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The logo for the International Institute of Social Studies, featuring the word "Erasmus" in a stylized, cursive script.

**An in-depth study on stakeholder collaboration in green  
supply chain management and firm performance:  
evidence from the Vietnamese garment industry**

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## List of Acronyms

GSCM	Green Supply Chain Management
IGSCM	Internal Green Supply Chain Management
ISS	Institute of Social Studies
CMT	Cut – Make - Trim
PLS-SEM	Partial Least Squares Structural Equation Modeling
IP	Institutional Pressure
BM	Buyer Monitoring
FB	Factory-Buyer Collaboration
FS	Factory-Supplier Collaboration
BS	Buyer-Supplier Collaboration
EP	Environmental Performance
OP	Operational Performance
FP	Financial Performance

## **Abstract**

This research paper explores the pressing need for sustainability in the face of the rapidly expanding global economy, which places significant strain on the environment. The study focuses on the pivotal role of Green Supply Chain Management (GSCM) within the transition to circular economies. It systematically investigates how collaborative approaches to green practices among supply chain partners influence a firm's sustainability performance. Data from 13 garment manufacturing firms in Vietnam were gathered through a mixed-method approach, including surveys and interviews, and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) and benchmarking methods. The findings reveal that buyer monitoring and institutional pressures have a positive and significant impact on internal green supply chain practices. The study emphasizes the need for alignment between Vietnam's legal framework and international standards to foster environmentally friendly supply chain practices. Furthermore, it underscores the positive relationships between both internal and external GSCM practices and performance measures. Importantly, the research highlights the essential role of green supply chain practices and collaborative efforts in enhancing sustainability and performance in the garment industry. It emphasizes the responsibility of global buyers within the supply chain in driving collaborative initiatives with suppliers and ensuring the promotion of green practices throughout the supply chain, ultimately leading to comprehensive and positive impacts on sustainability.

## **Relevance to Development Studies**

This research topic holds significance within the field of Economic Development Studies, particularly in the context of ESG (Environmental, Social, and Governance) and the pursuit of Sustainable Development Goals (SDGs). It offers the opportunity to gain valuable insights into the role of garment manufacturing firms in Vietnam concerning economic development and their efforts to advance sustainability in line with ESG principles and SDGs 8, 12, and 13. The findings from this study can be a valuable resource for policymakers, businesses, and stakeholders, aiding them in making informed decisions that foster economic growth while addressing pressing environmental and social concerns.

## **Keywords**

Green supply chain management; stakeholder theory; stakeholder collaboration; operational performance; financial performance; environmental performance; Vietnamese garment industry.

# Chapter 1

## Introduction

The economy worldwide is getting bigger and moving faster. This leads to an increase in the production and consumption of goods, which unfortunately puts greater stress on the environment. Unless we shift our production methods, we risk a future where people's well-being declines, poverty remains intractable, the rich tapestry of life on Earth fades away, and our environment suffers lasting, irreversible harm to its core (Charkiewicz et al., 2001). To deal with this problem, a shift towards circular economies is required, one form of the transition is green supply chain management (GSCM), which considers the environmental impact of a product's lifecycle, including raw materials sourcing, manufacturing, and distribution (Bai et al, 2017; Beamon, 1999). Under GSCM, manufacturers procure environmentally-friendly raw materials for sustainable production, distributing them to consumers who prioritize eco-friendly products. Throughout this process, transportation is carried out using environmentally conscious logistics methods.

As a fact that businesses often prioritize finding solutions that foster growth and profitability, overlooking the environmental impact and economic implications of their operations. The integration of green supply chain management (GSCM) can enable organizations to achieve mutual improvements as well as is increasingly viewed as a strategic imperative by organizations due to its potential to have a lasting effect on their performance (Diabat and Govindan, 2011). Embracing adaptation can stimulate innovation, improve operational efficiency, and provide avenues for gaining a competitive edge (Porter & Linde, 1995). This highlights the increasing importance of achieving sustainability in business operations, but concerns remain regarding their performance. Shultz & Holbrook (1999) suggest that organizations are facing mounting competitive, regulatory, and community pressures to maintain a delicate balance between their economic and environmental performance. However, the challenges associated with green supply chain management have become increasingly complex due to the integration of company networks or supply chains, resulting in multidimensional issues with global warming being a significant concern (Nakano, 2013). Therefore, the process of managing green supply chains has become more intricate and nonlinear (Mohsin et al., 2021) and can be characterized as a wicked problem according to Pyykkö, Suoheimo, & Walter (2021).

Vietnamese textile and garment sector has experienced remarkable growth, contributing significantly to export turnover and employment due to factors like low labour costs, favourable policies, and a skilled workforce (Nayak et al., 2019). Nevertheless, the textile and apparel industry stand as the world's second most environmentally detrimental sector due to its intricate operations. This industry extensively employs a diverse array of resources, energy sources, chemicals, and dyeing agents in its processes (Huynh, 2022). Moreover, green supply chain management (GSCM) has gained substantial traction in countries like the United States, the European Union (EU), and Japan, where manufacturers have recognized its pivotal role in remaining competitive and adhering to environmental regulations (Do et al., 2020; Liu & Quang, 2016). However, GSCM remains a relatively unexplored concept in the context of Vietnam's academic research and its garment industry, despite the global trend towards sustainable practices.



The principal aim of this research encompasses two key objectives. Firstly, it entails the development of a comprehensive conceptual framework to thoroughly comprehend the motivating forces and underlying factors that drive the adoption of Green Supply Chain Management (GSCM). Secondly, the study seeks to assess the impact of cooperative interactions among stakeholders operating within the domain of green supply chain management on the overall performance of firms in the Vietnamese garment industry, with a primary focus on garment manufacturing companies for export. This assessment will predominantly delve into the examination of internal green supply chain practices and their influence on firm performance through collaborative efforts between factory-buyer, factory-supplier, and buyer-supplier relationships.

These objectives give rise to the following research questions:

Research question 1: What are the motivating factors that lead to the implementation of Green Supply Chain Management (GSCM) within an organization in the context of Vietnamese garment manufacturing industry?

Research question 2: To what extent do internal Green Supply Chain Management (IGSCM) and collaborative practices strengthen firm performance in terms of environmental, operational, and financial dimensions?

This investigation employs a mixed-methods approach characterized by methodological rigor. It combines survey questionnaires and interviews to thoroughly collect relevant data. Additionally, the analytical framework incorporates a path analysis conducted through the use of PLS-SEM (Partial Least Squares Structural Equation Modeling) using the SmartPLS 4 software platform. Furthermore, a benchmarking method is applied to evaluate the alignment of green supply chain practices with firm performance.

## 1.1 Motivation for the study: personal interest and gap in the literature<sup>1</sup>

The motivation behind this research paper stems from the relatively recent emergence of green supply chain practices in the Vietnamese manufacturing sector. During the author's tenure in the garment industry, a prominent challenge within sustainable supply chain management was discerning the precise actions and perspectives of stakeholders, particularly those of suppliers and buyers. While these stakeholders shared a mutual objective, there was a lack of clarity regarding the extent to which their collaborative efforts truly advanced their respective businesses. This study aims to address this crucial knowledge gap.

Recent research by [Le \(2020\)](#) has shown that in Vietnam, there is a lack of attention paid by policy-makers, businesses, and researchers to the concept of green supply chain management and its associated practices. Several studies have explored Green Supply Chain Management (GSCM) in Vietnam in areas such as tourism industry ([Nguyen et al., 2020](#); [Do et al., 2020](#); [Tran et al., 2020](#)), construction industry ([Le, 2020](#); [Pham et al., 2021](#)), steel industry ([Tran et al., 2023](#)), textile industry ([Nguyen et al., 2023](#)), and diverse sectors including garment industry with a primary emphasis on customers' awareness, suppliers' pressure, internal awareness of green supply chains ([Do et al., 2020](#)). In contrast, the primary focus of this research concentrates on the collaborative efforts of stakeholders within the realm of internal green supply chain practices and their impact on firm performance in the garment industry. This suggests a significant gap in the understanding and implementation of green supply chain management in the Vietnamese context, highlighting the need for further research in this area.

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<sup>1</sup> This research has been challenging, but the steadfast support of my family, especially the memory of my late father, continuously motivates me to persist daily. I am also grateful for Professors Elissaios and Hoai, whose unwavering guidance and encouragement kept me going through the difficulties of this journey. Special thanks to Ly Nguyen for generously assisting in the intricate data collection process, and heartfelt gratitude to my friends in Vietnamese garment factories for clarifying my research concerns.

## **1.2 The novelty of analysing diverse stakeholder perspectives**

The study employed a mixed-method approach to gather data, encompassing surveys and interviews conducted with both factories and buyers. The extensive data collection approach employed in this study was designed to provide a wide range of insights and viewpoints from different stakeholders within the Vietnamese garment industry. This research serves as the first paper with a specific focus on examining stakeholder collaboration within the industry. Consequently, the author incorporated slope analysis to assess buyer-supplier collaboration as a moderator variable, examining its influence on different dimensions on the performance. Therefore, this novel approach adds a fresh dimension to the analysis of stakeholder collaboration in Vietnam.

This research holds significant novelty and importance on several fronts. Firstly, it contributes to academia and industry alike by shedding light on the impact of stakeholder collaboration on sustainable performance within the realm of green supply chain management in the Vietnamese garment industry. Secondly, it carries valuable policy implications as the findings can serve as a foundation for informing policymakers in Vietnam about the challenges and opportunities associated with the integration of green supply chain practices within the garment industry, potentially guiding the formulation of supportive policies for sustainability. Lastly, it offers practical benefits to companies in the Vietnamese garment sector, equipping them with a deeper understanding of the pivotal factors influencing the effective implementation of green supply chain practices and empowering them to craft more efficacious strategies in this arena.

## **1.3 Research structure**

The organization of this research paper is outlined as follows: In Chapter 2, an extensive review of existing literature is presented, encompassing previous studies from global view to Vietnam. Chapter 3 includes the theoretical background and hypothesis development. Chapter 4 provides a detailed account of the chosen methodology and the research process employed. Moving on to Chapter 5, it offers an in-depth presentation and discussion of the analysis findings. Lastly, Chapter 6 serves as the conclusion, where limitations and implications for future research are considered.

## Chapter 2

# Literature review: the global trend towards green supply chain management

In this chapter, we delve into a comprehensive literature review concerning the transition towards green supply chains. Subsequently, we explore the nexus between green supply chain practices and firm performance both at the global and national levels. Afterwards, we narrow our focus to the garment industry in Vietnam for a more in-depth analysis.

## 2.1 Green Supply Chain Transition

### 2.1.1 Standard Supply Chain (Before 1780)

In the time when societies were primarily based on farming before 1780, the typical way of managing the supply chain was through skilled craftsmen who produced various items that buyers needed. Companies during this period generally had contentment among their workers, who were highly involved in creating and finishing products (Skinner, 1985). During this era, resources were efficiently reused in manufacturing because customers typically lived nearby, were willing to wait for extended order processing times, and experienced high levels of satisfaction with the products, resulting in minimal waste production.

### 2.1.2 Standard shifting towards Lean (1780 – 1960)

The industrial revolution took place between 1780 and 1960, technology played a pivotal role in shifting society from craftsmanship to industry, as noted by Skinner (1985). This period witnessed the emergence of larger and more stable market segments. Leading manufacturing companies emphasized achieving economies of scale, operational efficiency, and cost reduction (Nahm, Vonderembse, 2002). Consequently, the approach to supply chains evolved from being standard to becoming more streamlined and efficient.

Additionally, waste reduction during this era was primarily driven by economic considerations, with little regard for addressing the environmental impact stemming from manufacturing, as pointed out (Sarkis et al., 2011). Suppliers were perceived as separate entities, and companies aimed to maintain competitiveness and narrow profit margins by sourcing from multiple suppliers. Adapting to the unpredictable market conditions from both buyers and suppliers, businesses needed to transition from industrial systems, which focused on mass production and cost minimization, to post-industrial systems that prioritized rapid responses to produce a diverse range of high-quality products catering to varying buyer demands.

### 2.1.3 Lean, Agile, Hybrid shifting towards Green Supply Chain (1960 – Present)

As societies progressed and modernized, consumers became more discerning and had higher expectations, seeking not only lower costs and better quality but also improved availability and a wider variety of products (Doll & Vonderembse, 1991). The focus shifted away from mere efficiency for competing companies, as consumer demands expanded beyond factors like cost, quality, and speed (Pagell & Wu, 2009).

To manage this growing complexity, the adoption of lean and time-based manufacturing practices (TBMP) emerged. These practices helped companies reduce waste, increase production speed, and enhance flexibility, laying the groundwork for adjusting responsiveness, cost efficiency, and demand volume customization (Tu et al., 2001). These significant shifts set the stage for the evolution of manufacturing practices towards environmentally conscious supply chains. As a result of these transformative changes, companies began to adopt flatter organizational structures with more organic hierarchies. The perception of suppliers also underwent a transformation; they were no longer seen as mere cost burdens, but rather as integral extensions of the manufacturing process and essential components for achieving sustainability goals (Nelson et al., 2012).

