

## Supply Chain Risks, Green Supply Chain Management Practices and Organizational Performance: A Research Direction

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**Abstract:** Supply chain disruptions, such as floods and unforeseen events, have historically caused severe economic and environmental consequences, emphasizing the need for risk mitigation strategies to improve organizational performance. The multi-dimensional nature of these risks necessitates comprehensive classification and identification to inform effective managerial decisions. This study reviews the role of GSCM practices as a strategic approach to mitigate supply chain risks and enhance economic and environmental performance. By examining existing research on supply chain risks, GSCM practices, and organizational performance, this study seeks to fill a gap in the literature, particularly in exploring the integration of GSCM practices into risk mitigation strategies. This study contributes by highlighting the intersection of supply chain risks, GSCM practices, and organizational performance, with a focus on the Malaysian manufacturing sector. Through a comprehensive review and analysis, this study aims to shed light on the role of GSCM practices in building resilient and sustainable supply chains.

**Keywords:** *Supply chain risks, green supply chain management practices, organizational performance, roles of strategy.*

### 1. Introduction and Background

Academics and researchers have conducted numerous studies and literature reviews about supply chain management, substantiating the positive impact of effective supply chain management on organizational performance (Alam, 2022; Mutuerandu, 2014; Salazar, 2012). With the escalating complexity of supply chains, the efficacy of supply chain management has emerged as a pivotal factor influencing organizational performance. The intricate flow of supply chain activities across multiple tiers of the supply network, concerning product movement, is projected to encounter potential supply chain risks that necessitate early-stage mitigation (Bassiouni et al., 2023). Consequently, organizations must be attuned to the diverse array of supply chain risks, encompassing both external facets (environmental risks, information) and internal dimensions (manufacturing risks, supply risks, demand risks), all of which can substantially and adversely impact organizational performance (Bassiouni et al., 2023; Gurtu & Johny, 2021; Hendrick & Singhal, 2005).

Furthermore, findings from a survey conducted by Marchese and Paramasivam (2013) reveal that, as per the Business Continuity Institute's 2011 survey, a staggering 85% of global supply chain-involved companies experienced at least one disruption within 12 months. Notably, the far-reaching consequences of supply chain disruptions were evident when over a thousand industrial facilities worldwide were adversely affected by severe floods in Thailand in October 2011 (Business Forward Foundation, 2014). Reflecting on history, the aftermath of the Bhopal oil spill in 1984, analyzed by Kleindorfer and Saad (2005), exemplified how supply chain risks can lead to economic losses in the chemical sector, causing direct environmental harm and consequential impacts. This cascade of effects resulted in reduced production and sales for the implicated companies (Business Forward Foundation, 2014), substantial costs associated with recovery from disruptions, diminished revenues, challenges in timely deliveries, amplified downtimes (Marchese & Paramasivam, 2013), and compromised environmental reputation (Mangla et al., 2015).

Recent scholarly discourse has notably spotlighted the dual focal points of supply chain risk and environmental outcomes (Rao & Goldsby, 2009; Freise & Seuring, 2015). In a notable progression, Freise and Seuring (2015) have undertaken an extension of their prior research on supply chain risk, transposing the

lens from a predominantly economic perspective to one encompassing environmental consideration. However, this transition remains relatively unexplored and calls for a more comprehensive investigation. Recognizing this analytical void, it becomes paramount for organizations to discern potential supply chain risks and ascertain an optimal approach harmonizing with the distinct supply chain activities while aligning with environmental preservation goals (Ibrahim et al., 2021; Kleindorfer & Saad, 2005).

Amid this evolving landscape, a series of studies have substantively illuminated the benefits ensuing from the integration of green supply chain management practices, elucidating their favorable impact on both economic performance and environmental stewardship (Kumar & Chandrakar, 2012; Samad et al., 2021). Eltayeb and Zailani (2009) proffer the perspective that the widespread adoption of green supply chain management practices within a corporate framework begets an environmentally conscious product image, procedural enhancements, technological amelioration, and systemic refinements. Moreover, the practice of green supply chain management represents a novel and sustainable approach to strategic development, concurrently advancing financial gains and environmental well-being through the attenuation of environmental risk and impact (Hajikhani et al., 2012).

