al., 2021).

This study looks at the influence of the Big Five personality traits on individuals' intention to adopt electric vehicles. Parallelly, it also looks at the Behavioral Economics paradigm and attempts to understand its findings. Electric vehicles run on power generated by batteries, unlike conventional vehicles which run on fuels and gases (Cowan, Hulten, 1996). The major contribution of electric vehicles is the one they make on the environment due to the decrease in greenhouse gas emissions and the emission of toxic fossil fuels via the tailpipes of vehicles (Lieven, 2011). Electric vehicles do not produce carbon dioxide while driving which further contributes to a decrease in air pollution.

Proposed Theoretical Model and Hypotheses

Big Five Personality Traits and the Intention to Adopt Electric Vehicles

The Big Five personality traits, per the literature, include the traits of openness, agreeableness, conscientiousness, extraversion, and neuroticism (Duong, 2021).

Compassion, charity, social peace, and assimilating with others are all motivated by agreeableness (Dalvi-Esfahani et al., 2020). Individuals with a high level of agreeableness have attributes such as sharing, comforting, and cooperating (Markowitz et al., 2012). Individuals that are highly agreeable are more likely to have empathy for others (Markowitz et al., 2012). They are considerate toward meeting the needs of others and they care for the environment as well (Wang et al., 2021). These prosocial attributes of agreeable individuals motivate them to indulge in environmentally friendly behaviors (Sun et al., 2018). Studies have shown that individuals who are agreeable behave in an environmentally friendly manner, but the results have not always been consistent. Few studies have reported a negative and significant effect of agreeableness on pro-environmental behavior (Kvasova, 2015; Markowitz et al., 2012), whereas a few others have reported positive and significant effects (Sun et al., 2018). Hence, this study proposes the following hypothesis H1.

H1: *The personality trait of 'Agreeableness' has a significant impact upon the adoption intention toward electric vehicles.*

An individual's imagination and insight are described by the quality of openness (Sutin, 2017). Such individuals are very open and willing to learn new things and perceive the world from new perspectives (Kvasova, 2015). These individuals are willing to look at the world from a variety of perspectives (Sutin, 2017). Individuals with a high level of openness to the world love variety and diversity (Wang et al., 2021). They are on the lookout for unique encounters and intriguing adventures (Sutin, 2017). They have a creative way of thinking and expressing themselves (Kvasova, 2015). They are always interested in what is going on around them and are acutely aware of their surroundings (Wang et al., 2021). Individuals that score higher in this category are more likely to be able to adapt to and embrace change, as well as appreciate the world's creative technologies (Duong, 2021). Studies have found that openness is a personality trait that is associated with many environmentally friendly behaviors (Sun, 2018; Milfont, Sibley, 2012). Therefore, it is expected that individuals exhibiting a high degree of this personality trait are more likely to adopt electric vehicles. Hence hypothesis H2 follows:

H2: *The personality trait of 'Openness' has a significant impact upon the adoption intention toward electric vehicles.*

People with a high level of extraversion are outgoing individuals who delight in the presence of others. These people are often referred to as 'people's people' (Wilt, Revelle, 2009). They are divided into four categories: sociable, chatty, aggressive, and exuberant (Wang et al., 2021). A person with a high level of extraversion is not scared to take chances (Kvasova, 2015). They exhibit environmentally friendly behaviors (Sun et al., 2018; Wang et al., 2021; Milfont, Sibley, 2012). Hence it is assumed that individuals who display higher degrees of extraversion will adopt electric vehicles.

H3: *The personality trait of 'Extraversion' has a significant impact upon the adoption intention toward electric vehicles*

People that have a high level of conscientiousness are thoughtful, goal-oriented, and patient (Roberts et al., 2009). They assess the situation and make plans based on how it impacts and influences others (Roberts et al., 2009). Individuals with high conscientiousness have attributes such as being well-organized, punctual, self-disciplined, adhering to norms, and being able to prioritize successfully (McCrae, Costa, 1985). Since they have stronger environmental interests, highly conscientious people are more likely to perceive major ecological challenges (Sun et al., 2018) and they are likely to align their actions toward pro-environmental

behavior (Kvasova, 2015). Earlier research has shown a strong correlation of conscientiousness with environmentally friendly behavior (Kvasova, 2015; Milfont, Sibley, 2012). However, there are also studies that have found a negative association between the two (Fraj, Martinez, 2006).

H4: *The personality trait of 'Conscientiousness' has a significant impact upon the adoption intention toward electric vehicles*

Neuroticism is a personality attribute that describes someone who is unhappy, moody, and emotionally unstable (Widiger, 2009). Changes in the environment cause them to feel uneasy and they find it difficult to make decisions (Akhtar, 2019). Apart from the negative characteristics of neuroticism, these people are naturally thoughtful and reflect on situations well (Widiger, 2009). Several studies have explored the influence of neuroticism on pro-environmental behavior (Akhtar, 2019; Kvasova, 2015) and have found both significant (Akhtar, 2019) and insignificant (Milfont, Sibley, 2012) influences on environmentally friendly behavior of such individuals. Therefore, the hypothesis is as follows:

H5: *The personality trait of 'Neuroticism' has a significant impact upon the adoption intention toward electric vehicles*

Influence of Gender on Adoption of Electric Vehicles

Men and women, according to gender socialization theory, go through different stages of socialization and, as a result, interpret social expectations and values differently (Mostafa, 2007). According to previous research, female consumers pay more attention to environmental issues than male consumers, and as a result, female consumers have more favourable opinions about and stronger intent to purchase environmentally friendly products (Sreen et al., 2018). Therefore, this study examines the influence of gender differences on the Big Five personality traits on adoption of electric vehicles.

Based on literature review, five hypotheses have been formulated to find out the effect of the Big Five personality traits on adoption intention toward electric vehicles. The theoretical model for the study has been depicted in Figure 1.

Material and Methods

The study was conducted in two stages. Stage 1 related to hypothesis testing and validating the conceptual model used for the study. In stage II, the results obtained from stage 1 were verified using Rogers' Diffusion of Innovation theory (Rogers, 2003).

Stage I: Hypothesis testing and model analysis

The aim of this study was to test the proposed hypotheses. This was done through a structured questionnaire, which was pilot tested with 50 respondents and corresponding corrections were made to the instrument per the results obtained from the pilot study. The responses were collected using Google Forms from respondents from different parts of India. The sampling method was convenience sampling. A Google Form survey link was posted on social media accounts and respondents were approached using snowball sampling. The language of the questionnaire was English. The questionnaire had three parts. Part A collected demographic information of the respondents. Part B dealt with information on use or inclination to use electric vehicles as a sustainable means of transportation. Part C consisted of measurement items for the variables used in the study. The items were measured using a five-point Likert scale (5 = Strongly Disagree and 1 = Strongly Agree). The questionnaire was distributed to 250 respondents, out of which 150 valid responses were obtained. The collected data was analyzed using WarpPLS 3.0. Age of respondents ranged from 20 to over 50 with 30% of respondents who were female and 70% who were male. It was observed that 48%of respondents have used electric vehicles at least once in their lifetime.

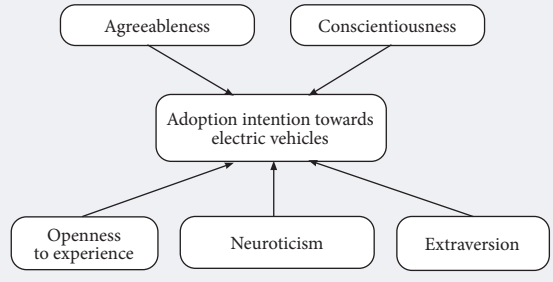
To test the adoption intention of respondents toward electric vehicles based on the effect of the Big Five personality traits, all variables were measured using constructs already established in previous studies. The Big Five personality traits were measured using six items each for agreeableness, conscientiousness, extraversion, and openness. Items were customized to the study from Sun et al. (2018). Neuroticism was adopted from Kvasova (2015). Each observed variable was measured using the five-point Likert scale.

Stage II: Validation of results from stage I using the Diffusion of Innovation Theory

Rogers (2003), as the preeminent researcher in the Diffusion of Innovation (DoI) theory had identified five distinct innovation attributes to explain the successful diffusion of an innovation. These attributes are: Relative Advantage, Compatibility, Complexity, Trialability, and Observability. They are summarized in Table 1.

In the current research, we draw from the seminal work of Rogers (1962) and combine that with the idea

Figure 1. **Theoretical Model**



Source: authors.

of memetics in new product diffusion (Langley et al., 2005; Langley et al., 2009). Memes are "cultural equivalent of genes" (Dawkins, 1976). Memetics theorizes a mechanism for the evolution of ideas and related behavior, and material artefacts associated with such behavior (Langley et al., 2005). Memetic theory proposes that for a behavior to be successfully diffused, a set of conditions need to be satisfied (Langley et al., 2005).

- Many copies of the behavior need to be available (fecundity)
- Reasonably accurate copies (fidelity)
- Long-lived copies (longevity)

We use the attributes enunciated by Rogers (2003) and attempt to link them with memetic theory as applied in the diffusion of new ideas as shown in Table 2.

Here in this research, we consider whether the innovation in question, namely EVs, would diffuse using a disaggregate (individual level) model. More specifically, we consider whether a person with certain personality traits as reflected through the Big Five traits would be interested in adopting the product. Based on the above, a survey instrument was developed. The instrument intended to understand the probability that an individual with certain personality traits would adopt the new product with certain attributes. We broadly follow the framework of (Langley et al., 2005). However, we take the Big Five personality traits, and combine that with the five product attributes of Rogers (2003). Thus, five times five equales 25 possible combinations.

We chose 11 experts in the domain of Consumer Behavior/New Product Diffusion to answer the question: What is the influence of product attribute A on the probability that an individual with trait T will adopt the product? The domain experts were academicians, managers in electric vehicle outlets, and subject experts. Scores on a Likert-type scale [-2 through +2] were aggregated using arithmetic means. The resulting data looked similar to Table 3.

The findings of the two stages are shown below.

Table 1. **Attributes of Innovation**

Attribute of innovation	Definition
Relative Advantage	The extent to which the innovation is perceived as being superior to the current option.
Compatibility	The extent to which the innovation is perceived to be consistent with extant socio-cultural norms, perceived needs, and prevalent ideas
Complexity	The extent to which an innovation is difficult to understand and use
Trialabilty	The extent to which an innovation can be experienced on a trial/limited basis
Observability	The extent to which an innovation is "visible" to potential adopters

Source: authors.

Table 2. **Memetic Theory and Diffusion of New Ideas**

Attribute per memetic theory	Attribute per Rogers (2003)
Fecundity (innovation gels with existing behavior, so more copies are possible)	Compatibility
Fidelity	Trialabilty and observability [more copies are possible]
Longevity	Relative advantage over existing alternatives gives an opportunity to the new product to be more stable.

Source: authors.

Table 3. **Big-Five Personality Traits and Product Attributes**

Personality trait	Product attribute
Openness	Relative advantage
Conscientiousness	Compatibility
Extraversion	Complexity
Agreeableness	Trialabilty
Neuroticism	Observability

Note The influence of each personality trait / product attribute on the purchase decision is assessed on a scale: Very high/high/indifferent/low/very low.

Source: authors.

Stage I Results

Reliability and Validity of Variables

Reliability, in the absence of any other alterations, pertains to the degree to which a test, method, or instrument, like a survey, can produce consistent results across different situations (Paula & Helena, 2006). Reliability of constructs were evaluated using Cronbach's alpha, which is the association or relationship between a group of items (Fornell, Larcker, 1981). Cronbach's alpha values for all personality construct indicators were found to be higher than the 0.70 minimum acceptable threshold (Fornell, Larcker, 1981). This indicated the reliability and consistency of the constructs used in the study. The Cronbach's alpha values for each construct is given in Table 1. All the scales were found to have values of Cronbach's alpha in the acceptable range, with the lowest being E (extraversion) at 0.677. Hence, the constructs used in the study were found to be reliable (Nunnally, 1994).

Confirmatory factor analysis to analyze the discriminant and convergent validity of variables was performed. The degree to which numerous construct items that theoretically should be related to one another are actually related is known as convergent validity (Hair et al., 1998). Individual item loadings and the Average Variance Extracted (AVE) were utilized to assess the convergent validity. Standard benchmark values for factor loading and extracted average variance are 0.40 and 0.50, respectively (Hair et al., 1998). If the square roots of the average variance retrieved (diago-

nal elements) are higher than the correlations between each pair of latent components, discriminant validity has been demonstrated (Hair et al., 1998). Based on the factor loading values, items having factor loadings less than 0.5 were excluded from the list. The resulting number of items for each construct was three. The factor loadings of all three selected items for each construct along with validity findings are reported in Table 4.