**Table 1**  
**Supply chain transition**

Time Frame	Era	Supply Chain Type	Firm Characteristics	Manufacturing Focus	Environmental Focus	References
Before 1780	Agrarian	Standard	Modest size, featuring an organic structure, employing a horizontal hierarchy, and relying on product quality	Economy of Scope	Tendency to reuse all materials	Skinner in 1985; Nelson et al. in 2012.
1780 - 1850	Industrial Revolution	Lean	The firm achieves higher production levels but faces constraints related to limited transportation, power, and flexibility	Economy of Scale	There is limited consideration of the negative environmental impact of waste, with the primary emphasis placed on waste reduction from an economic perspective.	Skinner in 1985; Nahm & Vonderembse in 2002; Sarkis et al. in 2011; Nelson et al. in 2012.
1850 - 1960			Transitioning towards mass production focused on efficiency, the firm experiences substantial technological advancements and an expansion in size, variety, complexity, and diversity			
1960 - 1980	Post Industrial Revolution	Shift to Lean, Agile, Hybrid	The firm experiences rising consumer demand for variety, timeliness, and cost-effectiveness, leading to increased market complexity.	Economy of Scale and Scope, with an emphasis on the latter	The US Environmental Protection Agency (EPA) was established, followed by a significant emphasis on pollution prevention and mitigation strategies in each state.	Doll & Vonderembse in 1991; Tu et al. in 2001; Pagell & Wu in 2009; Nelson et al. in 2012.
1980 onwards		Shift towards Green	System design evolved to prioritize consumer needs, transitioning from linear/sequential approaches to parallel, integrative, and systematic methodologies			

Green supply chain management can be considered the involvement of production process in activities that consist material reduction, recycling, reutilization, and substitution in the 1990s (Narasiman & Carter, 1998) or the environmental impact of a product's lifecycle, including raw materials sourcing, manufacturing, and delivery to the end-user (Beamon, 1999). The adoption of green supply chain management offers various advantages but there are still lingering concerns about its overall performance (Shultz & Holbrook, 1999).

Next, we delve into the literature review of green supply chain practices and firm performance, examining both the context of global views and Vietnam specifically focusing on garment industry.

## 2.2 Green supply chain practices in a global view

The number of studies investigating the connection between green supply chain practices and firm performance has been on the rise, driven by the growing interest of companies in adopting sustainable practices both within their organizations and throughout their supply chains. Nevertheless, the results of these studies have revealed both positive and negative correlations, creating a sense of uncertainty among practitioners regarding the most advantageous course of action to follow. According to the literature review in green supply chain management (Tseng et al., 2019), it is evident that the field of Green Supply Chain Management (GSCM) literature is predominantly influenced by research conducted in Asia, America, and Europe.

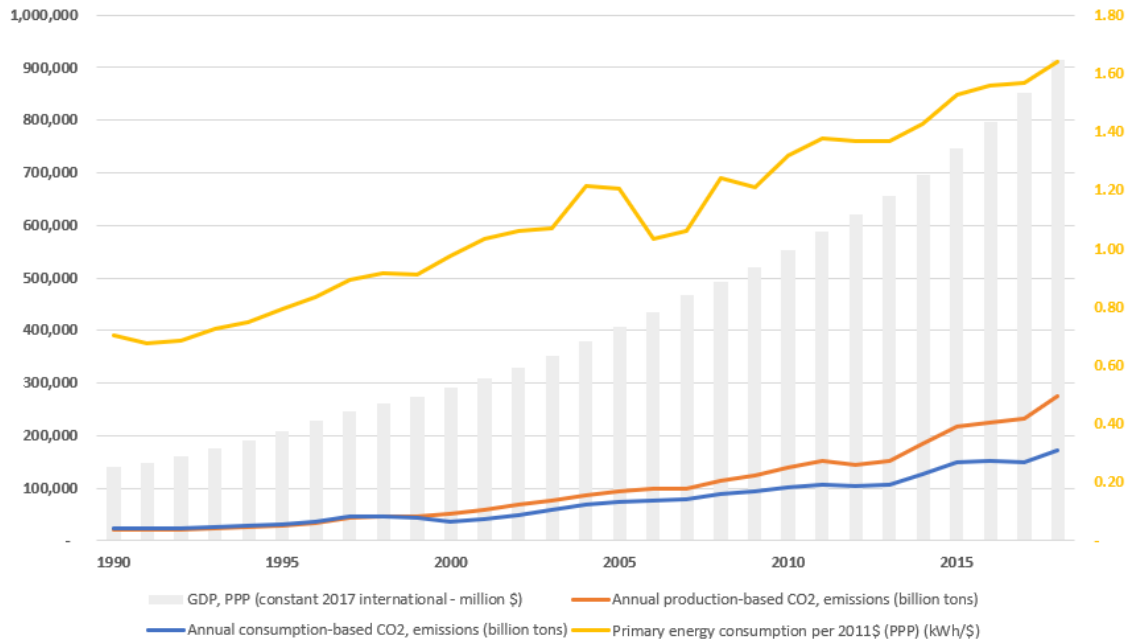
Previous research has yielded inconclusive findings, indicating a lack of a significant impact of green practices on financial performance in China (Zhang & Yang, 2016). Additionally, mixed results have been reported regarding the influence of both external and internal green practices on environmental, financial, and operational performance in Malaysia (Zailani et al., 2012), Korea (Lee et al., 2012), China (Lai & Wong, 2012), the US (Green et al., 2012; Vachon & Klassen, 2008), Pakistan (Ahmed et al., 2018). Furthermore, there is no substantial evidence supporting the effect of green supply chain practices on operational performance in Brazil (Vanalle et al., 2017), in China (Zhu et al., 2007).

Nonetheless, a meta-analysis conducted by Golicic & Smith (2013), which analysed environmental practices research spanning from the 1990s to 2011, has demonstrated a notably positive and significant association between environmental supply chain practices and firm performance across three major regions: Asia, Europe, and North America. Given the mixed findings in existing research, there is a need for comprehensive and in-depth investigations to provide a clearer understanding of the connections between green practices and performance metrics, as suggested by Geng et al. (2017).

In the following sections, we will explore green supply chain practices within the context of Vietnam, with a particular emphasis on the garment industry.

## 2.3 Garment manufacturing for export in Vietnam

Figure 1  
GDP growth, carbon emissions, energy consumption in Vietnam



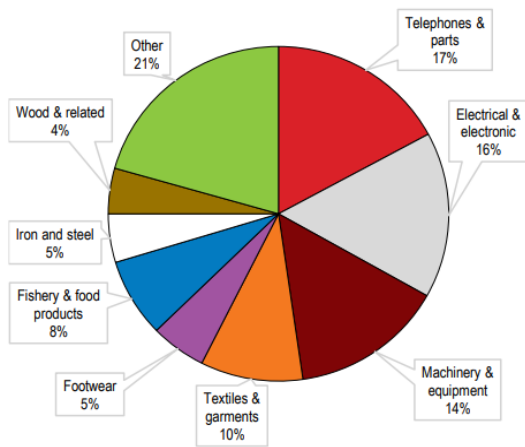
Source: OWID (2023)

Over the years from 1990 to 2018, Vietnam's Gross Domestic Product (GDP) exhibited a consistent upward trend, reaching 914,596 million dollars in 2018. This economic growth was accompanied by a noticeable increase in annual production-based CO<sub>2</sub> emissions, peaking at 274,223 billion tons in 2018, as well as an increase in annual consumption-based CO<sub>2</sub> emissions, reaching 172,716 billion tons in the same year. Vietnam's economic growth has led to rising carbon emissions, aligning with the Environmental Kuznets Curve theory (Stern et al., 1996), which suggests that as economies develop, environmental issues worsen initially but can improve with increased environmental awareness and regulations. Vietnam must prioritize transitioning to a sustainable economy, incorporating eco-friendly policies and renewable energy to balance economic prosperity with environmental responsibility.

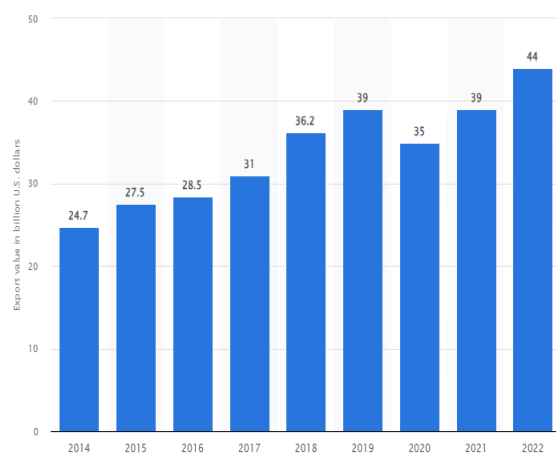
Additionally, primary energy consumption per 2011 dollar (PPP) experienced an overall rise, reaching 1.64 kWh per dollar in 2018. A higher energy intensity in Vietnam means that more energy is needed for each unit of GDP, indicating inefficient energy utilization to generate a given level of economic output in the country. These trends reflect Vietnam's economic expansion and its growing environmental impact over this time period.

As indicated by the survey conducted by the Vietnam Chamber of Commerce and Industry (VCCI, 2023), only 31.8% of domestic private enterprises possess a clear understanding of environmental regulations. Furthermore, 68% of businesses report adverse impacts from climate change. Additionally, 44% of domestic enterprises and 38% of foreign direct investment (FDI) enterprises admit to not fully complying with environmental regulations. Presently, awareness of green economy issues in Vietnam remains relatively nascent. Many businesses lack an understanding of their environmental responsibilities and often lack personnel well-versed in environmental laws. The complexity and inaccessibility of environmental regulations, coupled with the high compliance costs, contribute to this challenge.

**Figure 2**  
**Exports by-products in Vietnam (2021) and Vietnam’s textile & garment exports**



Source: CEIC (2021)



Source: Statista (2022)

Vietnam is a rapidly growing economy in transition that prioritizes green innovation in its development strategy (Huang et al., 2022). The garment manufacturing sector is a significant driver of Vietnam's socio-economic progress, exerting substantial influence on employment and exports. It constitutes more than 10% of the overall export revenue (2021), with a consistent upward trend from 2014 to 2022, except for a decline in 2020 attributed to the disruptions caused by the COVID-19 pandemic (see Figure 2). Nevertheless, it is important to note that the textile, apparel, and fashion (TAF) sectors are globally recognized as among the most environmentally polluting industries (Grazzini et al., 2021). Hence, this study underscores the significance of researching the Vietnamese garment industry.

The textile and garment industry in Vietnam consists of two major parts: textile and garment. Textiles are the initial stage in clothing manufacturing, produced through processes like spinning, weaving, knitting, and dyeing to create the fabric or material used for making garments. While garments are the final products created by cutting, sewing, and assembling textiles. The garment industry involves designing, cutting patterns, sewing, and adding finishing touches to create wearable clothing items (Nguyet, 2014).

The garment manufacturing industry in Vietnam is a crucial sector, yet there is a lack of scholarly work that concentrates on Green Supply Chain Management (GSCM) practices within this field. In examining other industries (as shown in Table 2), our literature review focused on prior research in green supply chain management, with a predominant utilization of the PLS-SEM model for investigation. However, it is worth noting that no existing research has explored the connection between green supply chain practices and stakeholder collaboration in Vietnamese garment industry.