In consequence, the embrace of green supply chain management practices is prognosticated to assume a pivotal role as a strategic imperative for organizations, adroitly addressing the nexus of environmental and economic challenges while concurrently ameliorating potential perturbations within the supply chain (Ibrahim et al., 2023; Nikbakhsh, 2009). As such, this study's overarching objective is to conduct a comprehensive review of green supply chain management practices, contextualizing them as a strategic hub for organizations to both mitigate supply chain vulnerabilities and bolster the tandem facets of economic and environmental performance. Furthermore, this inquiry extends its purview to encompass earlier investigations into supply chain risks and their interplay with organizational performance. Notably, this discourse remains pertinent in 2023, reflecting the dynamically evolving landscape of supply chain dynamics and risk management paradigms.

## 2. Literature Review

**Developing Country of Southeast Asia:** Developing countries in Southeast Asia have become integral players in the global economy, with their supply chain activities playing a pivotal role. As these countries encounter unique challenges and opportunities, understanding the landscape of SCM practices and supply chain risks is of paramount importance. For instance, Thailand country has faced several supply chain risks such as political instability. Thailand has experienced political unrest and changes in government, which can lead to uncertainty and disruptions in supply chain operations. Due to that, it has directly affected the economic performance of the organization in Thailand and globally. Frequent changes in regulations, trade policies, and customs procedures can impact import/export processes and logistics are also the risks experienced in Thailand (Yingvilasprasert et al., 2012).

Besides Thailand, Indonesia also experienced a few supply chain risks that disrupted the performance of the organization. Supply chain risks in Indonesia can stem from a variety of factors, including political, economic, environmental, and operational challenges. Indonesia's diverse geography, economy, and social landscape contribute to a range of potential risks that businesses operating in the country should consider. Indonesia is located in a seismically active region, making it prone to earthquakes and tsunamis that can damage infrastructure, disrupt transportation, and impact the production process (Karningsih et al., 2018).

Brunei is also one of the Southeast Asia countries that should be considered. Brunei is a small, wealthy country located on the northern coast of Borneo in Southeast Asia. Brunei's economy is heavily reliant on oil and gas exports. Fluctuations in global oil prices can impact the country's economic stability, which in turn can affect consumer demand, production, and supply chain activities (Ndah and Odihi, 2017).

Similar to Indonesia, the Philippines also presents a unique set of supply chain risks due to its geographical and socio-economic characteristics. While the country offers opportunities for business growth and investment, there are several potential risks that organizations should consider when operating in the Philippines. The country is situated along the Pacific Ring of Fire, making it prone to seismic activity that can

impact manufacturing facilities, logistics, transportation networks and supply chain networks (Haraguchi et al., 2015).

Vietnam has become an attractive destination for manufacturing and sourcing due to its growing economy, competitive labor costs, and strategic location. However, like any country, Vietnam also presents specific supply chain risks that businesses should be aware of. While Vietnam has a large and relatively low-cost labor force, certain industries and regions may experience shortages of skilled labor, potentially affecting production capacity. Strikes and labor disputes can disrupt supply chain operations and lead to production delays (Nguyen et al., 2020).

**Malaysian Manufacturing Sector:** The pivotal role of the manufacturing sector within the Malaysian economy is underscored by its substantial contributions to gross domestic product, employment rates, and external trade dynamics (Hooi, 2017; Lee & Jitaree, 2019). Serving as a prime driver of economic advancement, it presents significant employment avenues for Malaysians, aligning with the ambitious objective of attaining a high-income economy by 2020. The trajectory of Malaysia's manufacturing sector has been one of remarkable evolution and growth. Its origins in the late 1950s, characterized by rubber and tin manufacturing, have expanded to encompass diverse industries including oil palm, electrical and electronic, steel, and automobile sectors (Chang, 2012; Chang & Zach, 2019). The sector's rapid expansion underscores its integral role within the national economy.