Structural Model Analysis

To test the hypotheses used in the study, we used Structural Equation Modeling (SEM) which is based on Partial Least Squares (PLS). Two factors supported the decision to use PLS: first, PLS can more easily incorporate reflective and formative scales than covariance structure analysis (Chin, 1998). Second, PLS allows for a relatively small sample size and does not require any prior distributional assumptions (Chin, 1998). For the analysis of the measurement models and the structural model, WarpPLS 3.0 (Kock, 2011) was employed. Calculating the path loadings and R2 values is part of the structural model evaluation (Hair et al., 1998). The strength of the correlations between the independent and dependent variables are shown by the path loadings and the predictive ability of the structural models is gauged by the R2 values (Hair et al., 1998). We computed path loadings and t-statistics for proposed relationships using a bootstrapping method.

Bootstrapping was done with a resample of 5,000. The assessment of the structural model involves checking the following in line with Hair et al. (2014); collinearity, significance of path coefficients, value of R2 for model fit, effect size, and predictive relevance. The VIF value for the model was below 5, hence collinearity was not an issue. The effect size of each predictor was interpreted using the rule given by Sullivan and Feinn (2012), where 0.02 indicates a very weak effect, 0.15 indicates a medium effect, and 0.35 indicates a strong effect. The predictive relevance of model was calculated using 'Stone-Geisser Q-squared coefficients' (Stone, 1974). The blindfolding procedure for the model indicated a cross validated redundancy index greater than zero, which indicated the presence of predictive relevance. Figure 2 shows the estimated model using WarpPLS.

As illustrated in Table 5, H1 represents the path from agreeableness to adoption intention. The results show that this relationship is positive and significant (β=0.26, $p < 0.05$). H2 is the relationship between openness and adoption intention. This is significant and positive (β=0.22, $p < 0.05$). The relationship between extraversion and adoption intention was found to be significant and positive ((β=0.24, $p < 0.05$). Similarly, the relationship between conscientiousness and adoption intention was also found to be significant and positive (β=0.24, $p < 0.05$). The relationship between neuroticism and adoption intention was found not to be significant (β=0.05, $p = 0.29$).

Table 4. **Construct Loadings and Validity Checks**

a) Factor loadings

Construct	Item	Loading
Agreeableness	AG1	0.661
	AG2	0.803
	AG3	0.768
Openness	O1	0.762
	O2	0.745
	O3	0.739
Neuroticism	N1	0.797
	N2	0.775
	N3	0.723
Extraversion	E1	0.834
	E2	0.865
	E3	0.796
Conscientiousness	C1	0.800
	C2	0.730
	C3	0.731

Source: authors.

b) Validity test results

Construct	CR	AVE	√AVE	Cronbach's α
Agreeableness	0.79	0.87	0.93	0.79
Openness	0.79	0.56	0.74	0.81
Neuroticism	0.81	0.58	0.76	0.73
Extraversion	0.87	0.692	0.83	0.67
Conscientiousness	0.79	0.56	0.74	0.82

Source: authors.

Stage II Results

The five factors that influence the diffusion of a new product (Rogers, 2003), namely, Relative Advantage, Complexity, Compatibility, Observability and Trialability, broadly are in consonance with the findings of the structural model. Table 6 displays the arithmetic means of the values obtained as an answer to the question of the influence of a new product attribute on the chance that an individual with a specific trait would adopt EV in India. Since a Likert-type scale was used, where +2 indicates a very high probability and -2 a very low probability, the average scores would provide insight into how a product feature would affect a person's likelihood of adopting it based on his/her personality trait.

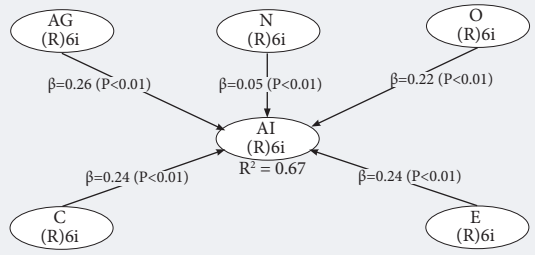
Table 6 shows that people with high openness are highly likely to adopt EVs as an innovation, whereas people with high neuroticism are generally disinclined to adopt EVs. Generally speaking, people with conscientiousness, agreeableness, and extraversion, are inclined to adopt EVs if the use of such EVs is not very complex.

Table 5. **Result of Hypothesis Testing**

Hypotheses	Coefficient	Result
H1: Agreeableness → Adoption intention	0.26 (p < 0.01)	Supported
H2: Openness → Adoption intention	0.22 (p <0 .01)	Supported
H3: Neuroticism → Adoption intention	0.05 (p=0.29)	Not supported
H4: Extraversion → Adoption intention	0.24 (p < 0.01)	Supported
H5: Conscientiousness → Adoption intention	0.24 (p < 0.01)	Supported

Source: authors.

Figure 2. **Estimated Model**



Source: authors.

Discussion

Environmentally conscious consumption is a major topic in today's marketing literature, particularly within the context of modern economies (Pham et al., 2021). With the growing number of environmental issues around the world, particularly in emerging Asian nations, sustainable consumption is now at the forefront of consumer behavior research (Quoquab et al., 2019). The personality of consumers influence sustainable consumption practices (Duong, 2021). The purchase of electric vehicles is one of the sustainable consumption practices, which needs to be encouraged for solving environmental issues across the globe. This study has attempted to explore the effect of the Big Five personality traits on the adoption intention toward electric vehicles by consumers.

This study has contributed to the pro-environmental literature from a theoretical standpoint. It has also contributed to consumer behavior literature in terms of understanding the personality of consumers to motivate them to adopt sustainable consumption practices. The results from this study have helped to explain the effect of the Big Five personality traits on shaping the adoption intention of consumers toward electric vehicles. This research found no discernible differences in the adoption intention between male and female consumers. The study has found that other than the personality trait of neuroticism, other traits such as agreeableness, extraversion, openness, and conscientiousness played a positive and significant role.

Consumers belonging to the conscientiousness personality type have traits such as being careful, responsible, and persevering (Barrick, Mount, 1991). The findings of this study reaffirm this observation since conscientious consumers were found to show an inclination toward the purchase of electric vehicles. This can be attributed to their of being responsible toward the environment through the adoption of sustainable consumption practices. Consumers who exhibited the trait of extraversion were found to be inclined to adopt electric vehicles. Since extravert consumers are sociable, expressive, and love social recognition (McCrae, Costa, 1997), they are likely to adopt electric vehicles. Their pro-environmental consumption practice is an expression of their social nature. They also expect social recognition for their adoption of electric vehicles as a sustainable means of commute to safeguard the environment. Consumers with the personality trait of agreeableness have warmth, sympathy, and cooperativeness as their basic nature (Colquitt et al., 2009). The findings of this study reaffirm this observation since agreeable consumers were found to show an intention to adopt electric vehicles which reaffirms their attitude of cooperation and sympathy toward environmental protection. Consumers with the personality trait of openness showed a positive intention to adopt electric vehicles. This reaffirms the observation that individuals who are open to change and welcome the adoption of pro-environmental consumption practices as a creative expression of their personality trait. The consumers with the personality trait of neuroticism were shown to have a negative adoption inten-

Table 6. **Effect of Factors Influencing Diffusion of A New Product on the Possibility of Adoption of EV by Individuals with Different Personality Traits**

Factors influencing diffusion	Personality traits				
	Openness	Conscientiousness	Extraversion	Agreeableness	Neuroticism
Relative advantage	+1.18	+0.73	+1.09	+0.91	–0.73
Compatibility	+0.91	+0.73	+0.45	+1.18	–0.36
Trialability	+1.45	+0.64	+1.18	+1.00	–0.36
Complexity	+0.09	–0.64	–0.22	–0.09	–1.27
Observability	+0.91	+0.64	+0.73	+0.91	–0.45

Source: authors.

tion toward electric vehicles. As per previous studies, individuals with this personality trait are generally insecure and avoid situations where they have to take control (Colquitt et al., 2009). The adoption of electric vehicles as a means of commute demands that the individual take responsibility or control of his or her choice of commute and face criticism, if any, by family and friends. Neurotic individuals may find themselves nervous or anxious in such situations. Hence, they avoid being original and stick to the use of conventional products, which are socially prevalent.

The results of Stage II showed that individuals with neurotic personalities will be influenced negatively by all the factors to adopt EVs. Another significant finding is that increase in complexity would negatively influence adoption intent in all personality traits, except those with Openness. This is in line with Rogers (2003). This study did not find any statistically significant influence of neuroticism on the intention to adopt EVs. This coupled with the negative influence of all product attributes influencing diffusion on individuals with neuroticism implies that there is a strong incentive for new product managers to consider this fact in their targeting exercise. There is also scope for research in understanding whether such people can change their attitude toward new product adoption as a result of social marketing. The findings from this study showed that personality traits based on gender did not influence adoption intention toward EVs, which essentially means innovation diffusion characteristics are not gender dependent.

These findings may guide managers of firms manufacturing and selling electric vehicles in several ways. Managers have to consider the fact that each consumer has a different personality especially when it comes to the purchase of sustainable or environmentally friendly products like electric vehicles. They should not try to market electric vehicles to all consumers in the same manner. Marketers can try to segment the market according to the Big Five personality trait of consumers and develop marketing campaigns with a focus on the type of consumer segment. This will result in better adoption practices.

The segmentation of consumers based on their personality traits will help marketers to satisfy consumer needs in a better way. EV marketing teams should create relevant advertising strategies to attract the right consumer segment according to their personality type. This can be achieved through the use of digital marketing techniques that help to target the right consumers. Techniques such as location, usage, and demographics-based marketing have the capacity to reach pro-environmental consumers accurately. Marketers can design strategies to make consumers aware of the benefits of using environmentally friendly products not only for their individual benefit but for the collective benefit of humanity. Marketers should make consumers understand the necessity of using pro-environmental products by motivating and incentivizing them.

The observations from this study have implications for policymakers also. They should be aware of the personality traits of consumers to formulate appropriate environmental protection measures. In particular, they can focus on proposing solutions that can bring about the better adoption of sustainable consumption practices keeping in mind the personality traits of consumers. The policy measures should make consumers feel proud of their choice for adopting sustainable consumption practices and not make them anxious, stressed, or under pressure to adopt. From a social perspective, government organizations can launch awareness campaigns about the benefits of using sustainable means of transport to protect the environment. Governments can motivate masses to adopt such transportation practices through incentives like reduced tariffs at the toll plaza, special lanes, social recognition, etc.

Openness as a Big Five personality trait is particularly effective at eliminating the status-quo bias in Behavioral Economics. As mentioned previously, they are more likely to "adapt to and embrace change and appreciate technology". This is reflected in the results: people with openness are predisposed toward the adoption of electric vehicles ($\beta = 0.22$, $p < 0.01$). Similarly, people with a high level of consciousness are thoughtful and able to "prioritize successfully" are expected to overcome Present Bias (non-linear and variable tendency of people to prefer a smaller payoff in a shorter time horizon over a larger payoff in the distant future). This is, again, reflected in the results ($\beta = 0.24$, $p < 0.01$). In contrast, however, individuals with neuroticism are uneasy with changes in the environment and, in this context, the adoption of a new technology. Thus, they are expected to exhibit Status Quo bias. This is reflected in the results ($\beta = 0.05$, $p = 0.29$): as a group, neurotic people do not intend to adopt electric vehicles. However, as these people are "naturally thoughtful and reflect on situations well", the nudge can be used to guide them to make positive decisions. One such option for policymakers is to modify the choice architecture (public and possibly private) to strongly incentivize the purchase of EVs over internal combustion engine vehicles. This is being done through various policy initiatives such as the National Electric Mobility Mission (NEMM) in India. However, an interesting question is whether purchase of EVs in India can be made the "default option" as a nudge? What could be the various potentially negative impacts of such a move? Moreover, people with a high degree of extraversion can be influenced by the action of their peers, namely, the purchase of EVs. Here the role of social influencers or mavens become important. Public authorities can take the help of social influencers, especially those perceived to be technology-friendly, to pitch for EVs as the vehicle of choice.

Conclusion

This study looked at the role of the Big Five dimensions of personality on the adoption of EVs in India and attempted to link such behavior with the paradigm of Behavioral Economics. This study was limited to the adoption of electric vehicles only. It can be extended to include other sustainable consumption practices like adoption of green clothing, organic food, eco-friendly housing, and so on. The study can be further extended to include post-purchase behavior such as consumer satisfaction from the use of eco-friendly products and re-purchase intentions. Future studies can explore the link between personality traits and adoption intention using mediators and moderators in the conceptual model. The mediator or moderator variable could be a contextual construct that can interfere with adoption intention such as attitude, trust, risk aversion, and others. The sample size of the data can be increased by extending the study to a global platform and not limiting it to a particular region. Further research can also investigate the role of various choice architectures in changing people's adoption behavior.