**Table 2**  
**Literature review of green supply chain study in Vietnam**

Sectors	Model	Findings	Reference
8 economic sectors of Vietnam	PLS-SEM	Green supply chain management positively affects both global collaboration capability and firm performance. Additionally, global collaboration capability positively influences firm performance. Interestingly, unlike previous studies, the size of Vietnamese enterprises does not statistically moderate the relationship between green supply chain management and firm performance.	Nguyen, X. H., & Le, T. A. (2020)
Automobile, Electrical and electronic, chemical, textile	PLS-SEM	Internal awareness and customers' awareness have a positive relationship with both Green Supply Chain Management (GSCM) practice and GSCM performance. In contrast, suppliers' pressure and regulatory pressure only impact GSCM practice.	Do et al. (2020)
Construction	PLS-SEM	The study reveals that green design and green manufacturing positively and significantly impact all three outcome categories, whereas green procurement affects economic and social performance but has no influence on environmental performance.	Le, T. (2020)
Construction	PLS-SEM	The absence of direct effects from internal integration on both customer integration and green performance is surprising.	Pham, T., & Pham, H. (2021)
Electronic, agriculture, food, and textile.	PLS-SEM	Green supply chain management positively influences firm performance, with competitive advantage and supply chain integration playing statistically significant roles as both mediators and moderators.	Tran et al. (2022)
Electronics, agriculture, food, textiles	PLS-SEM	Green supply chain management (GSCM) has a positive and significant impact on the operational performance of businesses in Vietnam	Doan et al. (2022)
FDI companies	PLS-SEM	Organizational commitment and government support are positively related to both GSCM drivers and GSCM practices, while social networks only have a positive relationship with GSCM drivers.	Van et al. (2020)
MNCs in Vietnam	PLS-SEM	Green practices within the supply chain act as a positive mediator in the relationship between operational management practices and operational performance for multinational organizations operating in Vietnam.	Nguyet et al. (2020)
Steel Industry	PLS-SEM	Internal Environmental Management (IEM), eco-design, and internal recovery are positively linked to environmental performance. Additionally, green purchases play a significant moderating role among IEM, eco-design, internal recovery, and environmental performance.	Tran et al. (2023)
Textile	PLS-SEM	Green supply chain and green entrepreneurship have a positive impact on a sustainable environment. Furthermore, the results suggest that green knowledge sharing and employee green behavior can potentially serve as moderators that strengthen the relationship among the mentioned constructs.	Nguyen et al. (2023)
Tourism	PLS-SEM	Implementing green supply chain management in the tourism industry enhances competitive advantage, corporate reputation, and environmental performance, ultimately boosting financial performance through mediating variables.	Nguyen et al. (2020)
Tourism	PLS-SEM	Supply chain quality integration positively influences both green supply chain management and financial performance. Green supply chain management also positively affects environmental performance and financial performance, with no moderating role from size or institutional pressure in these relationships.	Tran et al. (2020)
Vietnamese manufacturing industries	ISM method, based on experts' perspectives.	The most challenging elements are "Financial Costs," followed by the absence of Vietnamese government green regulations and senior management support. "Information" challenges fall in the middle, and the least challenging issues are the lack of training courses on GSCM and customer awareness and pressure on GSCM.	Chen et al. (2022)

Moreover, Vietnam has been acknowledged as a favourable location for research that focuses on environmental and sustainability matters (Huang et al., 2022; Fadly, 2020). According to the statistics from the General Statistics Office, in the first five months of 2023, Vietnam's textile and garment export turnover reached 12.3 billion USD, decreasing by over 17% compared to the same period last year. One potential explanation for this could be the lack of effective and comprehensive green supply chain practices. Conversely, Bangladesh, a region that has effectively embraced green supply chain practices, is experiencing an uptick in orders from buyers during the current period (Manh, 2023; Binh et al, 2023).

According to the research conducted by Do & Tran (2021), it was found that market and competitive pressures have a beneficial influence on the adoption of environmentally friendly export strategies by garment businesses in Vietnam. Additionally, collaborative efforts within the textile and garment supply chain have a positive effect on the competitive advantage of these enterprises in the Vietnamese market. These findings align closely with the existing challenges related to market retention in Vietnam, underscoring the significance of future research in the Vietnamese garment industry, particularly in the area of fostering cooperation among stakeholders in the garment value chain.

The context of the Vietnamese garment industry in this study is significant as it is the first of its kind to thoroughly and comprehensively investigate the connections between stakeholder collaboration in GSCM and a company's sustainable performance, thereby contributing to the literature on this topic.

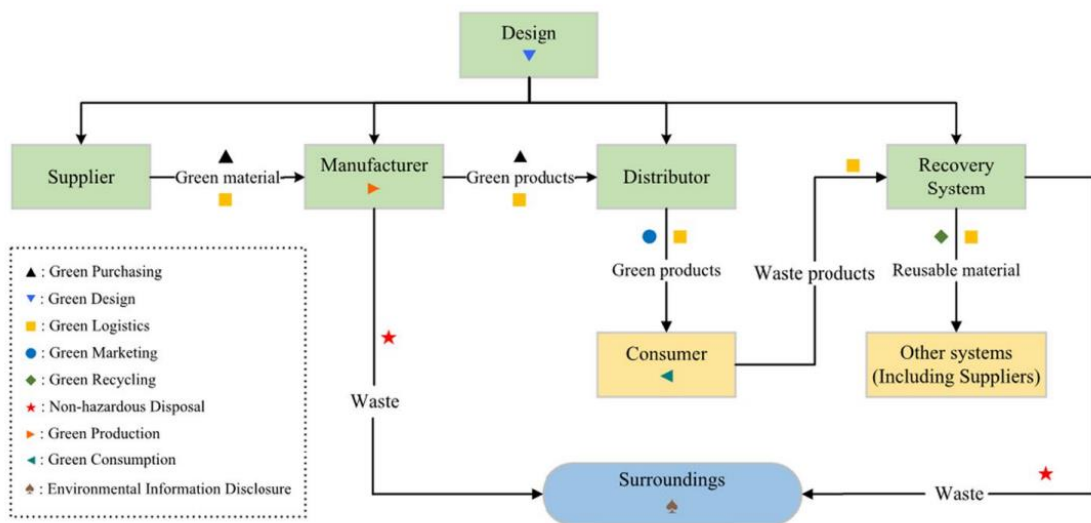
# Chapter 3 Theoretical Background

In this chapter, we will delve into the theoretical background, focusing on the construction of a theoretical framework that will underpin our research. As part of this process, we also will provide explanations for the theories and concepts that are directly relevant to our research objectives and hypotheses. This theoretical foundation will serve as the conceptual framework within which we will conduct our analysis and draw meaningful conclusions.

## 3.1 Green Supply Chain Management

Green Supply Chain Management (GSCM) consists of nine fundamental elements: eco-friendly design, sustainable procurement, environmentally-conscious marketing, green consumer practices, eco-logistics, eco-friendly production methods, recycling initiatives, non-hazardous waste disposal, and the dissemination of environmental information. Figure 4, as depicted in previous studies by [Abdallah et al. \(2012\)](#), [Olugu et al. \(2011\)](#) and [Sheng et al. \(2023\)](#), provides a visual representation of the interconnected nature of these processes and their engagement with diverse stakeholders.

**Figure 3**  
**GSCM and stakeholder relationship**



Source: [Sheng et al. \(2023\)](#)

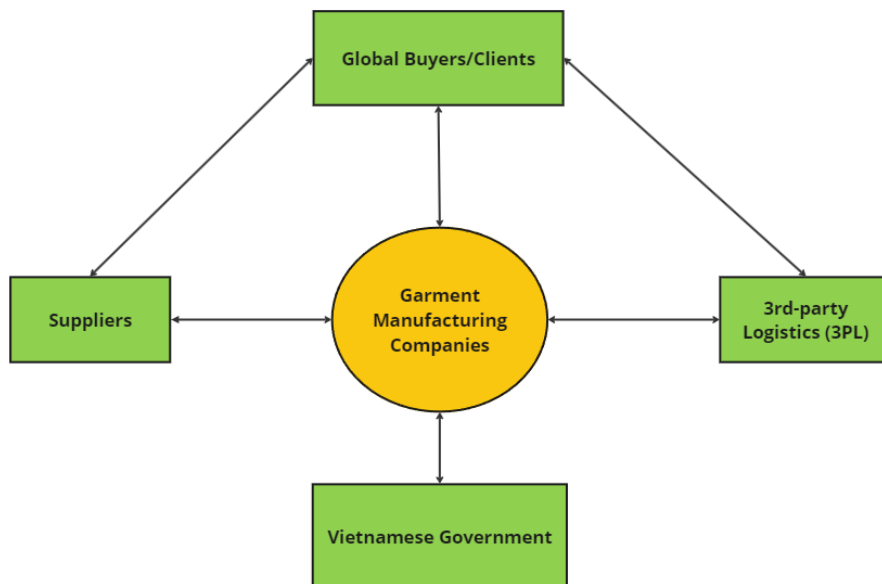
### 3.2 Stakeholder theory

The stakeholder theory offers a framework for overseeing organizations that comprise a range of internal and external parties. These parties, including employees, suppliers, buyers, and other entities, have the potential to be affected by business operations. Stakeholder theory suggests organizations create external effects on stakeholders. Then, stakeholders push organizations to reduce negatives and boost positive impacts. This theory promotes ethical principles and values in the management of an organization, encompassing actions such as environmental conservation and the establishment of sustainable supply chains, as exemplified by Jones (1995). In terms of organizational goals, the stakeholder theory suggests identifying individuals or groups that can influence the organization's ability to reach its objectives, or those who might experience consequences as a result of the organization achieving its goals, as proposed by Mitchell et al. (1997).

Regarding the environmental issues, stakeholder pressures internalize environmental concerns among supply chain members (Sarkis et al., 2010). Stakeholder analysis in Green Supply Chain Management (GSCM) highlights that not all GSCM practices boost firms' competitive advantage (Ahmed et al., 2020). In wrapping up, the evolution of stakeholder theory has yielded various perspectives and advancements. Nevertheless, its foundational principle persists: the recognition of external and internal groups as instrumental forces influencing an organization's operational practices (Sarkis et al., 2010).

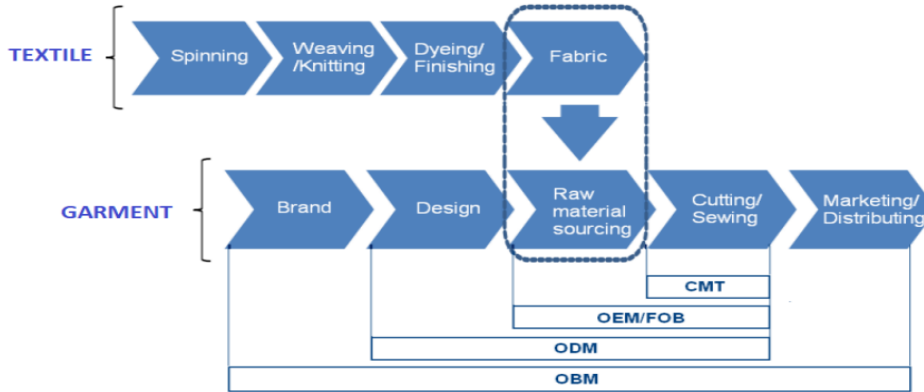
In the context of the Vietnamese garment industry, there are four primary stakeholders engaged in collaborative relationships with garment manufacturing companies. These key stakeholders include suppliers, global buyers, third-party logistics providers (3PL), and the Vietnamese government, as illustrated in Figure 4.

**Figure 4**  
**Garment manufacturing company's stakeholders**



### 3.2.1 Garment manufacturing companies

Figure 5  
Mains mode of production



Source: Bui (2014)

In the garment manufacturing industry, there are four distinct business methods (Figure 5). First, Cut-Make-Trim (CMT) involves a manufacturer handling fabric cutting, garment sewing, and finishing touches based on client specifications. Second, Original Equipment Manufacturing/Free on Board (OEM/FOB) sees the manufacturer not only producing garments but also sourcing materials and overseeing the entire production process. Third, Original Design Manufacturing (ODM) entails the manufacturer providing design services in addition to garment production, often with some client input. Finally, Original Brand Manufacturing (OBM) involves a company producing clothing under its own brand, managing design, production, marketing, and distribution. These methods cater to varying levels of client involvement and manufacturing responsibilities in the apparel sector. Because the sector in Vietnam is largely composed of small “cut, make, and trim” (“CMT”) companies, which conduct their work at the very final stages of the manufacturing value chain. Therefore, this research focuses on investigating these garment CMT (Cut, Make, and Trim) companies.

### **3.2.2 Global buyers**

Global buyers/clients, as referenced in this context, pertain to renowned brands seeking manufacturing partnerships in Vietnam to produce products on their behalf. Prominent examples of such global buyers/clients include Nike, Adidas, and VF, among others. These brands engage in the practice of outsourcing their manufacturing processes to Vietnamese companies within the garment industry. In this paper, we have chosen to use a single brand as a representative example of a global buyer named buyer X. However, in consideration of data security and confidentiality, we have refrained from disclosing the specific name of this buyer.

Global buyers are central to the value chain, overseeing the entire process. Hence, garment manufacturing companies are obligated to adhere to the environmental regulations and laws of their respective countries. However, their power can lead to pressure on suppliers, which can strain long-term relationships in supply chains (Talay et al., 2020).

### **3.2.3 Suppliers**

Suppliers in the garment industry play a crucial role in providing essential raw materials, including fabric, foam, buckles, locks, and various other items, as per the selection made by the buyer. The collaboration between garment manufacturing companies and their suppliers are pivotal in the production process. Additionally, a close partnership is maintained between the garment factories, suppliers, and the buyer to ensure the smooth and efficient execution of production activities.

### **3.2.4 Third-party logistics (3PL)**

In the context described, third-party logistics (3PL) providers offer essential logistics services for the transportation and delivery of the final products to various destinations, including the United States, European countries, and other international locations. These 3PL entities play a pivotal role in managing the distribution and supply chain processes to ensure efficient and timely delivery of the manufactured goods to their intended markets.

