Developing Supply Chain Integration Framework Towards Sustainability Performance: The Role of Green Supply Chain Management Practices

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ABSTRACT

This conceptual paper aims to investigate the relationship between supply chain integration (SCI), green supply chain management (GSCM) practices, and sustainability performance among small and medium-sized enterprises (SMEs) in Malaysia. Despite the significant contribution of SMEs to national economic development, their sustainability performance remains limited, particularly in the post-pandemic recovery era and amid increasing environmental concerns. Drawing upon the Resource-Based View (RBV) and the Natural Resource-Based View (NRBV) theories, this study proposes a conceptual framework where GSCM practices serve as a mediating mechanism linking SCI dimensions which are supplier integration, internal integration, customer integration, and information integration with economic, environmental, and social performance outcomes. A review of existing literature reveals a research gap in understanding the strategic role of GSCM practices within integrated supply chains in Malaysian SMEs. This paper contributes to the theoretical discourse by integrating SCI and GSCM within a sustainability performance framework and provides practical implications for SME managers and policymakers aiming to enhance competitiveness and environmental responsibility.

Keywords: Small Medium Enterprise, Supply Chain Integration, Green Supply Chain Management Practices, Sustainability Performance

INTRODUCTION

Small and Medium Enterprises (SMEs) are vital contributors to national income, global economic development, and job creation. Numerous studies have highlighted the significance of SMEs to global economies, emphasizing their role in fostering innovation, driving exports, and strengthening industrial development (OECD, 2023; World Bank, 2022). In terms of export contributions, SMEs significantly boost international trade, making them essential for economic resilience and competitiveness. Recognizing this, many governments have introduced targeted programs and policies to support SME growth and performance (UNCTAD, 2023). Globally, SMEs account for approximately 60% of employment and up to 70% of GDP in low-income countries. For middle-income countries, they contribute over 70% to GDP and about 95% to total employment, while in high-income countries, SMEs provide over 65% of employment and contribute 55% to GDP (World Bank, 2022). However, the post-COVID-19 economic recovery has posed severe challenges for SMEs. In Malaysia, a 2021 survey by the SME Association reported that 20% of 1,713 SMEs surveyed were considering permanent closing due to prolonged financial problem (SME Association of Malaysia, 2021). Moreover, SME growth declined by -5.6% in 2021, falling below Malaysia's overall GDP growth (DOSM, 2022). Beyond economic challenges, SMEs also contribute significantly to environmental degradation, being responsible for nearly 70% of global industrial pollution, making them critical targets for sustainability interventions (Shashi et al., 2019; Ramdan et al., 2022). Therefore, SMEs must focus not only on financial but also on environmental performance across their supply

chains. Integrating sustainable practices such as Green Supply Chain Management (GSCM) is essential. GSCM practices will help SMEs collaborate effectively across supply chains, manage upstream and downstream activities strategically, reduce emissions and waste, and enhance performance by delivering greater value to customers (Ali et al., 2021; UN Global Compact Malaysia & Brunei, 2025).

Although supply chain integration research had been conducted in many countries such as India (Shashi et al., 2018), China (Zhang et al., 2020; Flynn et al., 2010), United Kingdom (Papadopoulos et al., 2021; Vanpoucke et al., 2016), and United States (Kim et al., 2018; Kannan & Tan, 2010), nevertheless there is still limited studies on supply chain integration in Malaysian SMEs. In addition, based on available literatures, several studies conducted a systematic literature review analysis in explaining supply chain integration such as by (Croom et al., 2022; Fabbe-Costes & Jahre, 2008; Ataseven & Nair, 2017). Although much research has been done on supply chain integration, however there is still limited research conducted on the effect of supply chain integration towards sustainability performance specifically in Malaysian SMEs context. On the other hand, previous studies such as Zhu et al. (2017), Ibrahim (2020), Ibrahim et al. (2021), Eltayeb and Zailani (2014), Green et al. (2012), Tan et al. (2016) on their quantitative studies had investigating the implementation of green supply chain management practices on their effect to improve economic performance and environmental performance. However, there is still less research focus on GSCM practices as a strategy towards sustainability performance. Thus, this study attempts to fill up this existing gap by examining the GSCM practices among SMEs in Malaysia to achieve sustainability performance in terms of economic, environmental and social performance.