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GREEN MANAGEMENT MODELS

Green Banking for Sustainable Development

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Abstract

The ever-increasing threat of global climate change, environmental pollution, and the destructive impact of human activities highlight the need for more detailed research into tools to increase a country's environmental sustainability. In addition, it promotes the search for additional sources of funding for these activities. For developing countries, one of the main sources of environmentally sustainable development is international bank financing. Therefore, this study aims to analyze how international green banking affects the environmental sustainability of developing countries. For this purpose, the data series were compiled for the period of 2010 to 2020. The annual data for panel regression analysis are retrieved from the OECD and World Bank Open Data. The identified effects can be useful for government officials in terms of determining the benefits of using international green banking for gaining environmental sustainability.

Keywords: international banking; green banking; environmental sustainability strategies; green innovation; environmental performance; corporate social responsibility

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Introduction and Literature Review

One of the most pressing issues of today, attracting public attention around the world, is environmental. Their manifestations are energy crisis, air and water pollution, rising morbidity and more. Significant rates of world economic development only increase the consumption of natural resources, thereby deepening the existing problems in the world. Thus, the analysis of statistical data showed a steady increase in global consumption of electricity, water, carbon emissions. This increases the risk of depletion of non-renewable energy resources and threatens national and international environmental security (Chien et al., 2021; Tu et al., 2021; Nawaz et al., 2021). At the same time, despite the destructive impact of economic activity on the environment, economic development creates favorable conditions for scientific progress, the introduction of green technologies (use of renewable energy sources, smart technologies, green innovations, etc.). This, in general, allows society to solve environmental problems (Hsu et al., 2021). The success of these measures depends on the availability of sufficient financial resources.

According to the International Energy Agency (IEA), achieving the global goal of reducing emissions by 45% by 2030 and reaching net zero by 2050 requires an increase in investment almost three times (from 760 billion US dollars in 2019 to 2,200 billion US dollars in 2030). Emerging markets need $1 trillion a year in public and private financing to transition to a zero net income economy[1].

The liberalization of financial flows, the integration and globalization of financial and economic systems have significantly accelerated the cross-border movement of funds and the development of the international banking sector, which expands the opportunities for attracting external capital. The concept of green banking as the most innovative tool of environmental policy, which comes from the active participation of international financial institutions in overcoming environmental challenges, has become widespread. Six principles of green banking were formulated, which became the basis for a roadmap to bring the activities of international financial institutions and their approaches to capital allocation in line with the Sustainable Development Goals (SDGs). Mechanisms for prioritizing financial support are to be developed (Bhardwaj, Malhotra, 2013; Taghizadeh-Hesary, Yoshino, 2020; Malliga, Revathy, 2016; Zapotichna, 2023). An increasing number of banks are picking up this trend and aligning their policies with these goals, primarily by digitizing services (Deka, 2018). Doing so they contribute to energy saving and resource conservation (Jha, Bhome 2013). The poorest countries are increasingly being given concessional funding or grants to achieve the SDGs. The implementation of such measures, in addition to direct positive effects for the environment, forms a new image of the public perception of banks as entities not only focused on making a profit, but also making a great contribution to improving the environment[2].

The dynamics of the green bond market deserves special attention[3], the statistics of which are most fully presented in the reports of the Climate Bond Initiative (Climate Bonds Initiative, CBI). In 2021, its volume crossed the threshold of half a trillion dollars, and if the current dynamics are maintained, it can reach one "green trillion" as early as 2024.[4]

Experts estimate the annual volume of green bonds issuance in different ways, while giving a general guideline for assessing current investments. Thus, in order to achieve the set climate goals, governments, politicians and investors must increase the global volume of green bond issuance to $5 trillion per year by 2025 (CBI, 2022). According to the IMF and IEA, achieving zero CO2 emissions by 2050 over the next two decades will require additional investments of 0.6% to 1% of global GDP, totaling between $12 trillion and $20 trillion (IMF, 2021a, 2021b), and according to McKinsey's calculations, a total of $9 trillion per year should be invested in these projects (MGI, 2022).

Reuters' survey of economists conducted in the fall of 2021 revealed significant discrepancies in dollar estimates of the required total investment, reflecting the diversity of methodologies used. The median value was $44 trillion. In turn, Oxford Economics experts put the total amount of investment needed in energy and other sectors by 2050 at nearly $140 trillion, the highest estimate found in the survey (CBI, 2022). The top four green bond issuers in 2021 were the United States, Germany, France and China (about 54%)[5]. In institutional terms, more than 3/4 of the issue of such

[1] https://www.un.org/en/climatechange/net-zero-coalition, accessed 10.04.2023

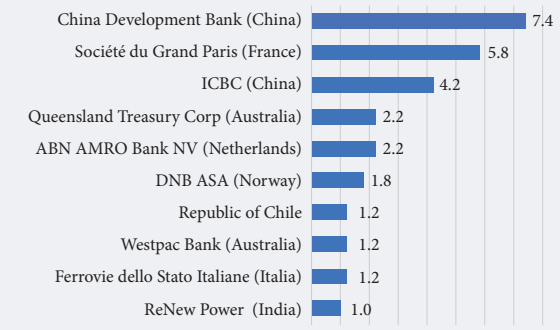
[2] Currently, with the participation of international financial institutions, a number of global environmental programs are being implemented, including the United Nations Environment Finance Initiative (United Nations Environment program Finance Initiative, UNEP FI) and Equator Principles (Equator Principles, EP). UNEP FI brings together over 500 financial institutions (mainly international banks and insurance companies) to develop mechanisms to promote sustainable development and environmental responsibility. (More details: https://www.unepfi.org/members, accessed 12.02.2023). The Equator Principles underlie credit risk management and are applied by international banks in providing financial and advisory support for environmental and socially oriented projects with a budget of more than $10 million (EPA, 2020). This initiative was joined by 138 financial institutions in 38 countries, which account for more than 70% of total project funding in rapidly developing countries.

[3] Target bonds issued for projects aimed at improving the environmental situation or minimizing damage to the environment.

[4] This goal was first identified in the framework of the «Conference of the Parties» (CoP) 2016 (https://unfccc.int/event/cop-22, accessed 15.02.2023).

[5] There are 21 sovereign green bonds were priced in 2021, including a GBP10bn (USD13.7bn) UK Gilt, the largest single debut sovereign green bond to date and the largest green bond of 2021. A smaller GBP6bn (USD8.25bn) deal followed in the UK later in the year, placing it among the top largest sovereign green bond issuers in the world. Consistently committed, the German state-owned development bank Kreditanstalt für Wiederaufbau (KfW) and the financial conglomerate, the largest US mortgage agency Fannie Mae, became the leading green issuers of the year (2nd and 3rd places) with a total volume of USD13.6bn and 13.4bn, respectively.

Figure 1. **Top 10 Climate Bonds Certified Issuers in 2021 (*$bn*)**



Source: (CBI, 2022).

securities falls on development banks and TNCs, the top 10 rating of which is shown in Fig. 1. At the end of 2021, the total amount of green bonds issued by banks in 58 countries reached $522.7 billion, which is 75% higher than the corresponding figures at the end of 2020.

Over the past 10 years, international banks have been a key contributor to environmental sustainability through their partner networks through proximity to direct beneficiaries. The European Bank for Reconstruction and Development (EBRD) holds the lead in allocating green investments. In particular, it provided loans for solar energy projects in Kazakhstan ($16.7 million) and Azerbaijan ($114.2 million) (EBRD, 2021a)[6]. In 2022, the EBRD committed an additional €2 billion to the "Green Cities", which aims to assist city administrations in preparing environmental strategies, financing sustainable infrastructure and technology exchange. Projects in the field of energy, green building and building renovation, renewable energy, water and wastewater treatment, solid waste disposal, etc. receive support. Over 50% of the total EBRD investment has already been allocated to the green economy direction[7]. Given the growing dynamics of bank financing in this direction, the question arises of assessing its contribution to the achievement of the SDGs, which is the subject of our study.

Table 1 lists the main studies in this area with key findings emphasizing the significant role of international banks in achieving the SDGs both at the national and interstate levels. However, the ambiguous environmental effects of these activities indicate the need for their in-depth study on a larger sample of countries and over a longer time horizon. Meanwhile, researchers approach the assessment of the contribution of banks in a fragmented way. Some consider banks only from the standpoint of transforming internal business processes, while others consider their intermediary functions in achieving the SDGs through certain "green" instruments (soft lending, the issuance of "green" bonds, etc.). The objective of our study is to comprehensively assess these two components using the example of studying the contribution of banks to the reduction of CO_2.

Materials and Methods

The information base of this study is the annual data obtained from the Organization for Economic Co-operation and Development, Statista and the World Bank Open Data (World Bank) for 2010-2020. The hypotheses established in the paper will be tested based on a data series from such countries as Austria, Denmark, Finland, France, Sweden, Czech Republic, Netherlands (EU countries with the best indicators according to the level of achievement of Sustainable Development Goals) and Ukraine, Azerbaijan, Greece, Moldova, Georgia (non-EU countries with medium and low level of achievement of Sustainable Development Goals). The choice of countries is due to the possibility of taking into account the different specificities of green banking (these countries differ in the features of the banking system, the types of their construction, the role of the state in achieving the Sustainable Development Goals) and the availability of a complete array of data necessary for calculations. Data collection and preprocessing was performed using the Microsoft Office Excel toolkit, and Stata 16 software packages were used for further econometric analysis. The study of the effect of international bank financing on environmental sustainability was carried out using two groups of indicators described in Table. 2.

The application of the macroeconomic approach is aimed at evaluating the effectiveness of the green banking policy in the country, and not at the level of an individual bank. This will allow us to determine the role of green banking in state environmental management and effective financing of eco-projects. The use of the micro-approach is more justified when evaluating the activity of a separate banking institution, determining its role in achieving the Sustainable Development Goals,

[6] In the first case, the project partner was the Green Climate Fund, the second was attended by a consortium consisting of: EBRD, Asian Development Bank, Japan International Cooperation Agency and Abu Dhabi Development Fund.

[7] Other initiatives include the participation of the IMF in joint development programs, the provision of technical assistance and knowledge to partners to solve problems related to the achievement of the SDGs. World Bank Group annually invests more than $65.9 billion to reduce poverty and stimulate economies in developing countries in Sub-Saharan Africa, East Asia and the Pacific, South Asia, Europe, Central Asia, Latin America and the Caribbean, the Middle East and in North Africa. New Development Bank annually mobilizes $7.2 billion for the implementation of infrastructure projects for sustainable development in the BRICS countries and beyond. Islamic Development Bank Group provides more than $7.8 billion to help people in the Middle East, Africa, Asia and Latin America. British Export Credit Agency in 2019 invested $1 billion in the implementation of international projects in the field of renewable energy.

Table 1. **Main Studies of the Links between Banking Activity and Environmental Indicators of the Country of Presence**

Subject of study	Description, key findings
The impact of green banking on environmental performance (Salvado et al., 2013)	Using questionnaire and research resume methods, the empirical study proved the positive impact of international banking environmentally friendly strategies on the level of eco-innovation and growth of banking sector competitiveness.
The role of international banks in the dissemination of green technologies (Risal, Joshi, 2018)	Using the tools of simple and step-by-step multiple regression analysis based on data from 189 banks, the authors proved the important role of international banks in encouraging the use of environmentally sustainable technologies to enhance the bank's reputation and awareness among customers.
The impact of international green banking on environmental performance of banks (Zhang et al., 2022)	Based on the modeling of structural equations for 352 bankers, the authors substantiate the mediating effect of financing on the relationship between international green banking and the environmental performance of private commercial banks. Empirical calculations have shown that green banking has a significant positive impact on the environmental performance of banks and sources of finance. At the same time, sources of financing environmental programs significantly affect the environmental performance of banks. The main shortcomings hindering the pace of green banking are the lack of customer awareness of green banking, high investment costs, technical barriers, lack of capable and competent staff to evaluate green loans, and difficulties in evaluating green projects. At the same time, increasing the competitiveness of banks, reducing long-term costs and expenses, providing online banking services, improving customer reputation and reducing carbon emissions is identified by the author as the main benefits of green banking.
Bank financing of projects to reduce greenhouse gas emissions (Michonski, Levi, 2010)	Bank-financed projects have reduced greenhouse gas emissions by an average of $3 million per project. These projects are mainly implemented by the World Bank, UNDP and UNEP. A GEF allocation of $2.7 billion in 1992 for climate-related projects reduced greenhouse gas emissions by one billion tons.
Investing in Low Emissions Enterprises (Campiglio, 2016)	The bank's investment in low-carbon emission ventures are considered as one of the main tools for combating climate change. Moreover, the author emphasizes that under certain economic conditions (low level of development, underdeveloped banking system, etc.), banks tend to shy away from lending to low-carbon activities even in the presence of a carbon price. In the opinion of the author, the use of a macroeconomic approach in the study of green banking will allow the evaluation of the effectiveness of the state monetary policy in the field of decarbonization of the economy. The data are especially relevant for developing countries, where the central bank system usually involves stronger state control over the distribution of loans and a wider range of monetary policy instruments than a single interest rate.
The role of international banks in shaping green policy principles (Tandon, Setia, 2017)	Based on primary and secondary analysis data and Garrett's ranking techniques the study concluded that the international banks play an important role in shaping green policy principles. State Bank of India's financing of a project to install wind turbines for individual use has reduced the country's dependence on polluting thermal energy, increased the country's energy neutrality and reduced its carbon footprint.
The contribution of foreign banks to the country's environmental performance (Gopi, 2016)	An example of a study that notes the negative impact of foreign financial structures on the environmental situation in the country. By financing projects, the implementation of which has a negative impact on the environment, banking institutions indirectly threaten the environment.