However, alongside its economic significance, the global spotlight has increasingly turned towards environmental performance due to escalating concerns regarding climate change and global warming. Malaysia's manufacturing sector emerged as a dominant contributor to environmental protection expenditure in 2014, outpacing other sectors (Department of Statistics Malaysia, 2016). Studies have underscored the accountability of manufacturers for the environmental conduct of their suppliers, with supply chain operations identified as a key factor influencing environmental challenges (Tachizawa et al., 2015; Andersén et al., 2020; Wong et al., 2020).

This has prompted a proactive response from manufacturing entities worldwide, with over 40,000 companies, including more than 400 in Malaysia, adopting ISO 14001 certification, embracing environmental management systems, and integrating sustainable practices (Baxte & Srisaeng, 2021). Consequently, the manufacturing sector remains an indispensable pillar of Malaysia's economic framework, propelling growth, generating employment, and facilitating trade connections. In light of mounting environmental concerns, the sector grapples with the intricate task of harmonizing economic progress with ecological responsibility.

In response, manufacturing enterprises globally, including those within Malaysia, have embraced ISO 14001 and implemented comprehensive environmental management systems, aiming to strike a balance between economic advancement and environmental preservation.

**ISO 14001 Certified Manufacturing Sector:** Introduced in 1996 and subsequently revised in 2004, ISO 14001 was designed with the primary aim of enhancing environmental performance. This internationally recognized standard serves as a framework for Environmental Management Systems (EMS) and was formulated by an international non-governmental organization known as the International Organization for Standardization (ISO). The efficacy of ISO 14001 has been substantiated through successful implementation. Presently, over 171 countries advocate for organizations to attain ISO 14001 certification due to its demonstrated capability in mitigating the environmental impact of manufacturing and service-related operations. Additionally, the adoption of ISO 14001 can lead to operational enhancements within an organization. As asserted by Petroni in 2001, the effects of ISO 14001 on an organization can be interpreted as either advantageous or disadvantageous, contingent on the strategic direction established by the organization. Moreover, Hanfield et al. in 2005 underscored the comprehensive coverage of ISO 14001, encompassing all facets of a business, including the management of the supply chain, thereby fostering improved organizational performance, particularly concerning environmental considerations.

**Supply Chain Risks:** Companies worldwide are currently grappling with formidable challenges within their supply chains. These intricate supply chain predicaments encompass a spectrum of issues such as quality

concerns, safety hurdles, shortages in supplies, adherence to environmental regulations, security vulnerabilities, legal entanglements, and regulatory intricacies. Regrettably, these challenges cast a detrimental shadow upon the entire network of supply chain operations (Christopher, 2005), consequently exerting an adverse influence on overall organizational performance (Munyuko, 2015; Gurtu & Johny, 2021).

In essence, the term "supply chain risk" refers to unforeseen events that cast an unfavorable light on performance outcomes (Mangla et al., 2015; Vilko et al., 2014; Kleindorfer & Saad, 2005). Within the pages of the book "Supply Chain Risk: A Handbook of Assessment, Management, and Performance" by Zsidisin and Ritchie (2008), the authors eloquently underscore the multi-faceted nature of supply chain risk. Consequently, it becomes imperative to discern and categorize the precursors to supply chain risk, thus offering valuable insights for managerial decision-making (Ya-feng & Qi-Hua, 2009).

**Green Supply Chain Management (GSCM) Practices:** The concept of Green Supply Chain Management (GSCM) has been formulated and implemented in response to growing environmental concerns, shaping decision-making processes across all stages of the supply chain network. This approach commences with an organization's meticulous management of materials and logistics operations and extends through to the final post-consumer disposal phase (Handfield et al., 2005). According to Singh (2010), the essence of GSCM practice lies in fostering environmentally conscious actions among suppliers, manufacturers, retailers, and customers - all integral participants in the supply chain. The underlying rationale is threefold: firstly, to achieve cost savings; secondly, to diminish delivery times; and thirdly, to optimize production efficiency. Moreover, GSCM adoption promises to enhance overall market growth, bolster financial performance, and successfully meet the diverse needs of customers.