Accordingly, the purpose of the present study is to investigate the supply chain integration on sustainability performance. Previous studies have supported the importance of GSCM in driving sustainability outcomes, especially when mediated through robust supply chain relationships (Sarkis et al., 2020; Agyabeng-Mensah et al., 2022). Previous study by Kumar et al. (2017) examined four dimension of supply chain integration namely supplier integration, internal integration, customer integration, and information integration in improving performance. Similarly, Delic et al. (2019) highlighted the need for further exploration into mediating mechanisms within SCI-performance links. Thus, the originality of this study lies in its investigation of GSCM practices as the mediator while this study responds to the demand by Kumar et al. (2017) and Delic et al. (2019) for further research to introduce the role of GSCM practices as a strategy specifically as a mediating role in sustainable supply chains, particularly in emerging economies like Malaysia.

LITERATURE REVIEW

Supply chain integration

The increasing degree of rivalry among organisations internationally has resulted in a change to do more than simply strategy design and implementation, but also to seek partnerships with other firms that would lead to a competitive edge in the market place (Huang et al., 2014). The increasing global competition among organizations has prompted a shift beyond traditional strategy formulation and implementation towards fostering strategic partnerships and collaborations that create sustainable competitive advantages (Sarkis et al., 2020; Agyabeng-Mensah et al., 2022). Manufacturing companies have spent years focusing on building strategies that will bring about the appropriate amount of transformation and operational effectiveness. Firms have understood, however, that developing strategies and integrating internal operations, suppliers, and consumers in a commercial relationship is the best way to get a competitive edge (Frohlich and Westbrook, 2001; Dubey et al., 2019). This provided the foundation for supply chain integration (SCI) as a method used by companies seeking to improve their performance by fostering stronger linkages among supply chain links (Smart, 2008). Organizations shifted from their earlier vertical integration tactics to become an association of enterprises that collaborate to acquire, manufacture, and sell products and services to their consumers. SCI is focused with the synergy that occurs between a firm's internal processes and external activities within its supply chain, which leads to organisational performance (Chen et al., 2009). Recent empirical studies affirm that firms that achieve higher levels of integration across their supply chains are more resilient, adaptive, and competitive in today’s volatile business environments (Kazancoglu et al., 2023; Dubey et al., 2021). In the context of this study, supply chain integration consists of four dimensions which are supplier integration, internal integration, customer integration, and information integration.

Supplier integration

Supplier integration refers to the active involvement of suppliers in a firm's key decision-making processes, including collaborative planning, forecasting, and inventory management, where real-time data on demand, production schedules, and stock levels are shared to create mutual value (Zhao et al., 2021; Li et al., 2022). This form of integration enables firms to establish long-term, trust-based partnerships that lead to strategic advantages such as reduced lead times, enhanced product innovation, improved service quality, and overall supply chain responsiveness (Lii & Kuo, 2016; Dubey et al., 2021). According to Thun (2010), effective supplier integration results in synchronized operations between a focal firm and its key suppliers, driving improvements in efficiency and performance. Similarly, Furlan et al. (2006) emphasized the importance of collaboration between customers and suppliers, advocating for a joint focus on long-term benefits rather than transactional gains. The customer-supplier integration process is most beneficial when it emphasizes relationship quality, trust, and mutual strategic alignment (He et al., 2023). Recent studies also highlight the importance of digital technologies, such as cloud-based platforms and real-time analytics, in facilitating information sharing and co-innovation between suppliers and buyers (Zhou et al., 2023). Furthermore, the integration process plays a critical role in sustainability-oriented supply chains, where suppliers and focal firms co-develop environmentally friendly practices and reduce waste across the supply network (Agyabeng-Mensah et al., 2022). Ultimately, the primary motivation behind supplier integration should be enhancing customer value and responsiveness, thereby driving competitive advantage in increasingly dynamic markets (Kim & Chai, 2017; Kazancoglu et al., 2023).