Due to constraints related to time and resource availability for conducting comprehensive research within a restricted timeframe, the involvement of third-party logistics (3PL) stakeholders falls outside the scope of this study. Excluding 3PL providers is not a significant concern for our research because our primary focus is on the internal green practices of factories and their collaborations with suppliers and buyers. Additionally, in our specific case study, 3PL providers are more closely associated with buyers, primarily involved in tracking delivery progress, aligning with our research objectives and scope.

### **3.2.5 The role of Vietnamese government in Green Supply Chain Management (GSCM)**

The government plays a multifaceted role in its interactions with garment manufacturing companies. These companies are obliged to adhere to the laws and regulations set forth by the government, particularly with regard to environmental and social responsibility. This entails a commitment to complying with legal requirements pertaining to environmental sustainability and social welfare as part of their operational practices.

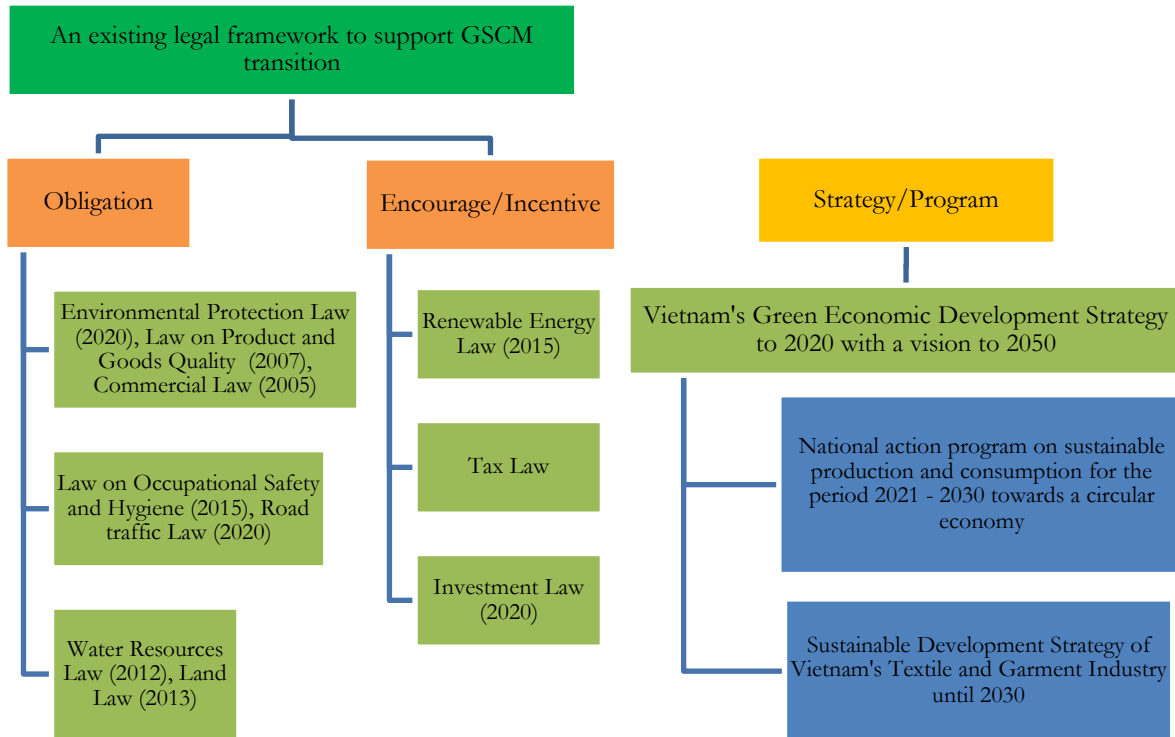
Vietnam embarked on its journey toward a green economy in 2012 with the introduction of a national strategy by the Prime Minister. This strategy is designed to prioritize objectives such as reducing carbon emissions, minimizing energy consumption, and enhancing the sustainable management of natural resources in support of long-term sustainable development, making an important contribution to repelling the negative impacts of climate change. Up to now, Vietnam has not yet completed the legal framework related to circular economy. However, Vietnam is actively pursuing the goal of achieving a greener economy by continuously working to develop and enhance its sustainable legal framework.

Vietnam's legal framework for Green Supply Chain Management (GSCM) within the garment industry is supported by several key laws (Figure 6). Notably, the Environmental Protection Law, which was amended in 2020, plays a pivotal role. This law establishes and enforces environmental standards, necessitating compliance from businesses engaged in specialized handmade garment production. It particularly focuses on environmental protection during various manufacturing processes, including handling and discharge.

Furthermore, the Law on Product and Goods Quality, enacted in 2007, is instrumental in ensuring that products meet both environmental protection and consumer health requirements. Simultaneously, the Law on Occupational Safety and Hygiene, passed in 2015, emphasizes the well-being of workers in the garment manufacturing sector. It addresses critical aspects such as working conditions and the creation of a sustainable working environment. The Road Traffic Law, effective as of 2020, encompasses regulations pertinent to traffic safety, vehicle standards, and freight transport procedures. The Water Resources Law, introduced in 2012, focuses on water resource management and monitoring, particularly concerning businesses operating in the garment manufacturing industry. Its aim is to ensure responsible and sustainable water resource usage. The Land Law, which was updated in 2013, outlines regulations concerning land management, use, and protection, which includes land designated for the construction of production and industrial facilities.

In parallel, the Renewable Energy Law, enacted in 2015, serves to promote the development of renewable energy sources and the adoption of clean energy practices within the industry. Additionally, the Commercial Law, established in 2005, is an integral part of Vietnam's legal and policy system, with direct relevance to green production in the garment manufacturing sector. Businesses producing green garments must adhere to Trade Law provisions to ensure their products meet sustainability and safety standards. The Tax Law provides incentives for businesses engaged in green economy activities, including tax reductions and exemptions for products and projects aligned with green economy principles within the garment industry. Lastly, the Investment Law of 2020 lays down regulations to support and facilitate projects related to the production of green garments, creating favourable conditions for investment in sustainable practices. Together, these laws establish a comprehensive legal framework for advancing GSCM in the Vietnamese garment industry.

**Figure 6**  
**Legal framework in Vietnamese garment industry for GSCM**



Moreover, the government has enacted initiatives at both the national and industrial levels to promote a more environmentally sustainable economy. During the 2021 United Nations Climate Change Conference (COP26), Prime Minister Pham Minh Chinh publicly affirmed Vietnam's resolute commitment to combatting climate change. This commitment notably includes the goal of achieving net zero emissions by the year 2050 (Phuong, 2021). As outlined in the national strategy for green growth spanning the years 2021 to 2030, with a vision for 2050, signed by Prime Minister (Le, 2021), there are four primary objectives aimed at mitigating the adverse effects of climate change. These objectives encompass the reduction of CO<sub>2</sub> emissions, the promotion of environmentally friendly economies, the adoption of sustainable lifestyles and consumption practices, and the facilitation of a green transition process guided by principles of equity and resilience. Furthermore, the garment industry in Vietnam receives support for the adoption of eco-friendly supply chain practices through two additional initiatives: the National action program on sustainable production and consumption spanning from 2021 to 2030, aimed at fostering a circular economy (SWITCH, 2020), and the Sustainable Development Strategy of Vietnam's Textile and Garment Industry until 2030 (VITAS, 2023).

In recent years, Vietnam has been progressively enhancing its legal framework to promote sustainable economic development with a focus on green initiatives. However, the country is still in the early stages of green economic development, facing challenges related to legal framework transition, funding, human resources, and scientific and technological resources. Therefore, in the coming years, Vietnam needs to prioritize the implementation of a comprehensive set of solutions to foster green economic growth in the current context (Khanh, 2023).



### 3.3 Coordination theory

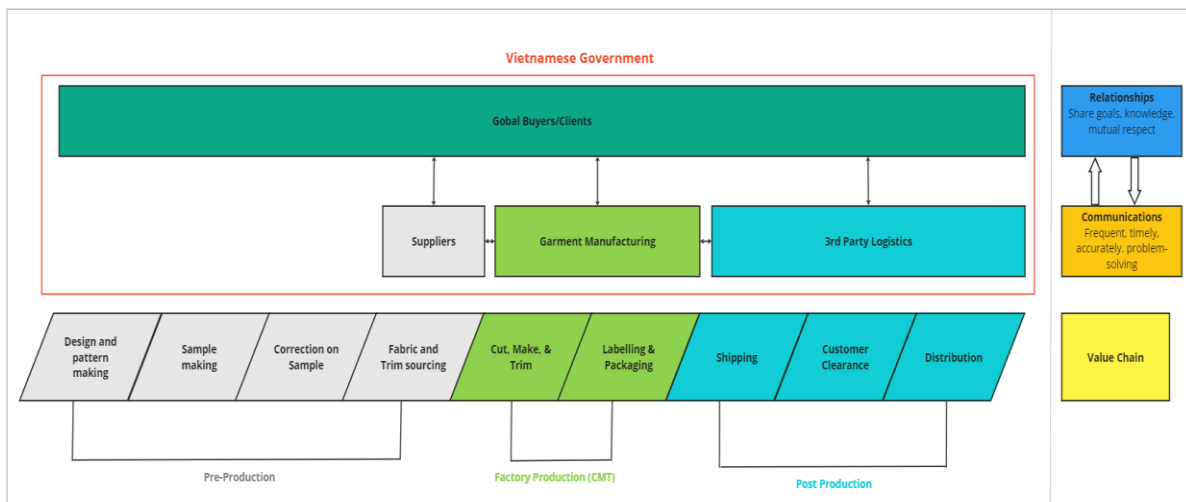
Coordination theory has the potential to both learn from and provide insights to various fields like economics, sociology, and organization theory (Malone & Crowston, 1990; Malone, 1988). It explores how diverse systems can achieve coordination, emphasizing the management of interdependencies between activities to accomplish a unified goal (Malone & Crowston, 1994). According to Crowston, coordination theory is still evolving, particularly in understanding how coordination operates within complex systems. He highlights individuals within a system face challenges in achieving coordination due to dependencies within the organization, which hinder the efficiency and effectiveness of processes. In wrapping up, coordination theory is characterized as a set of principles that outline how the actions of distinct individuals can be systematically organized to attain specific objectives.

### 3.4 Stakeholder collaboration and green supply chain management

By utilizing a coordination theory perspective, [Zhu et al. \(2012\)](#) indicated that integrating external and internal Green Supply Chain Management (GSCM) practices yields improved performance results across the entire supply chain. The coordination theory asserts that businesses should unify actions throughout their supply chain. Furthermore, it contends that coordinating organizational activities, both internally and externally, such as management practices, leads to improved performance results within the supply chain ([Ahmed et al., 2020](#)).

The concept of the green supply chain involves weaving environmental considerations into production, engineering, and logistics processes ([Sarkis, 2006](#)). In a coordinated supply chain, a central firm assumes the role of decision-maker, and by leveraging a network of relationships, collaborative goals lead to enhanced performance outcomes ([Shah et al., 2008](#)).

**Figure 7**  
**Stakeholder coordination in Vietnamese garment industry**



Within the garment industry, coordination theory provides valuable guidance for stakeholders engaged in green supply chain management. The theory underscores the paramount importance of nurturing robust relationships and facilitating seamless communication among supply chain actors. This entails a multifaceted approach, encompassing close collaboration, the exchange of critical information, the incorporation of cutting-edge technologies, compliance with evolving regulatory mandates, and the utilization of performance metrics as essential strategies. By emphasizing these facets, coordination theory encourages garment industry players to work collaboratively with manufacturers, suppliers, global buyers, 3PL, and government agencies promote sustainability (Figure 7). It underscores the necessity of transparent information sharing regarding environmental practices and production processes.

### **3.4.1 Imposition of institutional pressure on garment manufacturing firms**

The Vietnamese government has implemented environmental regulations and policies on manufacturers to boost Green Supply Chain Management (GSCM) and other corporate environmental practices, largely to enhance exports and attract foreign investment (Le, 2021; SWITCH, 2020). Institutional pressures play a pivotal role in driving companies to adopt internal GSCM practices, similarly influencing automotive suppliers to pursue GSCM measures (Vanalle et al., 2017). Firms are compelled to conform to institutional pressures exerted by external stakeholders.

Buyer monitoring plays a crucial role in manufacturers' adoption of internal Green Supply Chain Management (GSCM) practices (Laari et al., 2016). Companies embrace certifications like ISO 14001 or HIGG FEM due to buyers' environmental assessment (Vachon, 2007). Buyers hold significant influence as key stakeholders, being essential for firms' sustainability, and they notably shape organizations' strategic choices.