Source : compiled by the author based on the materials of the listed works.

Table 2. **Indicators for Assessing the Impact of International Bank Financing on Environmental Sustainability**

Group	Components
1) The CO_2 emissions (metric tons per capita) will be used as a generalizing indicator of the level of load on the environment.	The first group includes indicators that determine the level of financial support of international financial institutions and transnational banks for environmentally friendly measures: • environmentally related R&D expenditure (% GDP); • energy public RD&D budget (% GDP); • annual investment needs for renewable energy, energy efficiency and low-emission vehicle (bn); • climate bonds (bn); • green loan (bn); • firms using banks to finance investment (% of firms); • foreign bank assets in total banking assets (%).
2) Green policy indicators of international financial institutions (two components as independent variables)	Includes indicators that characterize banking institutions as direct participants in the process of achieving sustainable development goals: • total number of online non-cash transactions (millios); • number of internet card transactions; • share of contactless payments in the total number of non-cash card payments (%).

Source : compiled by the author.

Table 3. **Descriptive Statistics of All the Variables for All Countries**

Variable	Description	Mean	Min → Max	St. Dev.
CO2	CO_2 emissions (metric tons per capita)	5.032	0.047 → 17.051	3.785
BFI	Firms using banks to finance investment (% of firms)	24.02	17.03 → 51.36	15.06
FBA	Foreign bank assets in total banking assets (%)	21.36	17.05 → 44.69	9.02
NCT	Total number of online non-cash transactions (millios)	39.58	31.89 → 68.96	14.32
ICT	Number of internet card transactions (millios)	41.69	33.91 → 69.30	16.02
SCP	Share of contactless payments in the total number of non-cash card payments (%)	48.69	38.19 → 69.28	19.68
RDE	Environmentally related R&D expenditure, % GDP	0.08	0.020 → 0.155	0.032
EPB	Energy public RD&D budget, % GDP	0.01	0.01 → 0.090	0.002
INV	Annual investment needs for renewable energy, energy efficiency and low-emission vehicle, bn	839	235 → 1012	13256
CB	Climate Bonds, bn	24	7 → 32	15
GL	Green loan, bn	123	52 → 164	24

Notes: Min – minimum value. Max – maximum value. St. Dev– Standard deviation.

Source: author's calculations.

and the level of its transparency. However, taking into account that most projects of an environmental nature are financed by several sources of funding, as well as the fact that not all organizations publish their reports in terms of sustainable development policy, there is no complete information on the volume of international bank financing of environmental sustainability by individual banks in individual countries the use of a micro approach within this study has a number of limitations. Table 3 shows the results of descriptive statistics for all variables used to analyze the impact of international green banking on environmental sustainability. As a result of statistical analysis, the same number of observations was used for each of the analyzed indicators (n = 190). This number of samples allowed to balance the analyzed data panel. Macroanalysis was carried out by building regression models of panel data (Bahl, 2012; Purwanto et al., 2021; Chen et al., 2022; Ullah et al., 2021). The use of this method is due to its advantages over the cross-section and time-series data in the analysis of consecutive data series (Kumari, Sharma, 2017).

In general, the dependence of CO_2 emissions on the international green banking can be represented as follows:

$$CO_2 = f(BFI, FBA, NCT, ICT, SCP, RDE, EPB, INV, CB, GL), \quad (1)$$

The advantage of this model is to ensure high reliability of the results. Greater reliability and validity of the results will be ensured through the use of the generalized method of moments (GMM), which minimizes the impact of endogenous factors.

The Hausman test will be used to determine the model that most fully describes the established interdependencies (fixed or random effects) and allows to determine a statistically significant relationship between factor and result variables.[8]

Formalization of the relationship between the CO_2 emissions and green policy of international financial institutions and transnational banks in the field of ensuring environmental sustainability using a regression equation with fixed effects can be done as follows:

$$CO_{2t} = \alpha 0 + \beta_1 X_{1t} + ... + \beta_i X_{it} + \varepsilon_{it}, \quad (2)$$

where X_{it} — the independent variables ((*BFI, FBA, NCT, ICT, SCP, RDE, EPB, INV, CB, GL*); *i* — the subscript of entity (i = 1, … ,10); α_0 — an unknown intercept; $\beta_{i...n}$ — the coefficient of explanatory variables; ε_{it} — the error terms; *t* — time (t = 2010-2020).

Due to the different nature of the outcome and independent variables, it is important to transformed them into a comparable form and avoid the difficulties associated with the dynamic properties of data series. This can be achieved by logarithmic the right side of the equation as follows:

$$CO_{2t} = \alpha_0 + \beta_1 lnX_{1t} + ... + \beta_i lnX_{it} + \varepsilon_{it} \quad (3)$$

Formalization of dependencies using the equation of random effects can be done as follows:

$$CO_{2t} = \alpha + \beta lnX_{1t} + \mu_{it} + \varepsilon_{it} \quad (4)$$

where X_{it} – the independent variables (*BFI, FBA, NCT, ICT, SCP, RDE, EPB, INV, CB, GL*); α — an unknown

[8] Given the confirmation of the statistical significance of factors and resulting variables, the formalization of the relationship between indicators should be carried out using a model of fixed effects. Otherwise, it is advisable to use a model of random effects.

intercept; β — the coefficient of explanatory variables; ε_{it} — the error terms; μ_{it} — the random heterogeneity specific to the i-observation (constant through time).

In the next step, we will test the relationship between the CO_2 emissions and policy of international financial institutions and transnational banks in the field of ensuring environmental sustainability using the Hausman test. The choice of the most acceptable model was made based on the following equation:

$$p = (\beta_{RE} - \beta_{FE}) \times (\Sigma FE - \Sigma RE) \times (-1) \times (\beta_{RE} - \beta_{FE}) \quad (5)$$

where β_{RE} — coefficient estimated from a random-effects regression model; β_{FE} — coefficient estimated from a fixed regression model; ΣFE — fixed effects covariance matrix; ΣRE — random effects covariance matrix.

Exceeding the p-level above 0.05 allows us to confirm the hypothesis about the link between the CO_2 emissions and policy of international financial institutions and transnational banks. On the contrary, the insignificant value of the Hausman test confirms the alternative hypothesis, which indicates the acceptability of the fixed effects model.

An important component of testing the validity of the hypotheses established in the paper and improving the reliability of the results is the procedure of panel regression analysis. To this end, we estimate the correlation between the analyzed variables by the Pearson coefficient using the following equation:

$$R = \frac{E((CO_2 - E(CO_2))(Y - E(Y)))}{\sqrt{var(CO_2)var(Y)}}, \quad (6)$$

where E(Y) – independent variables; var (CO2) and var(Y) – the variance of CO2 and independent variables.

The interpretation of the results is presented in Table. 4.

At the last stage, a series of data will be test on the presence of single roots using Levin, Lin and Chu, Im, Pesaran, Shin W-Stat method, ADF-Fisher Chi-square and PP-Fisher Chi-square. The general equation is specified as follows:

$$CO_{2t} = \rho_i \gamma_{it-1} + \sum_{j=1}^{p_i} \varphi_{ij} \varepsilon_{it-j} + \ldots + \delta_i X_{it} + u_{it}, \quad (7)$$

where ρ_i — the number of lags; X_{it} — the independent variables; ε_{it} — the stationary error; i — the index of essence (i = 1, …, 10); u_{it} – a stationary process.

To check the data for non-linearity of the relationship between them, an assessment of long-term relationships between indicators will be carried out using the method of autoregressive distributed distances (ARDL), which has the following form:

$$lnCO_2 = \beta_0 + \sum_{i=0}^{n} \beta_{1i} ln\, CO_{2\,t-1-i} + \sum_{k=1}^{P} \sum_{i=0}^{m} \beta_{2i} ln\, P_{k\,t-i} + \omega DU_t(T_b) + \varepsilon_t, \quad (8)$$

where DUt – is a dummy variable representing a structural break); P_k – is the k-th indicator characterizing the green policy of international financial institutions and transnational banks in the field of ensuring environmental sustainability.

Results

The initial stage of modeling the link between the CO_2 emissions and green policy of international financial institutions and transnational banks is to check all series of data for stationarity. To this end, we will analyze the indicators using Levin, Lin and Chu (LLC), Im, Pesaran, Shin W-Stat (IPS), ADF-Fisher Chi-square (ADF), and PP-Fisher Chi-square (PP) tests for the presence of single roots. To avoid the presence of erroneous regression and conversion of all exogenous variables to stationary, we will analyze the variables for the presence of single roots in the first difference. The results of the analysis are confirmed the hypothesis of the presence of unit roots at the level of statistical significance of 1, 5 and 10% (Table 5). Since P-values (Prob.) for all analyzed indicators are less than 0.05, which allows us to accept the null hypothesis about the stationarity of the data set. In this way, the analyzed indicators do not change their characteristics over time. ARDL modeling and hypothesis testing of a causal relationship between variables revealed a significant effect of the activities of international banks to achieve environmental sustainability, expressed in a negative correlation between green policy and the growth of CO2 emissions (Table 6). Annual investment needs for renewable energy, energy efficiency and low-emission vehicle, energy public RD&D budget and climate bonds have the greatest impact on CO_2 emissions. Thus, a 1% increase in the volume of annual investment needs for renewable energy, energy efficiency and low-emission vehicle leads to a decrease in CO_2 emissions by 0.45%, an increase in the volume of energy public RD&D budget - by 0.36%, the volume of climate bonds - 0.54%. At the same time, number of internet card transactions, share of foreign bank assets in total banking assets, share of contactless payments in the total number of non-cash card payments have almost no effect on the level of carbon intensity of the economy. The correlation coefficient for these indicators does not exceed 0.1%.

Thus, the obtained results testify to the important role of bank capital in ensuring the decarbonization of the economy. At the same time, indicators of the country's banking sector development do not have a significant impact on the resulting indicator. The reason for this situation may be that the bank's implementation of the green investment policy does not depend on the size of the bank's capital and the volume of its operations but is a purposeful policy of the bank's management to comply with the principles of environmental responsibility. The results shown in Table 7 indicate a high level of reliability of the model with fixed effects (R-Squared - 0.890). Thus, all analyzed exogenous variables can explain the change in carbon emissions by 89.0%.

Table 4. **R-values and the Level of Correlation between CO2 Emissions and the Green Policy of International Banks**

R-value	Correlation between variables
0 < R < 0.2	No correlation
0.2 < R < 0.5	Low
0.5 < R < 0.7	Average
0.7 < R < 0.9	Strong
0.9 < R < 1.0	Highly strong
R < 0	Negative

Source: author.

The analysis of the strength of the connection between the indicators confirms the previous results regarding the importance of the indicators that determine the level of financial support of international financial institutions and transnational banks for environmentally friendly measures in reducing CO_2 emissions. Thus, a 1% increase in climate bonds leads to a 0.284% reduction in CO_2 emission, the amount of green loans – by 0.257%, environmentally related R&D expenditure – by 0.245%, energy public R&D budget – by 0.325%, annual investment needs for renewable energy, energy efficiency and low-emission vehicle – by 0.358%. The indicators that characterize banking institutions as direct participants in the process of achieving sustainable development goals practically do not affect the volume of CO_2 emissions. For example, an increase in the number of transactions on Internet cards by 1% leads to a decrease in CO_2 emissions by 0.004%.