Recent articles continue to underscore the significance of GSCM as a pivotal strategy within contemporary supply chain management. For instance, an article entitled "Advancing Sustainability through Green Supply Chain Management," highlights how GSCM practices have gained considerable traction across diverse industries, driven by the imperative to reduce carbon footprints and promote ecological responsibility. By integrating eco-friendly considerations into each facet of the supply chain, organizations are witnessing tangible benefits, including reduced operational costs, streamlined processes, and enhanced reputation within environmentally conscious consumer segments. Furthermore, a study conducted by Habib et al. (2021) delves into the outcomes of implementing GSCM principles among major corporations. The research findings underscore the positive correlation between GSCM adoption and improved financial performance. Companies that prioritize environmental stewardship throughout their supply chains are not only fostering sustainability but are also reaping substantial economic rewards. This aligns with Singh's (2010) assertion that GSCM facilitates both ecological and economic gains. In sum, the adoption of Green Supply Chain Management practices has evolved into a pivotal paradigm, driven by a dual commitment to ecological preservation and operational excellence. As exemplified by ongoing research and contemporary articles, this approach transcends conventional supply chain operations, culminating in improved financial outcomes, heightened market growth, and an overarching ability to meet the dynamic needs of today's discerning consumers.

Yu et al. (2008) underscored the significance of Green Supply Chain Management (GSCM) practices, positioning them as a pivotal tool for the efficient utilization of energy resources while mitigating adverse environmental impacts across the entire supply chain spectrum. This notion finds validation in contemporary discourse, as evidenced by the research conducted by Mangla et al. (2015), which emphasizes the growing trend of companies embracing environmentally conscious practices within their supply chains. By doing so, these companies not only demonstrate a commitment to reducing their ecological footprint but also safeguard their business operations from potential disruptions stemming from environmental vulnerabilities.

In a nuanced departure from the conventional perspective of GSCM solely as an environmentally friendly endeavor, Kumar and Chandrakar (2012) introduce an alternative viewpoint. They shed light on GSCM practices being strategically harnessed for the pursuit of heightened profitability. This strategic utilization aligns with the evolutionary trajectory of environmental management, as elucidated by Beamon (1999) since the 1990s. The progression from mere risk management towards life cycle management represents a profound addition to environmental stewardship, underpinning the broader implications of GSCM adoption.

Building upon this foundation, Wu et al. (2011) discern the incorporation of life cycle assessment as a defining characteristic of GSCM, offering a systematic approach to address environmental ramifications at every stage of a product's life cycle. This holistic approach signifies an informed response to the ever-escalating environmental challenges intertwined with supply chain dynamics. As the nexus between GSCM and environmental risk gains prominence, Kumar and Chandrakar (2012) echo the emergent perspective of GSCM as an indispensable mechanism to mitigate environmental risks within the supply chain. In addition, a study by Abbas and Tong (2023) in the context of automobile firms in China stated that GSCM practices have a strategic role in enhancing the effectiveness of firm performance.

Drawing inspiration from Munyuko's (2015) advocacy for risk management approaches to fortify supply chain efficacy, the current study endeavors to augment organizational performance through the strategic integration of GSCM practices. By embracing GSCM as a potent tool, this research seeks to curtail supply chain risk, thereby enhancing operational resilience and fortifying the overall supply chain landscape. The relationship between the proposed study's objectives and the role of GSCM's strategic evolution is supported by Table 1, which shows a compilation of pertinent literature affirming GSCM's role as a strategic underpinning within the broader area of supply chain management.