### **3.4.2 Internal Green Supply Chain Management (IGSCM)**

Internal Green Supply Chain Management (GSCM) refers to environmentally responsible practices adopted within an organization. Successful implementation of these practices relies heavily on coordination across all functional departments and the entire supply chain (Rao & Holt, 2005). Internal GSCM encompasses activities like obtaining ISO 14001 or FIGG FEM certification, conducting environmental audits of departments, labelling products with eco-labels, establishing green procurement systems, reducing greenhouse gas emissions, and maintaining green product compliance data (Yu et al., 2014). These practices are employed to mitigate negative impacts and externalities, aligning with stakeholder pressures.

### **3.4.3 Supplier-Factory-Buyer collaboration**

The attainment of environmental sustainability necessitates cooperative efforts among manufacturing facilities, suppliers, buyers, as highlighted by Tachizawa et al. (2015). The alliance between global buyers and manufacturing facilities holds significant importance in the domain of Green Supply Chain Management (GSCM), as underscored by Woo et al. (2016). This collaboration with purchasers serves as a means to actualize a shared objective: the integration of eco-friendly practices throughout a well-coordinated supply chain. Through this collaboration with purchasers, the collective goal of implementing environmentally responsible practices within a seamlessly coordinated supply chain is realized.

Green suppliers occupy a pivotal role in shaping a strategy for a green supply chain and elevating the overall performance in sustainability, as emphasized by Woo et al. (2016). In the context of a green supply chain, suppliers make notable contributions to environmental sustainability by incorporating eco-friendly materials and adhering to initiatives that prioritize environmental consciousness, as elucidated by Yang et al. (2011).

## **3.5 Firm performance and green supply chain management**

### **3.5.1 Financial Performance**

Enhancements in a firm's financial performance are evidenced by decreased wastages and reworks, heightened productivity, and an increased return on assets (Fullerton et al., 2014). Green initiatives contribute to both ecological and financial improvements within a well-coordinated supply chain (Yang et al., 2011). Combining buyer collaboration with internal green practices stands out as the most potent approach to boosting financial performance (Laari et al., 2016).

### **3.5.2 Operational Performance**

Manufacturers are compelled to embrace green practices due to increased buyer demand for environmental sustainability. This adoption not only enhances operational performance but also becomes a foundation for elevated buyer satisfaction (Chavez et al., 2016). Taking a proactive stance in environmental management leads to enhanced operational performance within firms (Vachon & Klassen, 2008). Engaging in internal environmental management activities and collaborating with suppliers and buyers contribute to enhanced operational performance across dimensions such as delivery, flexibility, cost, and quality (Yu et al., 2014a).

### **3.5.3 Environmental Performance**

Manufacturing firms have the capacity to diminish harmful air emissions, water pollution, and solid waste, along with minimizing the use of toxic materials (Zhu et al., 2008). Weak coordination in external green practices can compromise the environmental performance of manufacturing firms (Zhu et al., 2012). When influenced by external stakeholders' pressure, the goal of enhancing environmental performance is to mitigate the adverse effects of the externalities generated by the firm.

## 3.6 Hypothesis development

### 3.6.1 IGSCM and pressures from different institutions

#### *3.6.1.1 Institutional Pressures and IGSCM*

Organizations often find themselves facing a multitude of pressures originating from a diverse array of stakeholders. In line with stakeholder theory, the influence of key stakeholders applying institutional pressures can be instrumental in driving organizations to enhance their adherence to regulations while transitioning from traditional business practices to more environmentally sustainable operations (Ahmed et al., 2019). Besides that, Government-imposed regulatory pressures play a crucial role in compelling businesses to adopt reactive internal environmental management practices (Zhu et al., 2012). Therefore, In the presence of robust institutional pressures, organizations typically allocate resources towards the implementation of comprehensive environmental practices (Vanalle et al., 2017).

Numerous researchers have conducted empirical studies to examine the influence of institutional pressures on organizations, with a consistent finding of a positive and significant relationship with the adoption of internal environmental and green practices (Zhu et al., 2013; Mohanty and Prakash, 2014; Vanalle et al., 2017; Yang, 2018; Ahmed et al., 2020). Building on these research findings and empirical results, we formulate our first hypothesis (H) as follows:

**Institutional pressures have a positive impact on internal green supply chain practices (H1a).**

#### *3.6.1.2 Buyer Monitoring and ISGCM*

Global buyers often require their suppliers to proactively implement environmental practices (Zhu & Sarkis, 2004). Therefore, the decision of an organization to adopt environmental management practices is influenced by stakeholders (Sarkis et al., 2010).

Buyer monitoring encompasses various activities such as gathering, evaluating, assessing, and analyzing supplier information, the supplier's environmental management practices, and incoming products (Lee, 2008). It is also defined as a system designed to ensure that suppliers adhere to specific environmental commitments and to implement corrective actions when necessary (De Giovanni & Vinzi, 2014). Several studies have conducted empirical investigations into the influence of buyer monitoring on the adoption of internal green practices and consistently observed a significant and positive relationship between these factors (De Giovanni & Vinzi, 2014; Laari et al., 2016; Ahmed et al., 2020). Given the buyer's pivotal role as a key stakeholder in accordance with stakeholder theory, and considering the aforementioned discussion, I formulate the hypothesis (H) as follows:

**Environmental monitoring by the global buyer has a positive impact on internal Green Supply Chain Management (GSCM) practices (H1b).**

### 3.6.2 IGSCM and stakeholder collaboration on firm performance.

#### 3.6.2.1 IGSCM and stakeholder collaboration

To establish external environmentally responsible partnerships within a supply chain network, an organization must actively adopt and implement internal sustainability practices. This alignment with coordination theory requires the coordinated efforts of diverse individuals or functional units within the system to achieve a specific objective (Malone, 1988). Shifting from a distant and transactional approach to a more collaborative and cooperative relationship between buyers and the supply chain is crucial for achieving more favourable outcomes in environmental management efforts (Preuss, 2005). The incorporation of environmentally sustainable practices into the supply chain, encompassing both logistical and technological aspects, is intricately linked to monitoring and collaboration with key suppliers and buyers (Vachon & Klassen, 2006).

The empirical studies conducted by Zhu et al. (2013), Laari et al. (2016), and Khan et al. (2017) collectively suggest a strong and positive correlation between internal and external eco-friendly practices within the supply chain's functional operations. According to stakeholder theory, suppliers and buyers both play crucial roles, but effective coordination and collaboration between them are key factors that can enhance Green Supply Chain Management (Zhu & Sarkis, 2004; Ahmed et al., 2020). Consequently, we formulate our hypotheses (H) as follows:

**H2: Internal environmentally sustainable practices have a positive impact on environmental collaboration with buyers (H2a), with suppliers (H2b).**

#### 3.6.2.2 Environmental collaboration and firm performance

##### a. IGSCM and operational performance

Vachon & Klassen (2008) conducted research to investigate a firm's environmental collaboration with its suppliers and buyers and discovered that it exerts a positive and substantial influence on operational performance. This finding was further corroborated by Ahmed et al. (2019), where collaborations were identified as a result of well-coordinated efforts among partners. Additionally, Yu et al. (2014a) also provided support for this notion in their study, establishing a significant and positive relationship between Green Supply Chain Management (GSCM) with suppliers and buyers and operational performance.

##### b. IGSCM and financial performance

Woo et al. (2016) found a noteworthy link between environmental collaboration and financial performance, a conclusion consistent with the observations made by Corsten and Felde (2005). In their research, Corsten and Felde noted a positive and substantial influence of supplier collaboration on a company's financial performance.

##### c. IGSCM and environmental performance

De Giovanni (2012) provided further support for this perspective in his research, demonstrating a significant association between external environmental management and environmental performance. Laari et al. (2016) conducted a study that unveiled significant associations, including supplier monitoring with supplier collaboration and environmental performance, as well as positive and significant links between environmental collaboration with buyers and financial performance.

Considering the vital role of coordination among stakeholders, we establish our hypotheses (H) as follows in alignment with coordination and stakeholder theories:

**H3: Implementation of internal GSCM practices has a positive impact on environmental performance (H3a), operational performance (H3b), financial performance (H3c).**

**H4: The extent of environmental collaboration with buyers has a positive impact on the enhancement of environmental performance (H4a), operational performance (H4b), financial performance (H4c).**

**H5: The engagement in environmental collaboration with suppliers has a positive impact on environmental performance (H5a), operational performance (H5b), financial performance (H5c).**

**H6: The interaction between buyer-supplier collaboration and factory-supplier collaboration has a positive impact on environmental performance (H6a), operational performance (H6b), financial performance (H6c).**

### ***3.6.2.3 Impact of environmental performance on firm performance***

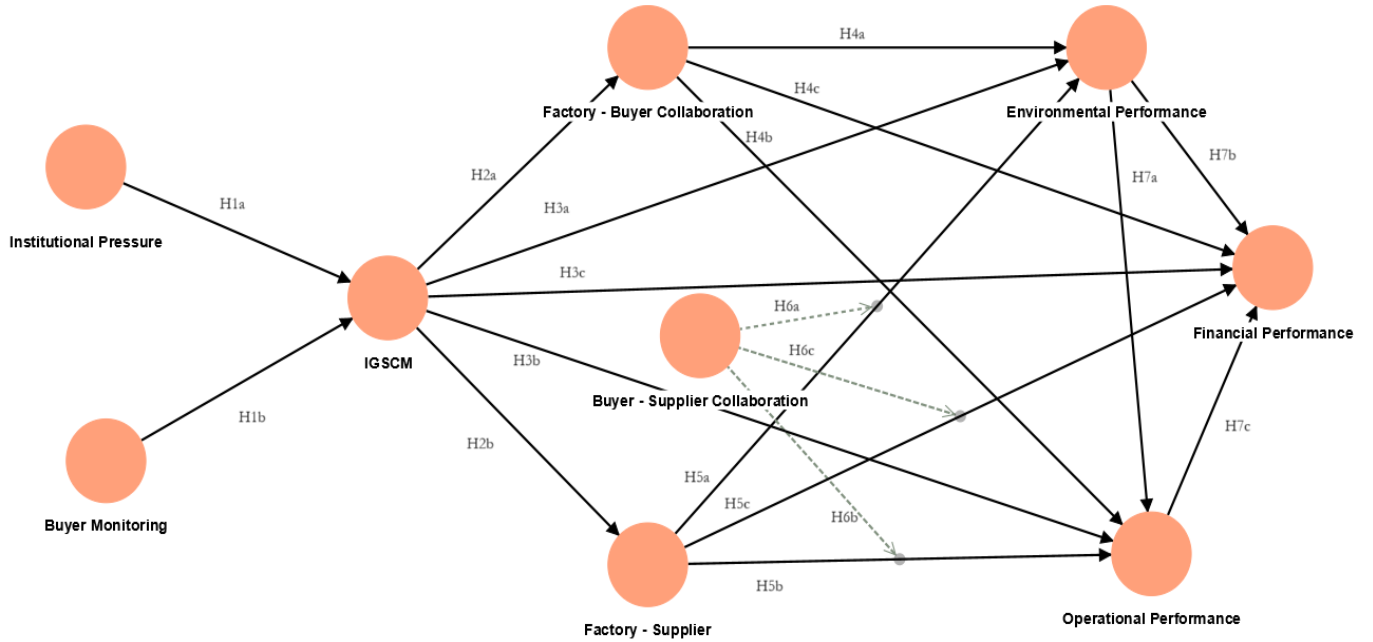
As organizations strive to improve their environmental performance, they incorporate environmentally sustainable practices while acknowledging the intrinsic link between this effort and essential performance metrics like operational efficiency and financial sustainability within their organizational context.

There is a noteworthy and positive correlation between environmental performance and both financial and operational performance in manufacturing firms (Hubbard, 2009) as well as the support provided by Fullerton et al. (2014), Yu et al. (2014), and Ahmed et al. (2020) for the idea that operational performance significantly affects financial performance. We propose the following hypothesis (H):

**H7: Environmental performance has a positive impact on the operational performance (H7a), financial performance (H7b) and Operational performance has a positive impact on financial performance (H7c).**

### 3.7 Research Framework

**Figure 8**  
**Research framework**



In this study, the independent variables under examination include institutional pressures (IP), buyer monitoring (BM), and buyer-supplier collaboration (BS). On the other hand, the dependent variables encompass internal green supply chain practices (IG), factory-buyer collaboration (FB), factory-supplier collaboration (FS), financial performance (FP), operational performance (OP), and environmental performance (EP).



## Chapter 4

# Research methodology and data collection

In this chapter, we comprehensively delve into the methodology and data collection procedures, which will aid in determining the analytical models to be employed and shed light on the nature of data to be collected as well as the data collection methodologies to be utilized.