Empirical evidence suggests a significant and positive relationship between supplier integration and sustainable performance, particularly in the dimensions of economic, environmental, and social outcomes. For instance, Agyabeng-Mensah et al. (2022) found that manufacturing SMEs that engaged in closer collaboration with suppliers achieved higher levels of environmental performance through improved waste management, reduced emissions, and greater compliance with environmental regulations. Similarly, findings by Dubey et al. (2019) revealed that supplier integration contributes to economic sustainability by enabling cost reductions, shorter lead times, and improved product quality through synchronized planning and real-time information sharing. In the context of social sustainability, supplier collaboration has been linked to better labor practices and increased transparency in sourcing (Zhou et al., 2023). Moreover, Li et al. (2022) confirmed that supplier integration enhances firm resilience and sustainable performance by fostering long-term strategic alignment and trust, which are critical in managing disruptions and meeting stakeholder expectations. Hence, the hypothesis is proposed:

H1: Supplier integration has significant effect on sustainability performance

Internal integration

Internal integration refers to the extent to which various departments and functional units within a firm collaborate and coordinate their operations, information sharing, and strategic decision-making to achieve common goals. It is a crucial dimension of supply chain integration that ensures alignment across procurement, production, logistics, marketing, and sustainability functions (Flynn et al., 2010; Wong et al., 2011). Previous studies have highlighted that effective internal integration enhances a firm's capacity to adopt sustainable practices by enabling seamless communication, real-time information exchange, and cross-functional collaboration (Alzoubi & Yanamandra, 2020). For example, Zaid et al. (2021) found that strong internal integration significantly improves a firm's ability to implement green initiatives, reduce operational waste, and ensure compliance with environmental regulations. This is particularly relevant for SMEs, which often face resource constraints and benefit from internal alignment to execute sustainability strategies efficiently (Agyabeng-Mensah et al., 2022).

Moreover, empirical evidence from Dubey et al. (2020) demonstrated that internal integration positively influences both environmental and economic performance by promoting a culture of shared responsibility and sustainability-oriented innovation. When internal departments work in harmony, firms can better monitor carbon footprints, manage resources efficiently, and respond proactively to sustainability challenges. Similarly, He et al. (2023) emphasized that internal integration enhances employee engagement in sustainability, improves stakeholder trust, and fosters social sustainability outcomes. In the context of Malaysian SMEs, internal integration has been recognized as a key enabler for achieving sustainability goals due to the increasing pressures

from regulatory frameworks and global value chains (Zamri et al., 2023). Accordingly, the following hypothesis is suggested:

H2: Internal integration has significant effect on sustainability performance

Customer integration

Customer integration refers to the extent to which a firm collaborates with its customers to align product development, demand forecasting, information exchange, and sustainability goals. It involves continuous interaction and communication to better understand customer needs, jointly develop solutions, and share responsibility for environmental and social impacts (Flynn et al., 2010; Vachon & Klassen, 2008). Meanwhile, **customer integration** in the supply chain allows enterprises to have a deeper understanding of the requirements and special demands of their customers, allowing them to serve them better. Integrating customers into a supply chain focuses on gathering information from consumers such as their purchasing habits, product preferences, and ability to acquire items, which is then utilised to make better decisions throughout the production process or sales to customers (Lotfi et al., 2013). When businesses interact with their consumers, they are able to respond quickly and efficiently to their customers, boosting order fulfilment and visibility.

In the context of sustainability, customer integration plays a critical role in enhancing sustainable performance, which encompasses economic, environmental, and social outcomes. As customer expectations shift toward environmentally friendly and ethically produced products, businesses are increasingly required to co-create value with customers through sustainable innovation and responsible supply chain practices (Yousaf et al., 2022; Yu et al., 2020). Empirical studies show a positive correlation between customer integration and sustainable performance. For example, Dubey et al. (2020) found that customer collaboration promotes eco-design, product responsibility, and environmental transparency, resulting in improved environmental performance and competitive advantage. Similarly, Agyabeng-Mensah et al. (2022) reported that manufacturing SMEs engaging in customer-focused green initiatives experience enhanced economic and environmental outcomes. They emphasize that listening to customer sustainability preferences helps firms optimize processes, reduce waste, and increase customer satisfaction and loyalty. Furthermore, Wong et al. (2023) extended this perspective by demonstrating that Malaysian SMEs that integrate customers into their sustainability strategies tend to outperform their peers in terms of green product development and brand reputation. Based on the above, the hypothesis is formulated as follows:

H3: Customer integration has significant effect on sustainability performance

Information integration

For companies aiming to connect with their consumers and suppliers, **information integration** has been discovered to be essential (Amue et al., 2014). However, information integration is not limited to technological efficiency and applicability. It necessitates the inputs and role playing of people, as well as technical systems, to generate, sort, process, and disseminate information to the appropriate location at the appropriate time for effective decision making (Sadler, 2008). Data may be collected in real time when information is exchanged across the supply chain, as better communications with other supply chain members are established, leading to enhanced customer service and demand forecasts (Amue et al., 2014). Information integration can be also refers to the seamless sharing, exchange, and coordination of real-time, accurate, and relevant information across departments within an organization and with supply chain partners. It is a key dimension of supply chain integration and plays a vital role in enabling firms to make informed, timely, and strategic decisions to support sustainability initiatives (Flynn et al., 2010; Yu et al., 2021).

In the context of sustainable performance, which includes environmental, economic, and social dimensions, information integration facilitates the coordination of sustainability efforts by improving visibility, traceability, and responsiveness throughout the supply chain (Agyabeng-Mensah et al., 2022). When firms are able to share environmental data, resource usage metrics, and compliance information with suppliers and customers, they are more capable of identifying inefficiencies, reducing waste, and complying with environmental regulations (Dubey et al., 2020). Empirical studies have shown that information integration is a strong enabler of green

supply chain management (GSCM) and sustainable performance. For example, Kamble et al. (2020) found that real-time information sharing significantly enhances green innovation and improves both operational and environmental performance in Indian manufacturing firms. Similarly, Zhu et al. (2019) demonstrated that firms with high levels of information integration were better able to monitor and manage carbon emissions and improve stakeholder engagement, thereby boosting sustainability outcomes.

In the Malaysian context, Zamri et al. (2023) emphasized that SMEs with strong internal and external information systems are more successful in adopting sustainable practices and aligning with environmental policies. Information integration helps mitigate uncertainty, enhances transparency, and fosters trust among supply chain members, which is critical for long-term sustainability performance (Wong et al., 2023). Moreover, Kusi-Sarpong et al. (2021) argue that digital transformation and technological capability, which enhance information integration, are essential for supporting circular economy initiatives and reducing environmental footprints. Thus, the hypothesis is proposed:

H4: Information integration has significant effect on sustainability performance

Green supply chain management (GSCM) practices

People began to consider the notion of environmental quality in the 1990s. Beamon (1999) changed the traditional supply chain into a green supply chain in order to decrease waste and pollution while minimising resource utilisation. The green supply chain was created by including recycling, remanufacturing, and reusing operations into the standard supply chain design. In the 2000s, academics were interested in the green supply chain idea and sought to understand how to implement it in a practical manner. As a result, academics begin to investigate ways to manage the green supply chain and promote the notion of green supply chain management to worldwide practise (Zhu et al., 2019; Baojuan, 2008; Srivastava, 2007; Zhu & Sarkis, 2004; Kogg, 2003; Zsidisin & Siferd, 2001). Green supply chain management, according to Hajikhani et al. (2012) and Boujuan (2008), include activities such as green designing, green production, green packaging, green marketing, and green recycling. Consumers nowadays want items that solve the problem of trash disposal (Dowie, 1994). Green supply chain management literature has expanded to include green supply chain management methods. Green supply chain management, according to Diabat and Govindan (2011), is currently regarded a green approach that is consistent in sustaining environmental performance at all management levels and across the supply chain. The 'green practise,' according to Groznik and Erjavec (2012), is linked to the green economy, and it attempts to improve three primary things: enhancing social fairness, lowering environmental risk, and improving the ecological problem. According to Field and Sroufe (2007), the business management team is identifying green supply chain management methods to satisfy the rising demand for environmentally friendly products in order to enhance environmental performance and save costs.