**Table 2: Roles of Strategy of Green Supply Chain Management Practices**

| Author(s) & Year            | Descriptions  | Journal  |
|-----------------------------|---|--|
| Hajikhani et al. (2012)     | GSCM, operating in a sustainable strategic role, embodies a sustainable approach to organizational growth within today's competitive landscape. This innovative method aims to secure concurrent financial and environmental advantages by mitigating environmental risks and impacts.  | <i>Australian Journal of Basic and Applied Sciences</i>              |
| Chen et al. (2010)          | The GSCM from a strategic and decision-making perspective improves the firm's present performance.  | <i>Industrial Engineering and Engineering Management (IEEM)</i>      |
| Diabat and Govinden (2011)  | Three important things that can be described as a green supply chain are environment, strategy and logistics.   | <i>Resource, Conservation, and Recycling</i>                         |
| Green Jr. et al. (2012)     | Effective implementation of GSCM practices, strategically integrated within operations and organization, can lead to the successful enhancement of both economic and environmental performance.   | <i>Supply Chain Management: An International Journal</i>             |
| Meera and Chitramani (2014) | GSCM practices are the revolution for the organization to foster win-win strategies to reduce environmental risk, improve environmental efficiency, and gain profit.  | <i>International Journal of Scientific and Research Publications</i> |
| Abbas and Tong (2023)       | Engineered with a strategic perspective, GSCM practices are tailored to empower companies to uphold streamlined processes and exert robust control across the supply chain.   | <i>Sustainability</i>  |
| Jell-Ojobor and Raha (2022) | GSCM strategically integrates environmental considerations into both forward and reverse logistics, achieving this through the implementation of a comprehensive set of environmental practices spanning the entire supply chain. The overarching objective is to strategically mitigate any potential adverse environmental effects. | <i>Business Strategy and The Environment</i>                         |

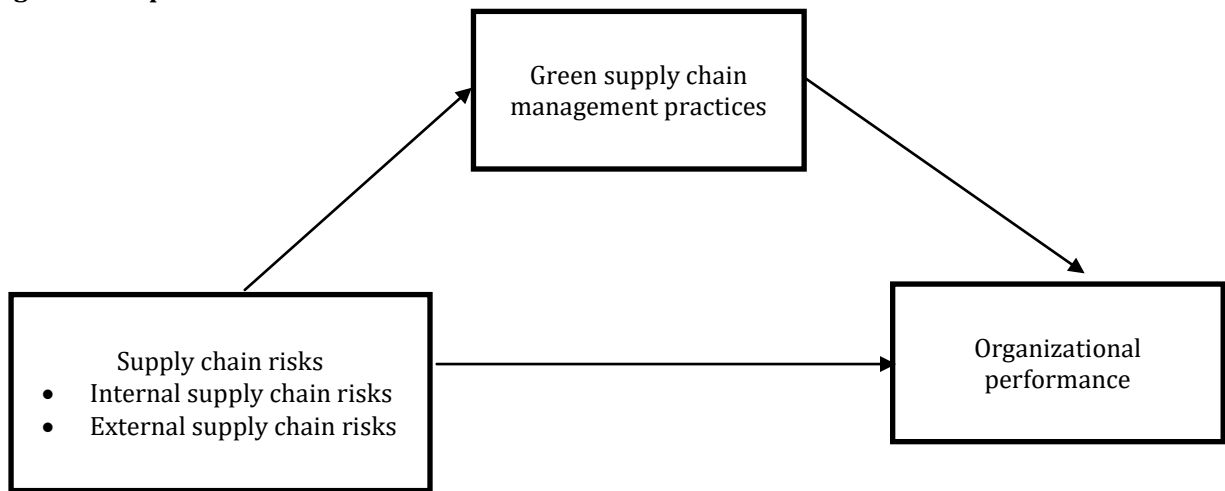
**Organizational Performance:** The concept of organizational performance is extensively explored in academic literature due to its crucial role in the advancement of countries (Gavrea et al., 2011). Consequently, the interpretation of organizational performance varies and necessitates identification by researchers aligned with their study objectives. In response to the increasing complexity of organizational goals, contemporary performance assessment encompasses both financial and non-financial indicators, constituting a pivotal focus for continual enhancement. To contextualize this study's scope, it aligns with the performance measurement paradigm established in the field of GSCM. Drawing from Laosirihongthong et al. (2013), this study adopts a



performance measurement framework that centers on parameters such as cost reduction and profitability for gauging economic performance, while embracing metrics like emission reduction, hazard mitigation, and material usage to quantify environmental performance.