At the next stage we will evaluate the parameters of the random-effects model. The results in Table 8 confirm the high reliability of the regression parameters from the random effects model (R-square is 0.784). Similar to the results obtained in Table 7, the evaluation of the parameters of the regression model of random effects (Table 8) confirmed the negative link between CO_2 emissions and indicators of green policy of international financial institutions and transnational banks. Thus, an increase in climate bonds by 1% leads to a reduction in CO_2 emissions by 0.46%, global loans – by 0.32%.

At the same time, the indicators obtained using the random-effects model exceed the correlation coefficients for the fixed-effects model. 0.564 compared to 0.245 for the share of environmentally related R&D expenditure, 0.658 compared to 0.358 for annual investment needs for renewable energy, energy efficiency and low-emission vehicle, etc.

Taking into account the obtained discrepancies, the Hausman test was carried out in order to identify the model that most reliably characterizes the relationship of the considered indicators (Table 9). The results were in favor of the fixed individual effects model. For all analyzed dependent variables p-level is less than 10%, and the value of the coefficient of determination is quite high.

The last stage of the study is to verify the validity of the hypotheses established in the paper using weighted least square statistical method, the advantage of which is the ability to neutralize the problems of autocorrelation

Table 5. **Panel Unit Root Results**

tests	Stat. param.	Variables										
		Unit Root in Level										
		CO_2	BFI	FBA	NCT	ICT	SCP	RDE	EPB	INV	CB	GL
LLC	Stat.	–2.87	–1.02	–0.96	–2.58	–2.84	–2.69	0.98	–1.54	–3.14	–2.85	–1.25
	Prob.	0.00*	0.00*	0.01*	0.01*	0.00*	0.00*	0.05*	0.02*	0.01*	0.00*	0.01*
IPS	Stat.	1.37	1.45	1.35	1.95	1.58	2.04	–0.58	–0.69	3.69	–0.56	21.35
	Prob.	0.05	0.01*	0.00*	0.00*	0.01*	0.01*	0.00*	0.01*	0.01*	0.00*	0.00*
ADF	Stat.	17.87	1.05	1.98	1.65	1.28	2.36	34.29	28.47	2.02	17.36	17.85
	Prob.	0.04	0.01*	0.01*	0.01*	0.00*	0.00*	0.05	0.00*	0,03	0.02*	0.04*
PP	Stat.	26.94	27.89	31.05	33.78	24.69	22.36	54.97	46.98	31.65	45.94	23.68
	Prob.	0.01	0.01*	0.01*	0.01*	0.00*	0.00*	0.01	0.01*	0.69	0.02*	0.00*
Unit Root in 1st Difference												
LLC	Stat.	–6.87	–4.87	–5.81	–6.35	–7.82	–4.36	–5.21	–6.87	–5.17	–8.98	–1.75
	Prob.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IPS	Stat.	–3.58	–2.58	–1.97	–2.69	–2.47	–2.47	–2.68	–5.19	–8.96	–7.52	–6.24
	Prob.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ADF	Stat.	51.89	66.54	61.95	58.47	51.69	63.58	61.28	66.59	47.29	55.69	24.69
	Prob.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PP	Stat.	147.95	98.87	85.47	59.68	88.74	76.98	87.87	113.27	107.96	187.89	98.24
	Prob.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: * p < 0.01, ** p < 0.05, *** p < 0.1. L

Source: author's calculations.

Table 6. **Results of the Correlation Analysis**

	CO_2	BFI	FBA	NCT	ICT	SCP	RDE	EPB	INV	CB	GL
CO_2	1.00	–0.11	–0.05	–0.17	–0.08	–0.05	–0.24	–0.36	–0.45	–0.54	–0.21
BFI		1.00	0.08	0.06	0.04	0.14	0.08	0.09	0.04	0.10	0.05
FBA			1.00	0.21	0.29	0.33	0.17	0.19	0.21	0.28	0.26
NCT				1.00	0.85	0.74	0.25	0.24	0.18	0.21	0.26
ICT					1.00	0.89	0.26	0.19	0.11	0.16	0.14
SCP						1.00	0.17	0.23	0.21	0.26	0.21
RDE							1.00	0.22	0.64	0.28	0.11
EPB								1.00	0.71	0.39	0.09
INV									1.00	0.27	0.17
CB										1.00	0.16
GL											1.00

Source: author's calculations.

and heteroskedasticity of panel data series. The coefficients shown in Table 10 confirm the preliminary results of the relationship between the analyzed data series. The regression coefficient for the indicators of the green loan and CO_2 emissions is 0.486 (at the level of statistical significance 1%), climate bonds — 0.527, environmentally related R&D expenditure — 0.621, energy public RD&D budget — 0.477. This confirms the negative statistically significant link between CO_2 emissions and international green banking. At the same time, a separate group of indicators has an insignificant impact on CO_2 emissions, in particular: regression coefficient for a number of companies using banks to finance investment (at the level of statistical significance 1%) – 0.086, share of foreign bank assets in total banking assets – 0.011, total number of online non-cash transactions – 0.166.

At the last stage, based on ARDL modeling, we will evaluate the presence of a long-term nonlinear relationship between indicators (Table 11). For all analyzed indicators, the p-value does not exceed 0.05, which indicates the feasibility of using this model to formalize the relationship between indicators. Indicators that determine the level of financial support of international financial institutions and transnational banks for environmentally friendly measures have the greatest impact on CO_2 emissions. A change in the volume of environmentally related R&D expenditure by 1% leads to a decrease in the volume of CO_2 emissions by 0.228% with a time lag of 2 years, energy public RD&D budget – 0.15%; annual investment needs for renewable energy – 0.346%, climate bonds – 0.183%. At the same time, the influence of share of foreign bank assets in total banking asset, number of internet card transactions, share of contactless payments in the total number of non-cash card payments is insignificant and without a time lag. A change in the share of firms using banks to finance investment leads to a change in CO_2 emissions with a time lag of 1 year.

Azerbaijan: Banking Sector Towards a Greener Growth Model

In Azerbaijan, the development of green banking is still at an early stage. Thus, according to the study, for the period of 2012-2016, the issuance of directive instructions on green banking by the Central Bank of Azerbaijan was not revealed (Allakhverdiyeva, Sorokina, 2021). And this is despite the fact that it was during this period that international financial institutions allocated "green" resources to Azerbaijan.[9] According to an OECD study, during that period, among other things, an obstacle to the development of environmental lending in the EU Eastern Partnership countries (including Azerbaijan) were regulatory barriers, expressed in the absence of state support and proper strategic planning, which often turned out to be a more serious factor, than the availability of funding. Among these countries, Azerbaijan had the smallest number of partner banks (2) participating in the distribution of funds under IFI environmental credit lines, and the lowest scores in assessing the development of climate and sustainable energy policies (OECD, 2016).

In recent years, the republic has been making significant efforts to protect the environment, develop a more environmentally friendly model of economic growth, with the priority of turning the country towards a more sustainable and flexible economy[10]. Adopted in 2021, the Azerbaijan 2030 agenda[11] lists green growth and a

[9] For example, in the second half of 2013, the European Investment Bank (Azerbaijani partner – AccessBank), through the Green for Growth Fund, which invests in energy efficiency and increased financing in renewable energy, invested $1.7 million; and the International Bank for Reconstruction and Development (Azerbaijani partner – Bank Respublika) – $47.1 million (for a period of 20 years with a 5-year grace period) for a project to support the improvement of solid waste management in Baku (Baybikova, Sterligova, 2014).

[10] https ://blogs.worldbank.org/europeandcentralasia/green-growth-mirage-or-reality-azerbaijans-future, accessed 15.05.2023.

[11] The full title is " Azerbaijan 2030: National Priorities for Social and Economic Development". https://www.economy.gov.az/ru/post/872/azerbaycan-qlobal-dayaniqli-inkisaf-meqsedleri-indeksinde-movzusunda-tedbir-kecirilib, accessed 15.05.2023.

Table 7. **Panel Regression Results for the Fixed-Effects Model**

Variables	Coefficient	Std. Error	t-Statistic	Prob
BFI	–0.012*	0.016	–5.548	0.000
FBA	–0.008*	0.011	–2.561	0.000
NCT	–0.015*	0.008	–3.548	0.000
ICT	–0.004*	0.112	–4.658	0.000
SCP	0.007*	0.006	–5.985	0.000
RDE	–0.245*	0.012	–24.365	0.000
EPB	–0.325**	0.023	–7.985	0.000
INV	–0.358*	0.095	–10.256	0.000
CB	–0.284*	0.045	–9.854	0.000
GL	–0.257*	0.023	–7.921	0.000
R-Squared	0.890			
Prob (F-statistic)	0.000			

Note: * p < 0.01, ** p < 0.05, *** p < 0.1.

Source: author's calculations.

Table 8. **Panel Regression Results for the Random-Effects Model**

Variables	Coefficient	Std. Error	t-Statistic	Prob
BFI	–0.019*	0.025	–5.145	0.000
FBA	–0.024*	0.018	–2.032	0.000
NCT	–0.017*	0.011	–3.145	0.000
ICT	–0.001*	0.032	–3.854	0.000
SCP	0.004*	0.012	–4.154	0.000
RDE	–0.564*	0.023	–17.365	0.000
EPB	–0.258**	0.031	–5.854	0.000
INV	–0.685*	0.112	–8.245	0.000
CB	–0.458*	0.068	–5.205	0.000
GL	–0.327*	0.042	–6.542	0.000
R-Squared	0.784			
Prob (F-statistic)	0.000			

Note: * p < 0.01, ** p < 0.05, *** p < 0.1.

Source: author's calculations.

Table 9. **Hausman Test**

Variable	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
BFI	0.0007	0.0006	1.1317	0.0028	0.0015	0.0029
FBA	–0.0120	0.0191	–0.5497	0.0001	–0.0939	0.0699
NCT	0.1434	0.0402	0.1724	0.0001	–0.3733	0.4104
ICT	–0.0445	0.0560	–0.6898	0.0000	–0.2856	0.1968
SCP	–0.6768	0.0144	–0.5820	0.0050	–0.7119	0.4866
RDE	0.0112	0.0163	0.6035	0.0000	0.0001	0.0001
EPB	–0.0525	0.0663	–0.8154	0.0000	–0.3376	0.2326
INV	–0.8001	0.0170	–0.6880	0.0059	–0.8416	0.5752
CB	0.0133	0.0193	0.7135	0.0000	0.0001	0.0001

Source: author's calculations.

clean environment as one of the five strategic priorities that underpin Azerbaijan's future development. As part of this goal, along with the prospective economic development of the country, the importance of improving the environment, investing in renewable energy sources, reducing the carbon footprint, and addressing other domestic environmental problems is emphasized, and activities are currently being carried out to achieve these goals.

Thus, one of the subgoals of the national "green roadmap" adopted in the republic in 2022 is the use of incentives by banks to finance electric and hybrid cars[12]. With this in mind, the Central Bank of Azerbaijan (CBA) has developed an action plan aimed at incorporating resilience and climate risks into public and private financing mechanisms, supporting the macroeconomic and regulatory framework for

Table 10. **Robustness Test**

a) Multi-dimension variables

Variables	Coefficient	Std. Error	t-Statistic	Prob
BFI	–0.086*	0.008	–12.7406	0.000
FBA	–0.011*	0.011	–29.6156	0.000
NCT	–0.166**	0.211	–19.9091	0.000
ICT	–0.615*	0.031	–10.7753	0.000
SCP	–0.790*	0.073	–16.4565	0.000
RDE	–0.621*	0.014	–7.85813	0.000
EPB	–0.477*	0.018	–13.2904	0.000
INV	–0.411*	0.009	–10.9856	0.000
CB	–0.527*	0.023	–7.19308	0.000
GL	–0.486*	0.017	–12.7406	0.000

b) One-dimension variables

R-Squared	0.891
Prob (F-statistic)	0.920
Adjusted R-squared	0.000
Durbin-Watson stat.	0.301
Schwarz criterion	0.131
Hannan-Quinn criterion	0.032
Akaike info criterion	–0.02

Note: * p < 0.01, ** p < 0.05, *** p < 0.1.

Source: author's calculations.

[12] The full title is «Roadmap for conducting assessments, preparation and implementation of proposals to stimulate and encourage the use of environmentally friendly modes of transport.» https ://report.az /ru /biznes /v-azerbajdzhane -razrabotana-dorozhnaya-karta-po-pooshreniyu-primeneniya-ekologichnyh-avtomobilej/, accessed 15.05.2023.