In recent years, researchers have increasingly focused on GSCM as a mediating variable that enhances the relationship between supply chain integration (SCI) dimensions such as supplier, customer, internal, and information integration towards sustainable performance, which encompasses economic, environmental, and social performance. This mediating role is critical as it explains how and why certain capabilities lead to sustainability outcomes. Table 1 shows the empirical studies which support the mediating role of GSCM:

Table 1: GSCM as a role of mediation

Author(s)/year	Description	Journal
Agyabeng-Mensah et al. (2022)	This study confirmed that GSCM significantly mediates the relationship between external integration and sustainable performance among manufacturing SMEs in emerging economies. Firms that incorporate green practices into their supply chains benefit more from collaboration and integration.	Journal of Manufacturing Technology Management
Dubey et al. (2020)	This study showed that supply chain collaboration positively affects sustainable performance, with GSCM practices mediating this effect. Their study highlights how shared environmental goals	International Journal of Production Economics

Author(s)/year	Description	Journal
	and practices enable firms to translate operational integration into tangible sustainability gains.	
Eltayeb & Zailani (2014)	This study emphasized the relevance of GSCM as a bridge between regulatory pressures and organizational sustainability in Malaysia. They identified that GSCM helps firms comply with environmental laws while also gaining competitive advantage.	Operations and Supply Chain Management: An International Journal
Ibrahim et al (2023)	This conceptual study highlighted the GSCM practices as the mediating variable on the relationship of supply risks and organizational performance.	Information Management and Business Review
Ibrahim et al (2021)	This study focusing on the role of GSCM practices as a strategy to improve both economic and environmental performance in mitigating supply chain risks. In this study, GSCM practices has been identified as the mediating role.	Journal of Academic Research in Business and Social Sciences

Based on several empirical evidence, the hypothesis is proposed:

H5: Green supply chain management (GSCM) practices mediates the relationship on supply chain integration and sustainability performane.

Sustainability performance

There is no clear and agreed-upon definition of sustainability performance since it is frequently limited to environmental consequences rather than social performance (Henri and Journeault, 2010). The performance of a corporation in terms of economic, environmental, and social issues is referred to as sustainability performance. Sustainability performance is increasingly viewed as a multidimensional construct encompassing economic, environmental, and social outcomes, commonly referred to as the triple bottom line (Elkington, 1997). This holistic perspective emphasizes not only profitability but also environmental stewardship and social responsibility. Organizations that embrace sustainability strategies often experience improved operational efficiency, brand reputation, and stakeholder trust (Dubey et al., 2021). Recent studies highlight that sustainability performance is significantly influenced by internal capabilities, stakeholder collaboration, and supply chain practices (Agyabeng-Mensah et al., 2022; Kusi-Sarpong et al., 2021). Various approaches are used to examine and monitor the effects of these factors. Much of the research on business sustainability performance has concentrated on links, such as those between environmental, social, and economic performance (Artiach et al., 2010). According to (Baumgartner 2008), a systemic corporate sustainability performance evaluation that demonstrates the interconnections between the system (business, society, and environment) is necessary to determine if corporate operations have a positive impact and contribute to SD principles.

Proposed conceptual framework

The resource- based view (RBV) and natural resource-based view (NRBV) theory are utilized as a guiding principle to investigate and explain the relationship between supply chain integration, GSCM practices and sustainability performance among Malaysian SMEs. According to RBV organizations are a collection of resources, some of which might be called strategic (Wernerfelt, 1984). Thus, corporations seeking a competitive edge must combine resources in a unique and distinct manner from other organisations that may not be able to do so (Dyer and Singh, 1998). At the same time, they must be concerned with the disparate allocation of resources among organization engaged in the supply chain integration process (Barney, 1991). As a result, the incentives for supply chain integration are focused on acquiring limited and specialised resources in order to secure and retain a competitive edge. Extended from resource-based view (RBV) theory, Hart (1995) introduced NRBV by introduced natural environment into RBV's drivers as a competence for the firm to gain the competitive advantage which leads this study to focus on the role of strategy of GSCM practices. The RBV theory and NRBV theory serves as the basis for the proposed conceptual framework as Figure 1:

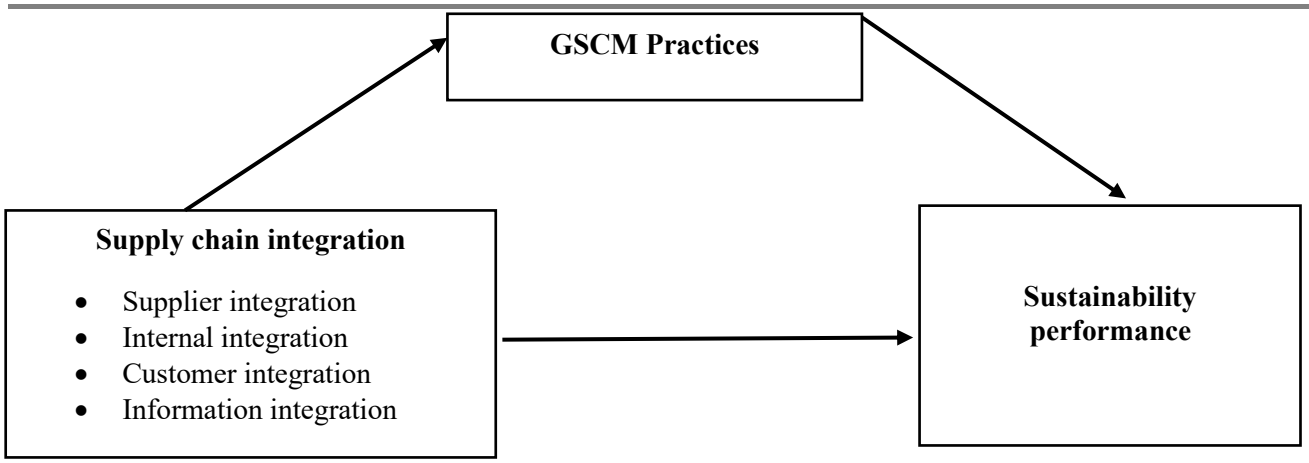

Figure 1: Proposed conceptual framework

PROPOSED RESEARCH METHODOLOGY

This research will be conducted as a correlational study with minimal researcher involvement in the natural environment, making it suitable for examining relationships among variables (Sekaran & Bougie, 2013). A correlational design is appropriate since the objective is to investigate the relationships between supply chain integration, green supply chain management (GSCM) practices, and sustainability performance among Malaysian SMEs. The study also adopts a cross-sectional approach, whereby data will be collected and measured at a single point in time (Zikmund, 2003). In addition, literature reviews will be conducted to analyse the dimensions of supply chain integration.

A survey method will be employed as it is the most suitable design to meet the research objectives. The sampling frame consists of Small and Medium Enterprises (SMEs) in Malaysia, with the population list obtained from SME Corp Malaysia (2022), which reports a total of 1,226,494 SMEs. To determine the sample size, the Raosoft calculator was used as a guideline, suggesting a minimum sample size of 385 SMEs, which aligns well with requirements for structural equation modelling (SEM). Since SEM-PLS will be used as the data analysis technique, careful consideration is required in determining the appropriate sample size. Hair et al. (1998) recommends a minimum of 100 observations for reliable results in SEM analysis.

This study will apply a simple random sampling technique, as it allows for generalization of the findings to the population (Creswell, 2014). Furthermore, this technique minimizes selection bias by ensuring every element in the population has an equal chance of being selected (Hair et al., 2010). The collected data will be entered into the Statistical Package for the Social Sciences (SPSS) and analyzed using descriptive statistics such as frequency, percentage, mean, and standard deviation. For hypothesis testing, SEM-PLS will be used to evaluate the relationships between exogenous and endogenous constructs in the proposed model. Additionally, key findings such as effect size (f^2) and predictive relevance (Q^2) will be assessed to determine the model's explanatory power.

Instrumentation

All questionnaire items in this study will be adapted from prior research and evaluated using a 5-point Likert scale, where 1 indicates "strongly disagree" and 5 indicates "strongly agree." A summary of the construct measurements is provided in Table 1.

Construct	Item	Cronbach's Alpha (α)	Reference
Supplier integration	1. We share demand forecasts and production plans with key suppliers. 2. Key suppliers are involved in our product design and development processes.	0.82-0.88	Flynn et al. (2010); Zhao et al. (2011); Narasimhan & Kim (2002).