This study is underpinned by the natural resource-based view (NRBV) theory, whereby this theory is introduced by Hart (1995). According to Hart (1995), the NRBV theory explains environmentally oriented as a strategy for the organization to improve performance and achieve a competitive advantage. This theory highlights three interrelated strategies for instance sustainable development, pollution prevention, and product stewardship. In the context of the study, green supply chain management practices have been reviewed as a strategic role for sustainable development to reduce the risk in the supply chain and improve the firm performance. Drawing upon this theory, the relationship between supply chain risks, green supply chain management practices and organizational performance will be discussed through previous scholars. Hence, supply chain risks are highlighted as an independent variable, GSCM practices as a mediating variable, and organizational performance as a dependent variable as shown in Figure 1.

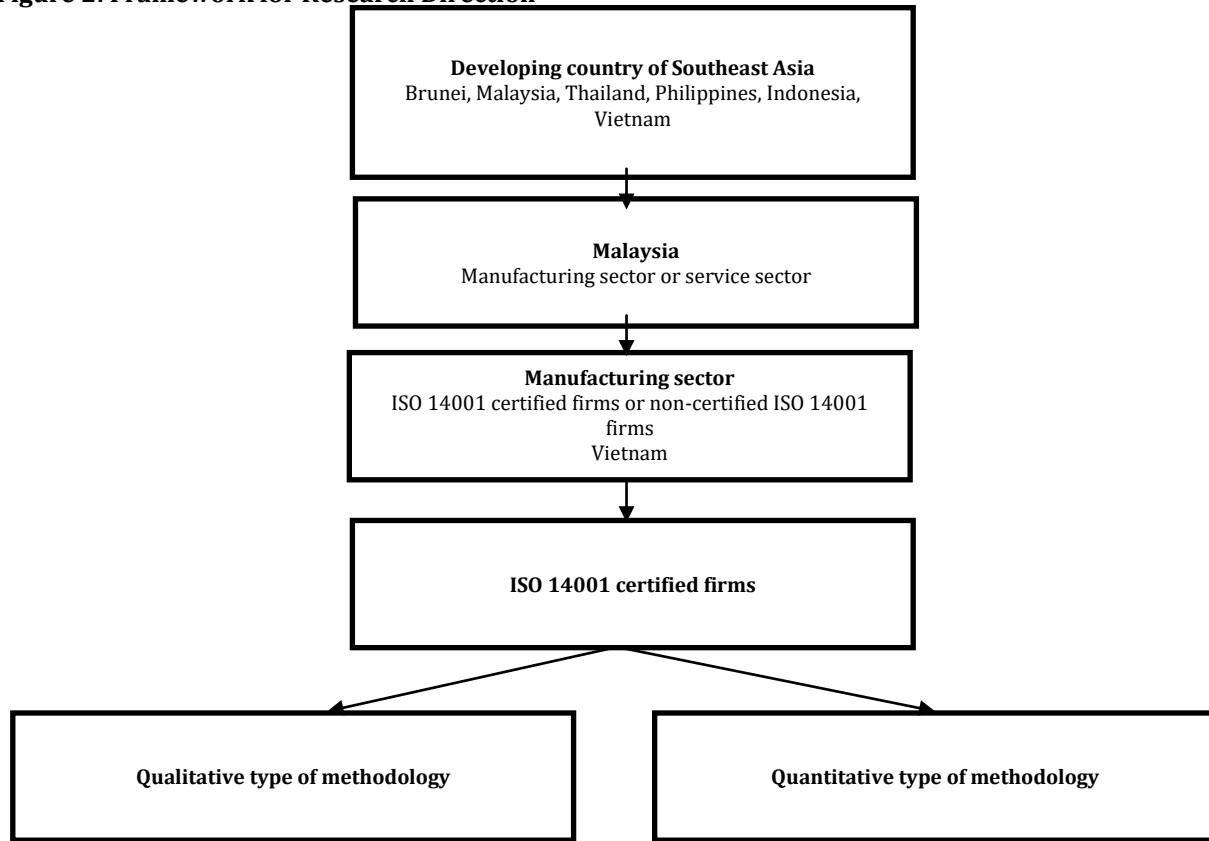
**Figure 1: Proposed Research Framework**