### 4.1 Research design

In this research, a path model and statistical analysis employed to investigate the relationships between different constructs using the Partial Least Squares Structural Equation Modelling (PLS-SEM). This model is commonly applied in economic research (Petković et al., 2022; Wang et al., 2022) and supply chain management research (Kaufmann et al., 2015) to assess the path coefficient linking the dependent and independent constructs. In this research, we employed path analysis as the methodology to examine the causal relationships between our independent variables, which consist of institutional pressures (IP), buyer monitoring (BM), and buyer-supplier collaboration (BS), and our dependent variables, which encompass internal green supply chain practices (IG), factory-buyer collaboration (FB), factory-supplier collaboration (FS), financial performance (FP), operational performance (OP), and environmental performance (EP).

Afterwards, we assessed the impact of GSCM practices on factories' performance by using Benchmarking method (Elmuti et al., 1997) and proposed critical success factors (CSFs) chosen as factor loadings in this paper.

### 4.1.1 PLS-SEM model

Partial Least Squares Structural Equation Modelling (PLS-SEM) is a statistical technique used for modelling and analysing the relationships between variables in a structural equation model. It is particularly well-suited for complex and data-driven research. Path coefficients are typically used in structural equation modelling (SEM) or path analysis. They represent the strength and direction of a specific hypothesized causal relationship between variables within a larger model. They are used to test theoretical models and hypotheses about the causal relationships between variables while correlation assesses the strength and direction of a general association between two variables. Path coefficients imply a directional causal relationship, indicating that changes in the independent variable have an effect on the dependent variable through a specified pathway (Hair et al., 2019).

As explained by Hair et al. (2010), SEM technique is chosen due to its high level of precision in analysing complex relationships among multiple variables. The technique employs various models to illustrate the relationship between observed variables and offer a quantitative assessment of the theoretical model, as stated by Schumacker & Lomax (2004). PLS-SEM has been proven effective in handling complex models that contain a significant number of indicators, constructs, or relationships, and has become more widely accepted as an appropriate method for such models over the years, as supported by Barclay et al. (1995). Additionally, the PLS-SEM algorithm evaluates the measurement model using partial regression and the structural model using ordinary least squares separately, which provides better estimation in scenarios involving small sample sizes and complex models, setting PLS-SEM apart from other types of SEM, as indicated by Hair et al. (2019).

The measurement model within PLS-SEM holds significant importance, serving as a vital element in confirming the authenticity and consistency of latent constructs. This entails evaluating aspects such as content validity, the reliability and validity of constructs, discriminant validity, and the scrutiny of model fit. Further elaboration on these measurement criteria will be provided in Chapter 5.3, where we discuss the results of the PLS-SEM model.

### 4.1.2 Benchmarking

Benchmarking has witnessed a surge in its adoption across various industries. Beyond its role as a mere data collection tool for evaluating a company's performance against its peers, benchmarking serves as a versatile technique applicable to both service and manufacturing sectors. It serves as a means of unearthing novel insights and innovative methods for enhancing operational processes, thereby enhancing the organization's capacity to meet customer demands effectively (Elmuti et al., 1997).

In this research, we employ the Benchmarking of Sustainability method, is inspired by the Lean Environmental Benchmarking (LEB) method proposed by Tomelero et al. (2017). The LEB method presents a structure that can be applied to the study of green supply chain practices and firm performance.

The critical success factors (CSFs) proposed in this study represent the pivotal elements or specific variables that are indispensable for an organization to attain its objectives and excel within the specified context. These CSFs were derived through the analysis of loading factors, aligning them with the outcomes from running the model presented in this paper.

## 4.2 Data collection

The data collection process commences with the author's creation of two surveys (as outlined in Table 3). These surveys are designed in accordance with the theoretical framework developed for this research, taking into account the insights presented in the paper by [Ahmed et al. \(2020\)](#) that served as the basis for this study.

Respondents for this study were selected through a purposive sampling technique. This research focused on two stakeholder perspectives including buyer X as a focal firm, and garment manufacturing companies. A mixed-method approach is utilized for both the garment factory survey and the buyer survey.

**Table 3**  
**Survey objects**

Actor	Topic	Survey	Interview
Garment factories engaged in contract manufacturing with Buyer X.	Institutional pressure, customer monitoring, IGSCM, factory-supplier collaboration, factory-buyer collaboration, firm performance.	Survey 1	Interview 1: Interviews with 3 factories about compliance on green supply chain management with the government, global buyers.
Buyer X as a focal firm	Buyer-supplier collaboration.	Survey 2	Interview 2: An interview with a production manager working at buyer X.

### 4.2.1 Data collection from the garment factories

Survey 1 was sent out to the garment manufacturing companies that are required to enter into a contract with a buyer X and must possess either ISO 14001 or FIGG FEM certification ([Appendix 1](#)). The survey participants occupy roles in the field of supply chain management, ranging from executives, senior officers, assistant managers, managers, general managers, to directors within garment companies. Notably, the compliance departments within the factories play a crucial role in the implementation of green supply chain practices. These departments are primarily responsible for overseeing all procedures and managing the transition to green supply chain practices, serving as intermediaries in its application across all departments within garment manufacturing companies. They are required to collaborate with various stakeholders in the garment value chain, which includes buyers, suppliers, third-party logistics companies, and the Vietnamese government. Therefore, this underscores the crucial role played by supply chain departments for the respondents participating in this survey.

An online survey using a Google form questionnaire conducted with purposive sampling comprising a total of 37 questions ([Appendix 2](#)). All questions are answered using a 5-point Likert scale (1=not at all, 2=a little, 3=to some degree, 4=relatively significant, 5=significant). However, in the case of the firm performance questionnaire, a 5-point Likert scale has been incorporated, featuring a percentage-based assessment (1=not at all, 2=a little - below 20%, 3=to some degree - between 20% and below 40%, 4=relatively significant - from 40% to below 80%, 5=significant - above 80%). Both the survey and interviews were conducted over a period of three months, specifically between July and September in 2023. To boost the credibility of the data, encouraging cross-departmental collaboration to collectively address the survey questions is advisable. As an incentive for their participation, upon survey completion, respondents will receive a token of appreciation in the form of an online shopping voucher.

In reference to the interviews conducted, a total of three interviews were carried out, each involving a different factory. These three interviews were intended to serve as representatives by three different firm sizes (101-499 employees, 500-1000 employees, more than 1000 employees) for the entire group of 13 factories. The interview questions primarily focused on assessing the extent to which these companies comply with green supply chain practices in accordance with the legal framework (Appendix 3). The objective was to determine whether the existing legal framework adequately supports them in their efforts to integrate environmentally sustainable practices.

#### 4.2.2 Data collection from the global buyer X

For the buyer data collection, a survey pertaining to buyer-customer collaboration (survey 2) was distributed with a 5-point Likert scale (1=not at all, 2=a little, 3=to some degree, 4=relatively significant, 5=significant). This survey was sent to the production manager at the buyer X one month in advance, specifically in July 2023, preceding the commencement of interviews scheduled for August 2023. The production manager at buyer X, responsible for monitoring various stakeholders within their company's value chain, was assigned the responsibility of assessing the extent of collaboration with suppliers in multiple garment manufacturing factories that maintain contracts with the buyer. An online survey was administered using a Google Form questionnaire, employing purposive sampling methods. The questionnaire consisted of a set of six questions related to the degree of buyer-supplier collaboration for each of the assessed garment factories (Appendix 4). Moreover, the short interview was taken after filling out the survey in order to dissent an insight into the answer. During the interview, the production manager leveraged the findings from environmental audits (Appendix 5) conducted in 3 factories to gain additional insights and information.

### 4.3 Sample size

By employing precise sampling methods, we collected 13 responses from the targeted research population for the factory survey. This population comprised supply chain practitioners working within ISO 14001 or FIGG FEM-certified garment manufacturing companies in Vietnam. Additionally, we obtained one dataset through a buyer survey with a focal firm X regarding buyer-supplier collaboration.

While PLS-SEM is indeed advantageous for research with limited sample sizes (Hair et al., 2019). It is essential to note that, like other statistical techniques, it can experience certain limitations in such scenarios. Specifically, when applied with small sample sizes, PLS-SEM may exhibit heightened standard deviations, reduced statistical power, and decreased accuracy (Goodhue et al., 2012). This paper underscores the significance of addressing the small sample size issue. Nevertheless, it should be noted that this paper also serves as a critical foundation, paving the way for further research that should be conducted with a larger sample size.

In order to increase the reliability of the response, data was collected through a combination of survey questionnaires and interviews, serving as the primary instruments for data collection, consisting of 41 items designed to assess performance outcomes (Appendix 6). In the next chapter, Table 4 provides comprehensive information regarding the constructs that were adapted and their respective sources and Table 5 provides a tabular overview of the demographic characteristics of the survey respondents.

# Chapter 5

## Results and Discussion

### 5.1 Overview

In this section, a comprehensive data analysis was conducted on the data collected in the study. The primary aim was to examine the pressures and influences affecting a garment firm's internal green supply chain practices, as well as the impact of internal green practices on performance measures both upstream and downstream in the supply chain. The independent variables considered in this study encompass institutional pressures (IP), buyer monitoring (BM), and buyer–supplier collaboration (BS). Meanwhile, the dependent variables consist of internal green supply chain practices (IG), factory - buyer collaboration (FB), factory - supplier collaboration (FS), financial performance (FP), operational performance (OP), and environmental performance (EP).

**Table 4**  
**Latent variables and their sources**

Latent Variables	Definition	Source
Institutional Pressure (IP)	Firms have to adhere to institutional pressures that are exerted by external stakeholders on the firms.	Zhu et al. (2013); Mohanty & Prakash (2014); Vanalle et al. (2017); Yang (2018); Ahmed et al. (2019); Ahmed et al.(2020)
Buyer Monitoring (BM)	Firms adopt certifications (ISO 14001 or FIGG FEM) as the result of the environmental monitoring of buyers.	Vachon (2007); Lee (2008); Laari et al. (2016); De Giovanni & Vinzi (2014); Laari et al. (2016); Ahmed et al. (2020)
Internal GSCM (IG)	Internal GSCM involves practices such as ISO 14001 certification, an environmental audit of departments, eco-labeling of products manufactured, green procurement system, reduction of greenhouse emissions, green product compliance data.	Rao & Holt (2005); Yu et al. (2014); Ahmed et al. (2020)
Environmental collaboration between factory and supplier (FS)	By collaborating with suppliers shared a goal of achieving green practices in a coordinated supply chain is materialized.	Vachon & Klassen (2006); Zhu et al. (2008); De Giovanni (2012); Tachizawa et al. (2015); Woo et al. (2016); Ahmed et al. (2020)
Environmental monitoring of buyer and supplier (BS)	The coordination between buyers and suppliers in the context of internal and external green supply chain practices which also covers the aspect of external groups influencing the organization's practices.	Vachon & Klassen (2006); Zhu et al. (2008); Yang et al. (2011); De Giovanni (2012), Tachizawa et al. (2015); Woo et al. (2016); Ahmed et al. (2020)
Environmental collaboration with buyers (FB)	By collaborating with buyers shared a goal of achieving green practices in a coordinated supply chain is materialized.	Vachon & Klassen (2006); Zhu et al. (2008); Yang et al. (2011); De Giovanni 2012, Tachizawa et al. (2015); Woo et al. (2016); Ahmed et al. (2020)
Environmental performance (EP)	Manufacturing firms can curb down hazardous air emissions, water, and solid waste and reduced consumption of toxic materials.	Zhu et al. (2008); Zhu et al. (2012); Ahmed et al. (2020)
Financial performance (FP)	A firm's financial performance is indicated by a reduction in wastages and reworks, improved productivity, increased return on assets.	Green et al. (2012), Yang et al. (2011); Fullerton et al. (2014); Laari et al. (2016); Ahmed et al. (2020)
Operations performance (OP)	Enhance and improve operational performance in terms of delivery, flexibility, cost and quality.	Vachon & Klassen (2008); Yu et al. (2014a); Ahmed et al. (2020)

The majority of the respondents are female professionals holding positions related to compliance within their respective companies. Additionally, some of them engage in cross-departmental collaboration, collaborating with colleagues from departments such as Supply Chain Management, Sales, and Production to provide comprehensive responses to the survey questions. Approximately 92% of the companies surveyed have foreign origins and are based in Vietnam. Furthermore, these companies typically boast a substantial headcount, with most employing over 1000 employees. All of these factories are engaged in the production of both bags and backpacks, and they are situated in the southern region of Vietnam (Table 5).