Table 11. **ARDL Regression**

a) Multi-dimension variables

Variables	Coefficient	Lag	Std. Error	p-value	Prob
BFI	–0.017	1	0.125	–1.45	0.006
FBA	–0.003	0	0.265	–1.65	0.006
NCT	–0.015	0	0.254	–1.85	0.001
ICT	–0.005	0	0.165	–0.85	0.014
SCP	–0.001	0	0.104	–0.65	0.025
RDE	–0.228	2	0.365	–1.36	0.003
EPB	–0.150	2	0.095	–0.95	0.004
INV	–0.346	2	0.085	–0.96	0.042
CB	–0.183	2	0.116	–0.84	0.007
GL	–0.269	2	0.165	–0.87	0.024

b) One-dimension variables

R-Squared	0.796
Adjusted R-squared	0.775

Source: author's calculations.

the implementation of these new priorities. In turn, the Association of Banks of Azerbaijan (ABA) gave relevant recommendations to banks. Along with this, they are preparing proposals for a green finance mechanism and green bonds, as well as forming a legal framework related to green finance in the country. All of these actions, in our view, are the right steps to minimize market uncertainty about greening growth while reducing transition costs.

Azerbaijan's efforts to switch to a "green" path of economic development and improve environmental performance have earned recognition and support from the international community and organizations such as UNDP, EU, World Bank, EBRD, Islamic Development Bank, etc.[13] The World Bank report on Azerbaijan highlights low-carbon hydrogen production and offshore renewable energy production, climate-smart agriculture and land use, and the development of a "blue" economy with a focus on exploitation as potential business segments that can attract and stimulate the growth of green banking and the preservation of the Caspian Sea and its coastline (World Bank, 2022). The country's ambitious green energy export plans are gaining momentum and are already being implemented in specific initiatives[14]:

- leading international companies in the field of renewable energy have signed contracts and memorandums of understanding for the production of more than 25 GW of renewable energy in Azerbaijan;
- the construction of the first wind and solar power plants began;
- in December 2022 between the governments of the Republic of Azerbaijan, Georgia, Romania and Hungary signed "Agreements on strategic partnership in the field of development and transmission of "green" energy".

Great opportunities for Azerbaijan in the development of the green economy in general and green banking, in particular, are associated with the prospects for the development of the territory of Karabakh, opening against the backdrop of progress in resolving the Armenian-Azerbaijani conflict (Hajiyeva, Musayeva-Gurbanova, 2022). Declaring Karabakh a zone of "green" energy, Azerbaijan has provided for the period 2022-2026. a plan of specific measures towards the decarbonization of the economy of this region of the country. Here are just a few of them (EBRD, 2021b) :

- creation of production and service sites for green technologies (an agreement on the formation of a «green» energy zone was signed with the Japanese company TEPSCO)[15];
- a joint project with the British company BP for the production of solar energy[16];
- laying the idea of "green" development in the Master Plans of three cities of the Karabakh economic region ("Cities of the Future"), developed by the Swiss city planning and architecture company SA Partners GmbH together with the government of the republic.

The above opportunities create favorable conditions both for the Central Bank of Azerbaijan and its commercial banks, and for international financial institutions to overcome the inertia observed in the formation and development of green banking in the country and to fully participate in this process.

Conclusion

Due to the aggravation of environmental problems and the low effectiveness of existing tools to deal with them, there is a growing demand for innovative mechanisms for solving these problems on a global scale, including the reorientation of economic entities towards the

[13] For example, EBRD, Asian Development Bank (ADB), Japan International Cooperation Agency (JICA) and Abu Dhabi Development Fund (ADFD) have provided a 114.2 million dollar loan for a photovoltaic (PV) solar power plant project in Azerbaijan (https ://www .ebrd.com/work-with-us/projects/psd/52221.html , accessed 15.05.2023) . Along with this, the EBRD, within the framework of the Green Cities program, allocated a loan of 10 million euros for the introduction of intelligent systems for collecting municipal solid waste and optimizing public transport routes in the city of Ganja (https://www.azernews.az/business/193690. html, accessed 15.05.2023).

[14] https://minenergy.gov.az/en/foto-qalereya/energetika-naziri-azerbaycan-xezerin-yasil-enerji-potensialini-avropaya-elektrik-enerjisi-yasil-hidrogen-ammonyak-olaraq-tedaruk-etmek-niyyetindedir, accessed 15.05.2023.

[15] http://www.tepsco.co.jp/english/topic/etopic_20210517.html, accessed 10.06.2022; https://minenergy. gov.az/en/xeberler-arxivi/yaponiyanin-tepsco-sirketi-ile-gorus-kecirilib, accessed 10.06.2022.

[16] https://www.bp.com/en_az/azerbaijan/home/news/press-releases/The-Ministry-of-Energy-and-bp-agree-on-next-stepsin-solar-project.html, accessed 15.06.2023.

principles of sustainable development. Every year more and more international financial institutions and transnational banks are involved in these processes. Numerous studies show their important contribution to the achievement of the SDGs, along with factors such as the level of economic growth (Nejat et al., 2015; Luqman et al., 2019; Shahbaz et al., 2021), social responsibility of the population and business (Sadiq et al., 2022; Debnath, Roy, 2019) and others.

This article is devoted to substantiating the role of the green practice of international banks as one of the most relevant ways to stimulate the introduction of corporate social responsibility principles, the implementation of environmental programs, the use of innovative resource-saving technologies, etc. Empirical calculations have confirmed the positive impact of global financial institutions on the dynamics of environmental development, expressed in a decrease in the volume CO_2 emissions through significant investments in environmental initiatives. The internal indicators of the development of the banks themselves do not produce significant external effects for the environment. A possible explanation is that the vast majority of environmental programs are implemented by the state or business. At the national level, the share of green initiatives implemented by banks is insignificant.

The results of the study give reason to expand the list of traditional mechanisms for stimulating sustainable development and to actively use the international green banking business to promote these processes. State institutions (in particular, players in the global financial market) should develop and implement appropriate policies aimed at encouraging banking institutions to support environmental initiatives and introduce green technologies to reduce the burden on the environment.

The main limitation of this study is the small sample size of the factor indicators. To date, there are no comprehensive studies of international green finance in relation to programs implemented to achieve the SDGs. As a result, it is not possible to generalize the essence of the impact of the green practice of international banks on sustainable development indicators for all countries and sources of funding. Another limiting factor is the low level of transparency in the activities of specific banks, especially from countries with underdeveloped economies, which publish only a small part of information about their activities, especially in the environmental aspect. In the course of further research, it is advisable to expand the list of indicators characterizing the financial parameters of environmental sustainability policy and develop strategies for solving these problems.

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Realization of Sustainable Organizational Performance Using New Technologies and Green Human Resource Management Practices

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Abstract

The introduction of a culture of environmental responsibility is becoming not just a branding tool, but also an important factor in business development. This article explores the possibility of increasing the environmental performance of companies through green methods of personnel management using the example of Iranian car manufacturers. The study combines survey and correlation-analytical methods.

The study reveals that the improvement of green methods of human resource management, covering such aspects as recruitment, training, and performance management, has a positive and significant impact upon the environmental performance of companies. The effectiveness of these activities increases with the use of new technologies such as learning management systems (LMS), cloud computing, and artificial intelligence. The application of green methods in personnel management stimulates the implementation of a corporate strategy of sustainable development and opens new career opportunities for employees. The benefits for the companies lie in the improvement of corporate image, the growing demand for their products, the improvement of production safety, and, consequently, that of the internal organizational climate.

Keywords: sustainable organizational performance; new technologies; green human resource management practices; automotive industry

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Introduction

Today, the importance of sustainability has made organizations focus on achieving sustainable performance. An organization that moves in the direction of sustainability is an organization that has developed its performance and activities over time through the management of economic, social, and environmental dimensions (Ibrahim et al., 2019). One of the issues that companies are facing today is how to improve performance according to new environmental laws. To do this, companies must implement environmental principles and laws across the entire supply chain and within all units of the company, including human resources. This leads to the emergence of green human resource management (Norton et al., 2017). Improving the performance of employees will increase their productivity and help the organization reach its goals.

In addition, companies seek to use different tools to gain competitive advantages and paying attention to technology strategy is one of the most important tools to achieve this goal (Yusoff et al., 2015). Technological issues are considered critical in terms of influencing the lives of future generations and the issue of technology sustainability has become the focus of leading organizations (Erkmen et al., 2020). Over the past decade, human resource researchers have increasingly paid attention to the challenge of developing sustainable human resource management systems as well as systems that support organizations in achieving their overarching sustainability goals (Lee et al., 2019). Research shows that human resource management, like modern technologies, plays a vital role (Alraja et al., 2022).

Applying green human resource management practices can be a suitable stimulus for realizing sustainable development goals, it can also improve new career trajectories with an emphasis on sustainability for current employees and those of the next generation to ensure a better future. (Li et al., 2019). Creating and expanding environmental knowledge and awareness is the first step toward overcoming environmental challenges and achieving the sustainable development of the environment (Amini et al., 2018). Since the use of new technologies affects a person's cognitive processing, the existence of necessary infrastructures for the use of new technologies helps an organization have a more complete understanding of environmental issues and, in turn, a higher level of control. In addition, the results of the studies show that organizations that have new tools and a higher understanding of environmental issues make more efforts to produce green products and take steps toward improving environmental performance.

Iran is a developing country and is moving through the stages of industrialization. Over the last few decades, it has faced many problems, including problems related to industrial pollutants. The rapid growth of industry and industrial development has exposed the natural environment of this country to many pressures and dangers. The severity of environmental pollution resulting from waste materials in cities and centers of industrial concentration is such that it has attracted the attention of scientific and executive authorities to ensure proper disposal or basic recycling of these materials. Due to the increase in environmental problems in developing countries such as Iran, the environmental concerns and awareness of society and of course the relevant employees such as those in the automobile industry have increased. Since the automotive industry is the largest in Iran after the oil industry, it is comprised of many companies and small sectors, it is clear that this industry is the mother industry due to its influence and dependence on various supporting industries. Furthermore, its impact on employment plays a significant role in improving the economic conditions of individual regions and the country as a whole. Some estimates indicate that two jobs will be created for each vehicle produced, 17% of which will be direct employment (car manufacturing and parts manufacturing) and 83% of which will be indirect employment (upstream industries and car service activities). Surveys show that if automobile companies, considering their strategic position in the country, pay attention to new technologies and apply green human resource management methods, they can provide the necessary grounds to strengthen and improve their performance. In doing so, they will meet their obligations and prove themselves socially responsible.

If companies pursue these sustainable practices, it will undoubtedly create a positive image of the brand of automobile companies on the market and provide the basis for improved performance. Studies show that the companies active in Iran's automotive industry in the last decade have been able to experience more stable organizational performance by empowering their human resources through the use of methods such as environmental education, establishing a green payment system, and green employee performance management. Strengthening employees' awareness of environmental challenges and improving methods through the use of new technologies, such as the use of cloud computing at automotive companies, has resulted in higher efficiency and cost reduction at the individual, organizational, and environmental levels. The application of green human resource management methods through the development of human capital helps organizations achieve optimal environmental management. However, in Iran, companies must overcome challenges such as poor understanding and awareness of environmental issues. Despite

[1] https://www.mordorintelligence.com/industry-reports/analysis-of-automobile-industry-in-iran, acessed 14.09.2022.

some shortcomings, people have begun to increasingly focus on environmental challenges and improving technical knowledge, thus bringing more attention to environmental management through green human resource practices day by day.

The importance of addressing this area increases as today's companies realize that developing a strong social conscience and green sense through green human resource management practices is not only a branding tool but an essential factor in business development. In recent years, Iranian automotive companies have been working toward realizing the vision of the Iranian automotive industry, which is to achieve first place in the automotive industry of West Asia, and they are facing two important challenges, sustainability and digital transformation. So far, a study on the topic of using new technologies and green human resource management practices has not been conducted in order to achieve the sustainable organizational performance. Addressing this issue can help Iranian automobile companies face the existing challenges as best as possible.

Considering the issues raised and the existing research gap in Iran's automotive industry regarding the use of new technologies and green human resource management methods, we seek to answer the following question: How does one achieve sustainable organizational performance in Iran's automotive industry through the use of new technologies and green human resource management practices?

Theoretical Literature and the Development of Hypotheses

New technologies and sustainable organizational performance

If new technologies are used correctly at the organizational level, it is possible to create a new level of progress and development at the organization (Lin, Ho, 2011). Studies show that by using new technologies, benefits such as increased efficiency, heightened service speed and improved performance are created for the organization (Rahman et al., 2018). The use of technology has always been related to the progress of the organization (Thomas et al., 2016). Accordingly, to achieve sustainable performance, organizations become more and more dependent on new technologies and their effects, and perhaps this is the most important reason that many companies develop at an extraordinary speed (Rahman, Aydin, 2019). The existence of relevant and compatible technological factors not only increases the speed and efficiency of the process but also often minimizes costs and improves productivity (Marler, Fisher, 2013).