### 3. Methodology for Research Direction

This research, study focuses on supply chain management while green supply chain management (GSCM) practices have been reviewed as a potential strategy to reduce the risk in the supply chain. This research also used related keywords on the supply chain and limited the selection of articles that explain the issue of supply chain risk. The idea of this research continues since the risks in the supply chain among developing countries in South East Asia have risen and crippled the economic and environmental development such as the Tsunami incident and Covid-19 pandemic disturbing the movement of the product through multiple tiers. With this viewpoint, supply chain disruptions such as acute labor shortages, climate change, and global geopolitical tensions cost the Malaysian economy RM8.7 billion each year (News Straits Times, 2023) motivates this research to identify the supply chain risk issues in Malaysia. The connection between supply chain risks, GSCM practices and organizational performance brings the idea to concentrate on the manufacturing company in Malaysia which obtained ISO 14001 since this sector involves the supply chain activity, supply chain management, and also applied the environmental management system. The research direction of methodology will be continued to conduct using qualitative study or quantitative study. Figure 2 shows the framework for the research direction of this study.

Figure 2: Framework for Research Direction



**Managerial Implications:** The significance of Malaysia's manufacturing sector within the nation's economic framework cannot be overstated, as it actively bolsters GDP, employment opportunities, and external trade dynamics. Yet, this pivotal sector confronts formidable environmental hurdles, with the manufacturing industry emerging as the principal contributor to environmental protection expenditure in the country. Notably, the intricate interplay of supply chain operations has been pinpointed as a substantial driver of environmental challenges, accentuating the pressing necessity for enhanced environmental safeguarding within the industry.

In this vein, there exists a growing imperative to address environmental concerns and instigate protective measures across the manufacturing landscape. This has set the stage for forthcoming research endeavors that aim to explore the intricate relationship between these three pivotal constructs: the manufacturing sector's economic contributions, its environmental challenges, and the critical role of supply chain activities.

The proposed research direction envisions a comprehensive investigation into these interconnected dimensions, to unravel the intricate dynamics that underpin their interplay. By delving into the relationships between economic performance, environmental sustainability, and supply chain intricacies, this research seeks to contribute valuable insights into the complex landscape of the manufacturing sector's operations in Malaysia.

#### 4. Conclusion and Recommendations

In conclusion, this paper emphasizes the importance of supply chain management in improving organizational performance and addresses the risks associated with supply chains. Supply chain risk, encompassing both internal and external dimensions, has been identified as a significant factor affecting organizational performance. Disruptions in the supply chain, such as environmental incidents, can lead to production and sales drops, increased costs, delivery problems, and damage to environmental reputation. To

mitigate these risks, GSCM practices have emerged as a strategic approach. GSCM practices involve considering environmental considerations at all stages of the supply chain and have been shown to have benefits in terms of economic, environmental, and overall organizational performance. By adopting GSCM practices, organizations can reduce environmental risks, improve processes and systems, and create an environmentally friendly product image. Utilizing the NRBV theory, the relationship between supply chain risks, green supply chain management practices and organizational performance is discussed and the proposed research framework also is developed.

There are a few limitations of this study. First, this study reviewed the overview of three variables which are supply chain risks, GSCM practices and organizational performance. Future research is recommended to explore the role of technology, such as blockchain, the Internet of Things (IoT), and artificial intelligence (AI), in mitigating supply chain risks and enhancing the adoption of GSCM practices. Second, this study is a review article that discusses the role of GSCM practices as a strategy that has the potential to mitigate supply chain risks and improve the performance of the organization. Future research can conduct a longitudinal study that tracks the implementation and impact of GSCM practices on organizational performance over an extended period. This could provide insights into the long-term benefits and challenges associated with sustainability initiatives within supply chains. Besides, future research can also compare the effectiveness of different GSCM practices across various industries and sectors which can investigate whether certain practices are more suitable for specific contexts and identify best practices for different organizational settings.

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