**Table 5**  
**Demographic profiles from the garment factory survey**

Demographic characteristics	Description (Sample Size = 13)	Frequency	Percent
Gender	Female	11	85%
	Male	2	15%
Designation	Low Level Manager	7	54%
	Middle Level Manager	6	46%
Department	Compliance	6	46%
	Compliance/Production	2	15%
	Compliance/Sales	3	23%
	Compliance/Supply Chain Management	1	8%
	Sales/Supply Chain Management	1	8%
Nation	Vietnam	1	8%
	Foreign	12	92%
Firm Size	101-499 employees	2	15%
	500-1000 employees	1	8%
	More than 1000 employees	10	77%
Location	Ben Tre	2	15%
	Binh Duong	3	23%
	Dong Nai	3	23%
	Tien Giang	1	8%
	Ho Chi Minh	1	8%
	Long An	3	23%

## 5.2 Reliability and validity of the model

### 5.2.1 Content Validity

**Table 6**  
**Factor loading significant**

Construct	Code	Items	Outer loadings	Mean	Standard Deviation	P-value	VIF
IP	IP1	Our company follows local and national environmental laws and regulations in Vietnam, international environmental regulations, the environmental regulations of the countries where our clients are located, including the US, UK, European countries, and others.	0.805	4.385	0.625	0.00	1.26
	IP3	Our main competitors, who have embraced an environmentally friendly approach, are viewed positively by customers.	0.893	4.385	0.836	0.00	1.26
CM	CM2	Our customers have requested details about our adherence to environmental regulations	0.656	4.615	0.625	0.00	1.31
	CM3	Our customers strongly request that I ensure our suppliers implement environmentally friendly practices.	0.979	4.385	0.487	0.00	1.31
IG	IG1	We have started using more environmentally friendly raw materials and components	0.633	4.538	0.634	0.00	1.01
	IG3	We conduct internal environmental audits to ensure our products meet the environmental goals.	0.823	4.231	0.576	0.00	1.01
FS	FS1	We have collaborated with our suppliers to consider environmental factors in product design.	0.932	3.692	1.136	0.02	2.05
	FS2	Our company and suppliers share a clear understanding of environmental responsibilities.	0.778	4.308	0.821	0.00	2.26
	FS3	Our company collaborates with suppliers to minimize the environmental impact of operations.	0.866	4.154	0.662	0.00	2.73
	FS4	Our company develops strategies to address green supply chain management (GSCM)- related issues with suppliers.	0.747	4	0.784	0.00	2.92
FB	FB2	Our company and our customers share a common understanding of environmental responsibilities.	0.912	4.538	0.634	0.00	1.25
	FB3	Our company collaborates with customers to minimize environmental impact in our operations.	0.775	4.385	0.625	0.00	1.25
EP	EP1	We have reduced carbon dioxide emissions relative to our production volume.	0.827	3.154	0.863	0.02	1.76
	EP2	We have reduced waste relative to our production volume.	0.926	3.231	0.89	0.05	2.75
	EP3	We have reduced energy consumption relative to our production volume.	0.79	2.923	0.917	0.02	1.88
FP	FP2	Our profit has increased as a result of adopting green supply chain practices.	0.925	2.692	0.991	0.03	2.17
	FP3	Our market share has grown as a result of adopting green supply chain practices.	0.938	2.692	0.821	0.00	2.17
OP	OP1	We ensure dependable delivery to our customers while upholding green practices.	0.865	3.846	0.863	0.02	1.43
	OP4	We have minimized waste in our production processes while upholding green practices.	0.895	3.308	0.91	0.05	1.43
BS	BS3	Our company (buyer) collaborates with tier-2 suppliers to minimize the environmental impact of operations.	0.965	4.385	0.487	0.00	2.15
	BS5	Our company (buyer) and tier-2 suppliers jointly provide resources, skills, and knowledge to strengthen GSCM.	0.885	4.538	0.499	0.00	2.15

In our research study, we assessed the content validity of our measurement items by utilizing composite reliability as the evaluation method. We adhered to the established criterion of having values greater than 0.6, which is recommended by respected scholars such as [Chin et al. \(1997\)](#) and [Hair et al. \(2019\)](#). In order to refine the accuracy of our measurement model, I eliminated items that exhibited stronger associations with other constructs. Initially, we had a total of 41 constructed items ([Appendix 6](#)), but after the removal process, we were left with 21 items that were integrated into our model (Table 6).

Our results, presented in Table 6, reveal robust factor loadings, with all items exhibiting loadings exceeding the 0.6 threshold, confirming their strong performance in capturing the intended constructs. In addition, table 6 also provides additional evidence supporting the goodness of fit in our model. Specifically, it highlights that all the variables in our model have Variance Inflation Factor (VIF) values lower than 3, in accordance with the guideline proposed by [Hair et al. \(2019\)](#). This suggests that multicollinearity, which can complicate the interpretation of results, is not a significant concern in our analysis.

**Table 7**  
**Predictive power of constructs**

Construct	R-square	R-square adjusted
EP	0.369	0.315
FB	0.379	0.363
FP	0.693	0.646
FS	0.197	0.175
IG	0.617	0.596
OP	0.616	0.571

Note: IG: internal green supply chain management, FB: factory-buyer collaboration, FS: factory-supplier collaboration, BS: buyer-supplier collaboration, EP: environmental performance, OP: operational performance, FP: financial performance.

We employed R-square Adjusted to assess the explanatory capacity of our model, interpreting it in a manner consistent with regression analysis ([Shmueli & Koppius, 2011](#)). The R-squared statistic ranges from 0 to 1, with higher values signifying a stronger explanatory power of the model. As a general guideline,  $R^2$  values of 0.75, 0.50, and 0.25 can be interpreted as substantial, moderate, and weak, respectively ([Hair et al., 2019](#)). To be deemed as possessing sufficient explanatory power, the explained variation should exceed 10% ([Raithel et al., 2012](#)). Our analysis revealed that the structural model accounted for approximately 31.5% of the variation in EP, 36% in FB, 64.6% in FP, 17.5% in FS, 59.6% in IG, and 57.1% in OP (Table 7). These results indicate that the structural model provides a satisfactory level of explanatory power.



## 5.2.2 Convergent Validity

To establish convergent validity, it is essential to verify that construct items, which are theoretically linked, indeed exhibit relationships with each other during the data analysis. This confirmation can be achieved through the use of three methods: factor loadings, composite reliability, and average variance extracted (as recommended by Hair et al., 2010).

In the factor loading analysis, we focus on the factors that are considered relevant, particularly those with high loadings, equal to or greater than 0.6 (Hair et al., 2019), and that are statistically significant (Table 6). In the second step, we assess composite reliability, which gauges the consistency with which the items represent the underlying latent constructs. The recommended and commonly accepted threshold for composite reliability is 0.7, as advocated by Hair et al. (2019) and Fornell & Larcker (1981). As shown in Table 7, our composite reliability values range from 0.7 to 0.93, significantly surpassing the recommended and prescribed thresholds.

In the third step, we assess the average variance extracted, which is defined as the amount of shared variance among the indicators of the latent construct, as outlined by Hair et al. (2019). Ideally, the average variance extracted should exceed 0.5, as recommended by Fornell & Larcker (1981) and Hair et al. (2019). As observed in Table 8, our values for average variance extracted range from 0.54 to 0.86, aligning with the prescribed level. Therefore, based on all three methods examined, convergent validity has been successfully established.

**Table 8**  
**Construct reliability and validity**

Construct	Composite reliability	Average variance extracted (AVE)
BM	0.813	0.694
EP	0.885	0.721
FB	0.834	0.716
FP	0.929	0.867
FS	0.901	0.695
IG	0.700	0.539
IP	0.839	0.723
OP	0.873	0.774

Note: IP: institutional pressure, BM: buyer monitoring, IG: internal green supply chain management, FB: factory-buyer collaboration, FS: factory-supplier collaboration, BS: buyer-supplier collaboration, EP: environmental performance, OP: operational performance, FP: financial performance.

### 5.2.3 Discriminant Validity

In this section, we address discriminant validity, which serves as a measure to determine how effectively a set of measurement items can distinguish one variable from others within a research model. In simpler terms, it assesses whether measures that are not expected to be related to each other indeed demonstrate no significant correlations following data analysis. To ensure discriminant validity, we analyse the square root of the average variance extracted in conjunction with the correlations between the research constructs, following the guidelines of Chin (2009) and Fornell & Larcker (1981). The common variance (shared variance) among all model constructs should not exceed the values of their respective Average Variance Extracted (AVE) scores.

**Table 9**  
**Discriminant validity (Fornell-Larcker)**

Construct	BM	EP	FB	FP	FS	IG	IP	OP
BM	<b>0.833</b>							
EP	0.12	<b>0.849</b>						
FB	0.571	0.484	<b>0.846</b>					
FP	0.12	0.751	0.146	<b>0.931</b>				
FS	0.61	0.115	0.209	0.025	<b>0.834</b>			
IG	0.538	0.566	0.616	0.299	0.443	<b>0.734</b>		
IP	0.279	0.407	0.438	0.247	0.489	0.7	<b>0.851</b>	
OP	0.12	0.743	0.494	0.681	0.226	0.409	0.568	<b>0.88</b>

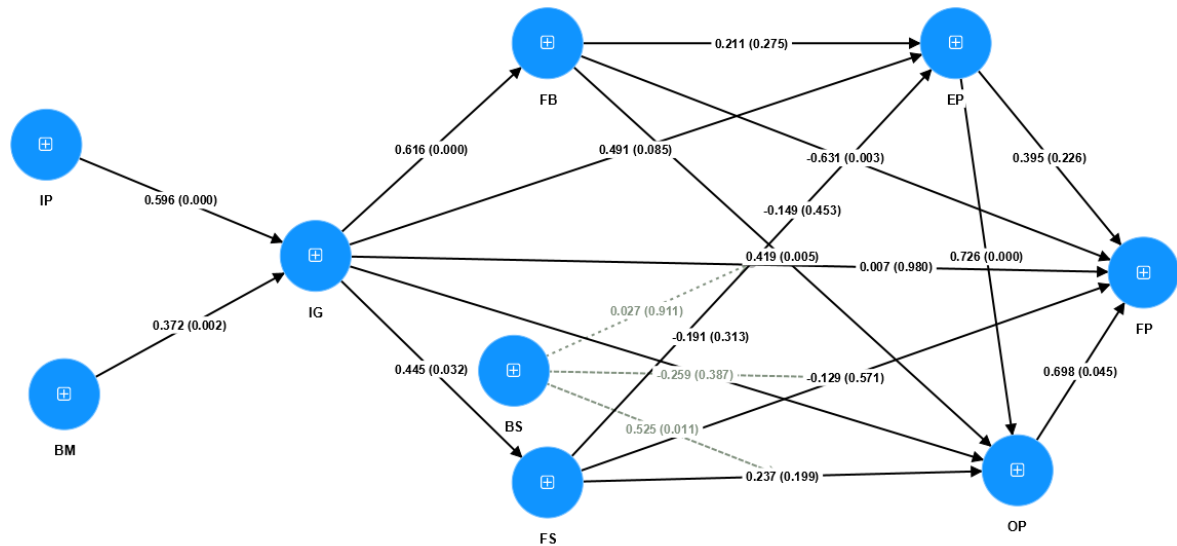
Note: IP: institutional pressure, BM: buyer monitoring, IG: internal green supply chain management, FB: factory-buyer collaboration, FS: factory-supplier collaboration, BS: buyer-supplier collaboration, EP: environmental performance, OP: operational performance, FP: financial performance.

As observed in Table 9, it is evident that the values on the diagonal line (representing the square root of the average variance extracted for each construct) are greater than the values in their respective rows and columns. This pattern confirms the establishment of discriminant validity, indicating that the measurement items effectively differentiate between the variables in the research model.

### 5.3 PLS-SEM Model Result

The primary focus of this paper is to assess the factors that stimulate the adoption of internal green supply chain management practices within garment manufacturing companies operating in Vietnam. Our research responds to the call made by [Geng et al. \(2017\)](#) and [Ahmed et al. \(2020\)](#) to investigate green supply chain management from a theoretical perspective.

**Figure 9**  
Path model result



**Table 10**  
Supported theory

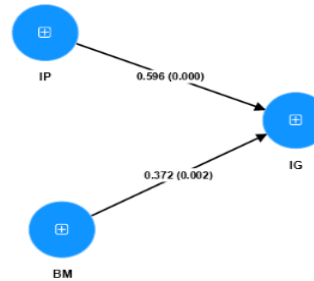
Constructs	Original sample	Sample mean	Standard deviation	T statistics	P values	Hypothesis result
IP → IG	0.596	0.582	0.111	5.393	0	Supported
BM → IG	0.372	0.382	0.118	3.138	0.002	Supported
IG → FB	0.616	0.628	0.1	6.162	0	Supported
IG → FS	0.445	0.427	0.208	2.144	0.032	Supported
IG → EP	0.491	0.394	0.285	1.721	0.085	Supported at 10%
FB → FP	-0.631	-0.598	0.21	3.004	0.003	Supported
FB → OP	0.419	0.365	0.15	2.787	0.005	Supported
EP → OP	0.726	0.771	0.15	4.826	0	Supported
OP → FP	0.698	0.564	0.348	2.006	0.045	Supported
BS x FS → OP	0.525	0.56	0.207	2.54	0.011	Supported

Note: IP: institutional pressure, BM: buyer monitoring, IG: internal green supply chain management, FB: factory-buyer collaboration, FS: factory-supplier collaboration, BS: buyer-supplier collaboration, EP: environmental performance, OP: operational performance, FP: financial performance.