Construct	Item	Cronbach's Alpha (α)	Reference
	3. We work with suppliers to jointly plan and solve operational and sustainability-related problems. 4. We collaborate with suppliers to reduce environmental impact (e.g., waste, emissions, packaging). 5. We maintain long-term strategic partnerships with key suppliers.		
Internal integration	1. Our company has real-time information sharing among internal departments. 2. Different departments in our company work together to achieve common goals. 3. Our functional areas (e.g., production, marketing, procurement) are well coordinated. 4. There is effective communication between various departments within our organization. 5. Our company promotes cross-functional collaboration to improve sustainability performance.	0.83-0.87	Flynn et al. (2010); Zhao et al. (2011); Yu et al. (2021)
Customer integration	1. We frequently interact with major customers to understand their needs and requirements. 2. Our company shares real-time demand and order information with major customers. 3. We work closely with customers to improve the quality of products and services. 4. Customers are involved in the early stages of product and service development. 5. We jointly solve problems with customers to enhance mutual performance.	0.83-0.87	Flynn et al. (2010); Zhao et al. (2011); Yu et al. (2021)
Information integration	1. We share real-time inventory, production, and demand data with supply chain partners. 2. We use electronic systems to share important operational data with partners. 3. Information shared among supply chain members is accurate, timely, and reliable. 4. Our information systems are compatible with those of our key supply chain partners. 5. We jointly plan and forecast demand with key partners using shared information.	0.85-0.89	Wong et al. (2011); Zhao et al. (2008); Li et al. (2006)
GSCM practices	1. We work with suppliers to improve their environmental performance. 2. We conduct regular environmental audits of our operations and supply chain. 3. Our company uses eco-friendly materials and inputs in production. 4. We have implemented energy-efficient and waste-reduction practices. 5. We collaborate with logistics providers to reduce environmental impacts (e.g., carbon emissions).	0.85-0.88	Ibrahim et al. (2020); Ibrahim et al. (2021); Sarkis et al. (2011); Green et al. (2012); Eltayeb et al. (2011)

Construct	Item	Cronbach's Alpha (α)	Reference
Sustainability performance	1. Our company has improved cost efficiency through sustainable practices. 2. Our company has reduced its environmental impact (e.g., emissions, waste, energy use). 3. We comply with environmental regulations and standards. 4. Our company has contributed to employee welfare, health, and safety. 5. Our sustainability practices have improved our reputation and stakeholder satisfaction.	0.82-0.89	Zhu et al. (2008); Eltayeb et al. (2011); Green et al. (2012)

DISCUSSION AND CONCLUSION

This conceptual article contributes to the growing body of literature on sustainable supply chain management by proposing a model that examines the relationship between supply chain integration (SCI), green supply chain management (GSCM) practices, and sustainability performance within the context of Malaysian small and medium-sized enterprises (SMEs). Anchored in the Resource-Based View (RBV) and the Natural Resource-Based View (NRBV) theories, the proposed framework posits that firms can gain sustainable competitive advantage by effectively integrating their supply chains and adopting GSCM practices.

The review of the literature reveals that SCI, comprising supplier integration, internal integration, customer integration, and information integration, has a direct influence on firm performance, including sustainability outcomes. At the same time, GSCM practices, such as green purchasing, eco-design, and waste minimization, serve as mechanisms through which these integration efforts translate into improved environmental, economic, and social performance. While numerous studies have explored the impact of SCI and GSCM in developed economies, research in the Malaysian SME context remains relatively underexplored, particularly concerning the mediating role of GSCM practices.

The proposed conceptual framework offers a novel perspective by suggesting that GSCM practices mediate the relationship between SCI and sustainability performance. This is particularly relevant for SMEs in Malaysia, where resource constraints often hinder the adoption of sustainable practices. By emphasizing the strategic role of integration and collaboration within the supply chain, this framework advocates for a more holistic approach to sustainability that extends beyond internal operations to include upstream and downstream partners. This article contributes to theory by integrating SCI and GSCM under a single framework rooted in RBV and NRBV. Practically, it offers valuable insights for SME managers and policymakers on how integrated and environmentally conscious supply chain strategies can enhance sustainability performance and long-term competitiveness.

Future studies could investigate the potential moderating variables such as firm size, environmental regulation, digital capability, or industry type to understand how these factors influence the effectiveness of SCI and GSCM practices. Comparative studies across different sectors or between developing and developed countries would also enrich the generalizability of the findings. Longitudinal research is recommended to assess the evolution of these relationships over time, particularly in response to global disruptions such as pandemics or climate change. Furthermore, qualitative approaches such as interviews or case studies could provide deeper insights into the practical challenges and strategic decisions involved in implementing sustainable supply chain practices.

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