New technologies are related to the development of organizational infrastructure such as hardware, software, and technological equipment, and hence affect a firm's performance (Rahman et al., 2018). Technologies have tremendous effects on all dimensions and aspects of organizations, and the managers of these organizations must pay attention to issues related to technology to run the organization efficiently and effectively (Yang et al., 2018). It must be acknowledged that these technologies bring with them countless opportunities and threats, but it must also be accepted that people, employees and members of society at large, are strongly influenced by technologies, which can lead to achieving sustainable performance. Accordingly, the first research hypothesis is proposed as follows:

H1: The use of new technologies has a significant impact upon sustainable organizational performance.

New technologies and green human resource management

Studies show that the adoption of management practices, such as green human resource management and green innovation, largely depends on technological factors (Zhu et al., 2019). The value of these factors depends on their compatibility with other technologies needed to implement green practices (Kumar, 2015). Costs related to energy consumption are one of the main reasons for companies to move toward the development of new technologies as well as green human resource management, and this issue has gained great importance in recent years (Jenkin et al., 2011). With the explosion of the use of information systems and technologies, the use of new technologies such as cloud computing and artificial intelligence aid in curtailing negative environmental impacts, moreover green human resource management practices including hiring and training, further improve sustainable outcomes(Zhang et al., 2019). New technologies increase the possibility of effective implementation of green human resource management practices by replacing costly and capital-intensive tasks with new practices and services (Ojo et al., 2022). Accordingly, the second research hypothesis is proposed as follows:

H2: The use of new technologies has a significant impact upon green human resource management practices.

Green human resource management practices and sustainable organizational performance

Today, the increasing destruction of the environment and natural resources is considered a major challenge facing humanity. These challenges have brought consequences impacting different dimensions and areas of human life. Increasing concerns about the environment and following them, the emergence of international environmental standards, have forced organizations to adopt green strategies, including green human resource management practices (Lewandowski, 2016). A review of previous research has shown that these practices, such as green recruitment and hiring, green training and development, and green incentives, have had an impact on the sustainable performance of organizations (Ziad et al., 2018).

Human resource managers can improve employees' awareness of environmental issues by choosing appropriate training programs (Bazrkar, Moshiripour, 2021). The study shows that the use of green human resource management practices will increase organizational commitment, strengthen environmentally friendly behaviors among employees, improve the organization's environmental performance, and will ultimately lead to sustainable performance for companies (Mousa, Othman, 2020). Accordingly, the third research hypothesis is proposed as follows:

H3: The implementation of green human resource management practices has a significant impact upon sustainable organizational performance.

Mediating the role of green human resource management practices

Today, new technologies and the innovations created using these technologies are integral sources of sustainable green developments (Yahya et al., 2014). Advances in technologies have led to improved environmental performance and sustainable green practices, including green human resource management (Wang et al., 2021).

Organizational sustainability and favorable environmental management are increasing day by day thanks to new technologies (Jaramillo et al., 2018). A review of studies shows that there is a strong positive relationship between technological factors and green human resource management practices, which helps companies achieve sustainable performance (Alraja et al., 2022). Accordingly, the fourth research hypothesis is proposed as follows:

H4: New technologies have a significant impact upon sustainable organizational performance through green human resource management practices.

A conceptual model of the study is presented in Figure 1.

Methodology

This current study was carried out using a descriptive survey. The statistical population of this study consists of senior and middle managers of 21 companies active in Iran's automotive industry with at least five years of work experience. These companies include: Iran Khodro, Saipa, Bahman Khodro, Kerman Motor, Negin Khodro, Azim Khodro, Shahab Khodro, Ocean Motor, Atlas Khodro, Irtoya, Arin Motor Poya, Media Motors, Madireh Khodro, Persia Khodro, Setare Iran, Jileran Khodro, Ramek Khodro, Diyar Khodro, Aframotor, Golrang Motor Family, and Alfa Motor. The initial estimate showed that the number of members of the statistical community is equal to 520 people.

Due the large statistical population, sampling was done using a simple random sampling method. The number of sample members based on Cochran's formula was 221 people at a confidence level of 95%. The main condition for the selection of the respondents was that they have at least five years of work experience. Of the sample of 221, 77 respondents had at least 10 years of work experience and 147 held a Master's degree. Based on this, it can be said that the respondents are suitable and sufficiently representative of the industry under study.

After identifying these people, a questionnaire was distributed among them electronically, and six weeks from the delivery of the questionnaire, 221 completed questionnaires were collected. In addition to the variables under investigation in this study, the questionnaire collected information about gender, education level, and amount of relevant work experience. The results of the analysis of collected data about the demographic characteristics are presented in Table 1.

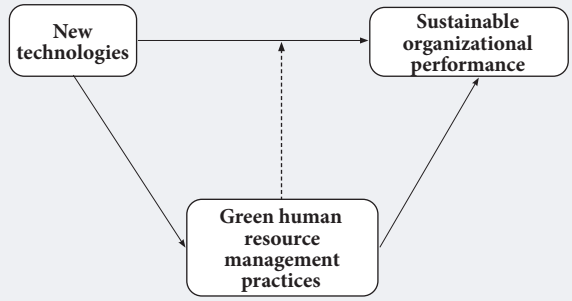
Data collection

In this research, library resources were used to examine the history of the objects of study and a questionnaire was used to collect data on the relevant companies. A five-point Likert scale was used in the questionnaire with the following range: very high, high, medium, low and very low.

It is worth mentioning that the current research questionnaire was compiled based on research literature and other questionnaires related to new technologies, green human resource management practices, and sustainable performance. Six items used were used in the questionnaire as a proxy for sustainable organization performance in line with Alraja et al. (2022): reducing paper consumption, reducing waste, reducing gasoline consumption, creating partnerships with green organizations and suppliers, improving compliance with environmental standards, and the use of environmentally friendly materials. From the nine items used in the research of (Alraja et al., 2022; Chege, Wang, 2020), new technologies were assessed with questions about: the production of quality products with the help of new technologies, providing services using new technologies, using new technologies in marketing new products, increasing the company's market share using new technologies, using technology to customize products, and integrating existing work with web-based services. To measure the variable of green human resources management practices, six components identified in Guerci et al. (2016) were considered: selecting employees based on environmental criteria, attracting employees through environmental commitment, providing environmental training to employees, green performance management, green job descriptions, and employee participation in environmental initiatives. The validity of the questionnaire items was checked.

In an initial validity check, the questionnaire was given to 20 experts and they were asked to give their opinion on each question regarding the evaluation of the related goal. Minor modifications of the question-

Figure 1. **Research Conceptual Model**



Source: authors.

naire were approved. In addition, to more thoroughly check the validity of the questionnaire, the content validity ratio was also assessed. Given that 20 experts evaluated the survey, the acceptable value of the content validity ratio was determined to be 0.42. Twenty-one items were assessed and demonstrated values higher than the standard of 0.42. As a result, it can be said that the content validity of the questionnaire items is confirmed. The reliability of the questionnaire was measured using SPSS software version 23 and Cronbach's alpha method. The obtained results showed that the value of this coefficient for each of the research constructs is as follows: new technologies: 0.88, sustainable organizational performance: 0.81, and green human resource management practices: 0.87. Considering that these values are higher than the minimum value of 0.7, it can be concluded that the study's questionnaire has high reliability.

Table 1. **Sample Characteristics**

Classification	Frequency (people)	Composition ratio (%)
Gender		
Male	169	0.76
Female	52	0.24
Level of Education		
Bachelor	48	0.22
Masters	147	0.67
Ph.D.	26	0.12
Work Experience		
5 to 10 years	38	0.17
10 to 15 years	77	0.35
15 to 20 years	67	0.30
Over 20 years	39	0.18
Total number of respondents	221	100%

Source: authors.

Data analysis method

The main method for conducting the research was structural equation modeling and each of the research hypotheses was tested through path analysis. This uses both SPSS 22 and Smart PLS.3 software.

The results of some studies demonstrate that the PLS method is the best for estimating models where only structures serve as common factors. On the other hand, CB-SEM can be used to estimate models with hybrid structures (Marin-Garcia, Alfalla-Luque, 2019). Therefore, it is necessary to choose the most desirable method, whether it be PLS- or other methods such as CBS-SEM.

Since there was not much transparency in the present study regarding the nature of the structures, the PLS method was chosen. Of course, other reasons such as the complexity of the research model, predicting the effects with models that arise from the data instead of previous theories, and also estimating the relative importance of indicators and not simply structures also informed the choice of PLS. PLS allows weights based on correlations or regressions to be estimated, or corrected with PLSc (consistent PLS). The correlations of those constructs are specified as common factors to make the results consistent with that measurement model (Dijkstra, Henseler, 2015). This provides versatility when analyzing mixed models where the constructs are composites.

Descriptive Statistics Results

In the descriptive statistics section, each of the research constructs were analyzed by mean, standard deviation, skewness, and kurtosis indicators and based on a five-point Likert scale, the results of this study are shown in Table 2.

According to the results obtained from the values of the skewness and kurtosis indices, considering that these values are in the range of -2 to +2, it can be concluded that the collected data related to the studied components follow the normal distribution.

Results of inferential statistics

KMO Test

In the present study, before evaluating the structural equation modeling method using Smart PLS software, KMO and Bartlett tests were conducted to ensure a sufficient sample size. In performing factor analysis, one must first make sure that the available data can be used for analysis or not. This test is used for this purpose. If the value obtained for the KMO index is higher than 0.7 and close to one, the desired data (sample size) is suitable for factor analysis. In addition, if the significance level of Bartlett test is less than 5%, it indicates that factor analysis is appropri-

Table 2. **Statistical Description of Research Variables**

Component	Mean	Standard deviation	Skewness	Kurtosis
New technologies	4.75	0.397	–1.118	0.367
Sustainable organizational performance	4.58	0.484	–1.756	0.462
Green human resource management practices	4.23	0.502	–1.489	0.398

Source: authors.

Table 3. **KMO and Bartlett Test Results**

KMO Index	0.968
Bartlett test	8621.1397
df	220
Significance level	0.000

Source: authors.

ate to identify the factor model. The results of this test are presented in Table 3.

Structural Equation Modeling Results

The results of fitting the measurement model. According to the PLS-SEM algorithm, in the first stage, the measurement models were evaluated. The results of evaluation of reliability criteria (Cronbach's alpha and combined reliability), Convergent Validity, and the results of measuring the factor loads of research variables are shown in Tables 4 and 5. The values obtained for factor loads are higher than 0.5, Cronbach's alpha is higher than 0.7, and the combined reliability is higher than the set criterion, i.e., 0.7. In addition, the result obtained from the convergent validity criterion shows that the convergent validity values of all research structures are higher than the standard value of 0.5. The Heterotrait-Monotrait Ratio (HTMT) index was used to assess the divergent validity of the research structures. Hensler et al. (2016) introduced this index. The HTMT index replaced the old Fornell-Larker method. The HTMT standard limit is 0.85 to 0.9. Divergent validity is acceptable if the values of this criterion are less than 0.9. The test results of this index are presented in Table 6.

The results of factor loading and Cronbach's alpha coefficients as well as software outputs show that the values of each of the above criteria of the latent variables are above the quorum and threshold. The suitability of the convergent reliability and validity of the research model can be confirmed.

The results of fitness of the model. Upon fitting the measurement models, we shall fit the structural model (conceptual model) and subsequently test the research hypotheses. P-value, t-value, R2, and Q2 indices were utilized to fit the research conceptual model.

R^2 is an essential criterion for checking the fit of the research conceptual model. Three values are introduced as the acceptable value, namely 0.19, 0.33, and 0.67, which show the weak, medium, and strong criteria of the R^2 criterion, respectively. The results of this test are presented in Figure 2.

The results obtained from the test of this index showed that the structural model of the research has an acceptable fit.

T-value: In the partial least squares method, various indices are applied to evaluate the structural model; one of the most important indices is the T-value index. If the value of the t-value is greater than 1.96, at the 5% error level, it indicates the correctness of the relationship between the studied structures. The results are presented in Figure 3.

P-Value is for measuring the appropriateness of the model to evaluate whether the test results are random or not. However, the value merely determines a cut-off point based on which we claim that the findings are statistically significant. Regarding the acceptable level of this index, many researchers state that the threshold should be less than 0.05. The results of the index are presented in Figure 4.

Q^2: The index was first introduced by Stone (1974) and determines the predictive power of the model. However, Hensler et al. (2016) introduced three values of 0.02, 0.15, and 0.35, which indicate the weak, medium, and strong predictive power of the structure, respectively. The results are reported in Table 7.

The results of Table 7 show that the fit of the model is good and has good predictive power.

Hypothesis test results

Based on the research data analysis algorithm using the partial least squares method, at this stage, according to the results obtained from the t-value, P-value, and path coefficients, the research hypotheses were tested. If the value of the significant coefficient in the t-value index for each path is more than 1.96 and the P-value is less than 0.05, the corresponding path is confirmed at a 95% confidence level and the related hypothesis is confirmed. The results are reported in Table 8.

Discussion and Conclusion

Sustainable performance is the main challenge facing organizations in the 21st century (Zhao et al., 2021). On the other hand, the use of new technologies in various fields, including digitalization, has given rise to a very dynamic environment with many changes that make it possible for organizations to achieve continuous improvement (Vidmar et al., 2021). In a situation where digitalization has affected all sectors

Table 4. **Model Fitting Results: Factor Loadings**

Item	Factor loading
New technologies	
Our company invested in R&D to produce quality products	0.637
Our company used new technology in the production process	0.735
Our company used new methods/procedures in production and service delivery	0.616
Our company used new technology in marketing new products	0.655
Our company market share has increased due to the use of the new technology in marketing	0.729
Using technology, we pay only for what we use	0.837
Customization using technology is easy	0.887
When we use technology, we find it difficult to integrate the existing work with the web based services	0.821
When we perform many tasks together, using technology, it takes up too much of my time	0.759
Sustainable organizational performance	
Our company adhering to reduce paper use	0.805
Our company adhering to reduce hazardous waste/scrap	0.813
Our company adhering to reduce in consumption of gasoline/fuel	0.832
Our company adhering to build partnership with green organizations and suppliers	0.680
Our company adhering to improve of environmental compliance	0.713
Our company adhering to use environmental friendly material	0.641
Green human resource management practices	
Our company adhering to select employees based on environmental criteria	0.768
Our company adhering to attract employees through environmental commitment	0.553
Our company adhering to provide environmental training to the employees	0.811
Our company adhering to provide environmental training to the managers	0.881
Job description in our company includes environmental responsibilities	0.669
Our company adhering to involve its employees in environmental issues	0.709

Source: authors.

Table 5. **Model Fitting Results - Cronbach's Alpha, Combined Reliability, Convergent Validity**

Component	Cronbach's Alpha	Combined Reliability	Convergent Validity
New technologies	0.908	0.918	0.585
Sustainable organizational performance	0.745	0.827	0.545
Green human resource management practices	0.766	0.841	0.569

Source: authors.

Table 6. **Discriminant Validity**

	I	II	III
I			
II	0.640		
III	0.581	0.873	

Note: I — New technologies; II — Sustainable organizational performance; III — Green human resource management practices.

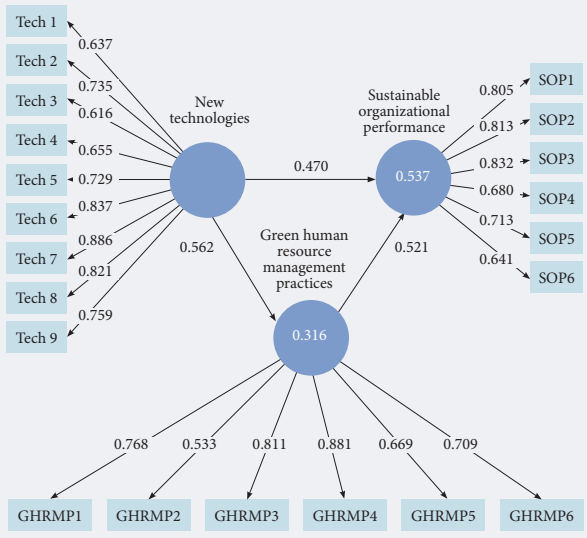
Source: authors.

of society, organizations in various industries, including the automotive industry, have the opportunity to use new digital technologies such as the Internet of Things and artificial intelligence to put their companies on a sustainable path (Ziyadin et al., 2019).

The movement toward sustainability and the use of new technologies help encourage dynamism and bring companies into the new era. The role of human resources is very important and decisive (Martins et al., 2021). Studies show that one of the most important reasons for the failure of human resource management in the field of sustainability is the lack of free practices. Therefore, human resource specialists and managers can make a great contribution to the sustainability of the organization by implementing green human resource management practices, including hiring and training environmentally minded employees (Hossain, 2021).

The purpose of the current study was to investigate the role of new technologies and the implementation of green human resource management practices in the achievement of sustainable organizational performance by Iranian automotive companies. The results of the hypotheses test showed that the use of new

Figure 2. **R^2 Values**



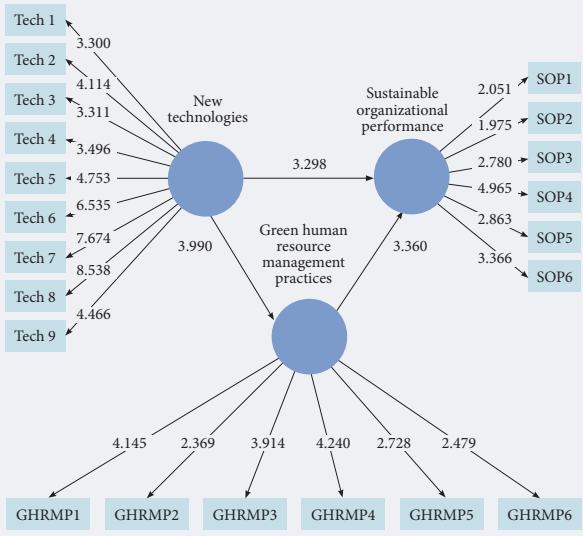
Source: authors.

technologies in the field of technology by the studied companies will be very effective in achieving the sustainable organizational performance and the implementation of green human resource management practices can be effective.

Analysis of hypothesis test results

The results of the first hypothesis test showed that new technologies directly predict and explain 0.470 of the changes related to sustainable organizational performance. The investigation shows that the obtained results were consistent with the research results of (Al-

Figure **3. T-Values**



Source: authors.

raja et al., 2022; Di Vaio, Varriale, 2020). This result further supports the idea that automobile companies in Iran can move in the direction of development and sustainable organizational performance by benefiting from new technologies such as the Internet of Things and blockchain in various sectors, including along companies' supply chains. Today, when many companies, including car manufacturers, are facing the challenge of destroying the environment through production technologies, Iranian car companies can reduce the harmful effects by taking measures such as optimizing car engines and using suitable fuels.

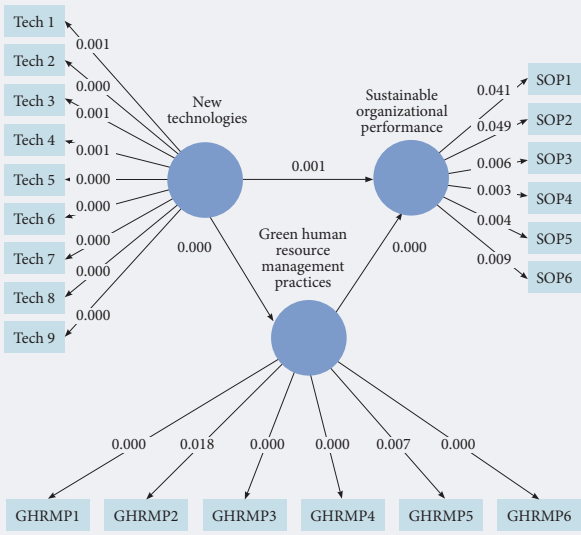
The results of second hypothesis test showed that new technologies directly predict 0.562 of the changes related to the implementation of green human resource management practices. The review shows that the obtained results were consistent with the research results of Zhao et al. (2021) and Ojo et al. (2022). This result supports the idea that automobile companies in Iran can move toward the effective implementation of green human resource management practices by benefiting from new technologies such as artificial intelligence, learning management systems (LMS), and cloud computing.

The implementation of green human resource management practices through the existing infrastructure in modern technologies can bring benefits such as facilitating trust in the organization's management, improving safety, and, as a result a better organizational atmosphere and fewer accidents at the workplace, preventing more pollution and saving costs. The organization should improve the environmental performance of the organization and increase the sale of green products to customers who want to buy green products from Iranian automobile companies.

The results of third hypothesis test showed that the implementation of green human resource management practices has a positive effect on the sustainable organizational performance of the studied companies, and green human resource management practices directly predict 0.521 of the changes related to sustainable organizational performance. The investigation shows that the obtained results were consistent with the research results of (Zaid et al., 2018; Mousa, Othman, 2020; Bazrkar, Moshiripour, 2021).

This result further supports the idea that automobile companies in Iran can strengthen their employees' environmentally friendly behavior by applying green human resource management practices, including green recruitment and selection, green training, and green performance management. Achieving sustainable organizational performance is based on the awareness of human resources regarding their position in the organization and the position of other physical and non-physical resources in the organization. They must know this demands sustainable performance from all parts of the organization and be against excessive consumption and the waste of resources, and they must call attention to environmen-

Figure 4. P-Values



Source: authors.

tal issues. One of the most important approaches in strategies related to the improvement of sustainable organizational performance among Iranian small-scale manufacturing companies is the wise use of resources. As a result, the managers of these companies can step onto the path of sustainability by strengthening this thinking and creating a green corporate culture.

The results of the fourth hypothesis test showed that new technologies indirectly predict 0.295 of the changes related to sustainable performance, and in this, the mediating role of green human resource management practices is confirmed. The investigation shows that the obtained results are consistent with the research results of Wang et al. (2021) and Alraja et al. (2022). This result shows that automobile companies in Iran can invest in modern technologies and green human resource management practices to produce products with less environmental pollution, strengthen knowledge and increase awareness and improve employees' attitudes toward promoting environmentally friendly behaviors. The results of this study provide clear evidence that the use of new technologies is one of the vital inputs that provide better conditions for companies active in the automotive industry to achieve sustainable performance.

Examining the results of path coefficients shows that there is a strong relationship between new technologies and green human resource management practices. Active companies can use this strong relationship to achieve sustainable. The implementation of methods such as selection and green hiring and green training in the context of new technologies will bring many benefits such as reducing costs and strengthening green corporateculture.

It is very important to understand that the managers of automobile companies in Iran should keep in mind that when the company's performance is developed and improved through the provision of new technology infrastructure as well as the application of green human resource management practices, the company's market share should increase. In addition, the delays caused by a lack of trust from customers will be reduced, and as a result, more opportunities will be created for these companies on domestic and foreign markets. In addition, new technologies can reduce energy consumption, which cuts production costs and imcreases profitability.

Practical and Academic Implications

The results of this study will motivate the managers of companyies active in Iran's automotive industry and the policymakers to focus on one of the most important internal factors, technology, instead of external factors alone. In addition, encourage an environmentally friendly culture through the implementation of green human resource management practices, in which various internal and external stakeholders adopt more environmental policies and regulations.

Company managers can use the findings of this study to actively develop sustainable performance strategies in response to environmental constraints. Accordingly, managers and decision makers of this industry are advised to take actions such as: 1) Using new technologies such as artificial intelligence, Internet of Things, and cloud computing in all departments of the organization, including the company's production department; 2) Benefiting from new technologies such as an electronic learning system to train employees

Table 7. **Q^2 Results**

	SSO	SSE	Q^2
New technologies	270.000	270.000	
Sustainable organizational performance	180.000	155.732	0.132
Green human resource management practices	180.000	157.332	0.126

Note: $Q^2=(1-SSE/SSO)$
Source: authors.

Table 8. **Hypothesis Test Results**

Hypotheses	β	T-Value	P- Value	Result
Tech → SP	0.470	3.298	0.001	Support
Tech → GHRMP	0.562	3.990	0.000	Support
GHRMP → SP	0.521	3.360	0.000	Support
Tech → GHRMP → SP	0.295	2.365	0.006	Support

Source: authors.

in green management; 3) Planning and implementing green human resource management practices, including green hiring, green training, green employee performance management, and green reward management in order to strengthen environmentally friendly behavior among the company's employees.

Limitations and Future Research

This study has limitations that may require more research in the future. First, the model developed in this study is based on the direct relationship between new technologies and sustainable organizational performance and an indirect relationship emphasizing the mediating role of green human resource management practices. Therefore, it is suggested that researchers use other effective components such as organizational culture and employee satisfaction in future research. Secondly, since the current study was exploratory, the findings of the research are limited to the size of the statistical population under study, i.e., companies active in the Iranian automotive industry. If the sample size and country under consideration change, the results may too. It is therefore suggested that this analysis be implemented using data from other industries for comparative purposes. Thirdly, the existence of different opinions regarding the questionnaire items among the members of the statistical sample can affect the results of the research to some extent, therefore, it is suggested that future research identifies other factors and control variables.

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