Figure 9 and Table 10 present the results obtained from our model. We will delve into a comprehensive explanation of these findings in the upcoming chapter.

### 5.3.1 Effect of institutional pressure and buyer monitoring on internal green supply chain management.

**Figure 10**  
Effect of IP and BM on IG



Note: IP: institutional pressure, BM: buyer monitoring, IG: internal green supply chain management

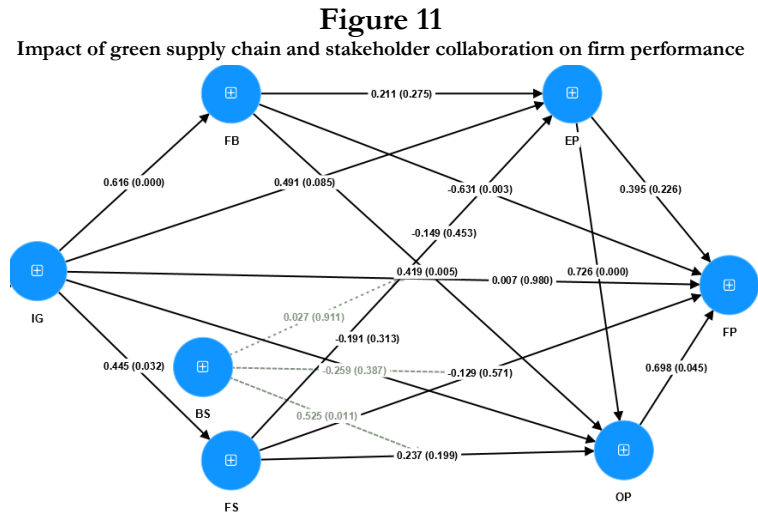
The findings affirm the principles of stakeholder theory, and they also provide substantial support for coordination theory. Our observations reveal that both buyer monitoring ( $\beta = 0.372$ ,  $P < 0.01$ ) and institutional pressures ( $\beta = 0.596$ ,  $P < 0.01$ ) exert a positive and statistically significant influence on internal green supply chain practices. This discovery aligns with the conclusions drawn by Lee (2008), Chavez et al. (2016), Laari et al. (2016), Vanalle et al. (2017), and Admed et al. (2020).

These research findings also indicate that diligent oversight of customer demands and expectations, coupled with effective mechanisms for maintaining accurate customer information and close collaboration with suppliers to implement eco-friendly initiatives, result in improvements in internal operational procedures, ultimately facilitating the adoption of environmentally conscious practices. Additionally, compliance with environmental regulations both in Vietnam and in the customer's country and recognition of competitors who have successfully embraced Green Supply Chain Management (GSCM) practices play a significant role in bolstering internal green supply chain practices.

When it springs to Vietnam's legal framework for Green Supply Chain Management, it emphasizes the significance of environmental protection laws (2020) in promoting eco-friendly practices within the garment industry. This assertion is supported by data collected from interviews with garment factories, offering insights into the current state of the industry. Nevertheless, it is crucial to note that while environmental protection laws in 2020 do provide guidance for managing internal supply chains, they are part of a legal system characterized by complexity and a lack of clarity. This complexity poses a considerable challenge for businesses in understanding and effectively implementing these regulations, as confirmed by the insights from interviews with factories with different firm sizes. Consequently, garment factories often face delays as they await further guidance, and persistent areas of uncertainty exacerbate the confusion and compliance difficulties.

The interviews with factories illuminate these challenges, underscoring the misalignment between the legal framework and its practical application in Vietnam. Consequently, the country has initiated national efforts to improve the legal system, with the goal of fostering a more environmentally conscious economy (Le, 2021). These initiatives are in line with the broader national strategy aimed at harmonizing environmental laws at the national and international levels. When it comes to encouraging more environmentally friendly practices within Vietnam, the current legal framework supports about 60% to 70% of the environmental standards and demands set by buyers. The remaining 30% to 40% of these requirements depend on the stricter environmental regulations of the buyers' home countries and the commitments of buyers to long-term environmental protection, as revealed in the factory interviews (Appendix 3). This division highlights the significant influence of external factors in shaping eco-friendly supply chain practices in Vietnam.

### 5.3.2 Effect of internal green supply chain and stakeholder collaboration on firm performance



Note: IG: internal green supply chain management, FB: factory-buyer collaboration, FS: factory-supplier collaboration, BS: buyer-supplier collaboration, EP: environmental performance, OP: operational performance, FP: financial performance.

Our research has uncovered that internal green supply chain practices, driven by buyer monitoring and institutional pressures, positively influence both buyer-factory collaboration ( $\beta = 0.616, P < 0.01$ ), in line with [Laari et al. \(2016\)](#) and [Admed et al. \(2020\)](#), and factory-supplier collaboration ( $\beta = 0.445, P < 0.05$ ), in line with [Seuring et al. \(2023\)](#). These results underscore the close relationship between internal green practices and effective collaboration with both buyers and suppliers during the implementation of green supply chain processes.

In terms of firm performance, it is observed that internal green supply chain management practices have a positive and significant impact on environmental performance, specifically at a 10% level of mean differences ( $\beta = 0.491, P < 0.1$ ). This finding aligns with the research conducted by [De Giovanni \(2012\)](#), [Yu et al. \(2014\)](#), and [Amed et al. \(2020\)](#), all of which endorse the notion that enhancing internal green supply chain management through the utilization of eco-friendly raw materials and conducting internal environmental audits contributes to waste reduction and consequently yields positive effects on environmental performance. Nevertheless, it is important to note that internal green supply chain management (IGSCM) does not have a significant impact on financial and operational performance ( $P > 0.1$ ). Furthermore, the results indicate that internal green supply chain management (IGSCM) may have a negative impact on operational performance ( $\beta = -0.191, P > 0.1$ ), although this impact is not statistically significant. This could be attributed to the fact that the implementation of green practices in Vietnam is still in its early stages, making the approach less effective. The garment factories may have encountered challenges in transitioning to green materials, production processes, and delivery methods, leading to these outcomes. It is reasonable to consider that the results did not reveal a significant relationship between these factors. This finding is in line with the research conducted by [Laari et al. \(2016\)](#), which also found no significant relationship between internal green supply chain management and financial performance.

In the context of downstream activities, it has been observed that engaging in collaborative efforts with buyers leads to a positive impact on operational performance ( $\beta = 0.419$ ,  $P = 0.05$ ) aligning with previous studies conducted by [Corsten & Felde \(2005\)](#), [Yang et al. \(2011\)](#), [Tachiwaza et al. \(2015\)](#), [Chavez et al. \(2016\)](#), and [Amed et al. \(2020\)](#). Nevertheless, it is worth noting that there is no statistically significant impact on environmental performance ( $P > 0.1$ ). This lack of statistical significance may be attributed to the small sample size, which may not adequately represent the entire population. The findings confirm that collaborating with buyers and incorporating their feedback can boost operational performance. It is also highlighted that fostering a shared understanding of environmental responsibility with buyers is essential for reducing environmental impact in operations. However, there is a significantly negative impact between factory-buyer collaboration on financial performance ( $\beta = -0.631$ ,  $P < 0.05$ ). These contradictory findings may be attributed to the fact that collaborating with customers to design more sustainable products or packaging can potentially lead to higher production costs. Green materials and processes often come at a premium, and the added complexity associated with customization can further increase these costs. This cost factor may have influenced the overall impact on financial performance in different ways, leading to varied results in different aspects of performance.

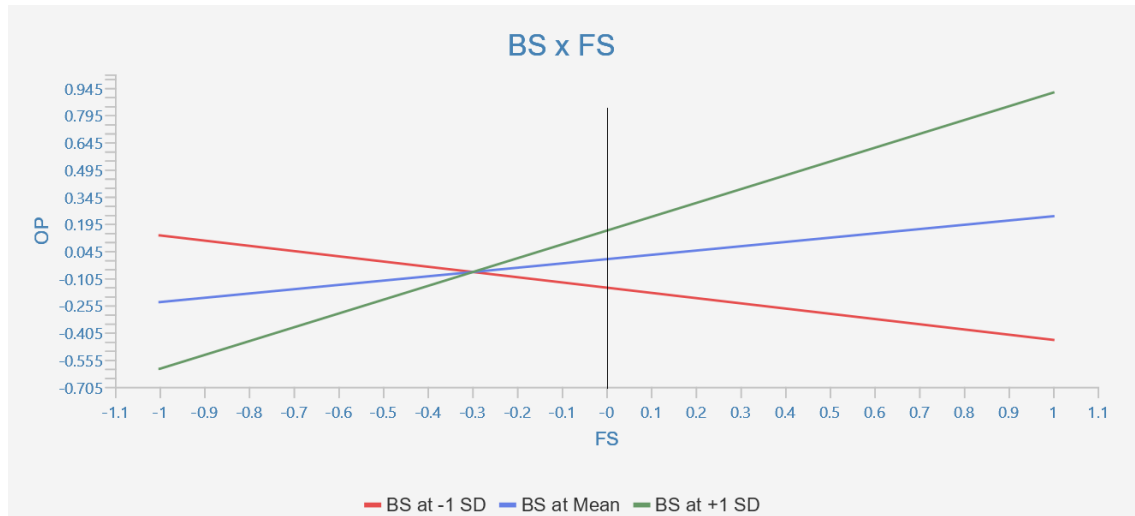
In the context of factory-supplier collaboration on the performance, the results indicate that there is no statistically significant impact on operational, financial, or environmental performance ( $P > 0.1$ ). This suggests that factories and their suppliers may not be strongly integrated in terms of implementing green supply chain practices. It is possible that a larger sample size may be needed to further investigate the relationships in these aspects.

It is worth noting that the influence of environmental performance appears to complement operational performance ( $\beta = 0.726$ ,  $P < 0.05$ ), which aligns with the findings of [Green et al. \(2012\)](#). It appears that environmental performance may have a positive effect on financial performance ( $\beta = 0.395$ ,  $P > 0.1$ ), although not statistically significant in this study. This finding is consistent with the research conducted by [Laari et al. \(2016\)](#) and [Amed et al. \(2020\)](#), which also found no impact of environmental performance on financial performance in their study. Operational performance is indeed linked to financial performance and exerts a significant impact on it ( $\beta = 0.698$ ,  $P < 0.05$ ). This finding aligns with the work of [Fullerton et al. \(2014\)](#) and [Amed et al. \(2020\)](#). Additionally, it responds to the call made by [Laari et al. \(2016\)](#) to investigate the influence of internal green supply chain management on operational performance and how operational performance, in turn, affects financial performance.

The adoption of eco-conscious supply chain practices in garment factories has resulted in reduced waste and energy use compared to their production levels. This has translated into greater dependability in delivering to customers, a dedication to environmentally-friendly principles, decreased production waste. Consequently, this has led to increased profitability and an expanded market share through collaborative efforts with diverse stakeholders.

### 5.3.2 Slope analysis: effect of BS x FS on OP

Figure 12  
Interaction moderation with simple slopes plot



Note: FS: factory-supplier collaboration, BS: buyer-supplier collaboration, OP: operational performance.

Regarding buyer-supplier collaboration from the buyer's perspective, strong support is found for the collaboration between the factory and the supplier, which contributes positively to operational performance ( $\beta = 0.525$ ,  $P < 0.05$ ). However, there is no statistically significant on environmental and financial performance ( $P > 0.1$ ). These results may be attributed to the fact that the collaboration between the buyer and the supplier is primarily focused on improving operational performance in the initial stages of implementing green supply chain management.

In general, when looking at the mean level of buyer-supplier collaboration (Figure 12), it strongly supports the idea that it contributes to a positive impact on operational performance through factory-supplier collaboration. Comparatively, when buyer-supplier collaboration is higher, the correlation appears to be even more pronounced, with a steeper relationship. This suggests that greater buyer-supplier collaboration leads to stronger support for factory-supplier collaboration, resulting in improved operational performance. However, in cases where buyer-supplier collaboration is lower (at -1 standard deviation), it has a negative impact on both operational performance and factory-supplier collaboration. This highlights the crucial role of the buyer as a central actor in collaborating with various stakeholders to enhance the performance of factories, particularly in terms of operational performance.

Based on the insights obtained from the interview with the production management at buyer X, they assess the performance of garment factories and also prioritize the monitoring of suppliers in terms of auditing and validating green certificates. Nevertheless, it is noteworthy that suppliers integrating green supply chain practices within the Vietnamese context are not prevalent. Typically, Buyer X had to seek out suppliers based on their specialization in providing materials with a specific green certification referred to as "Bluesign"<sup>2</sup>. This has made it challenging to monitor a large number of suppliers and has increased the workload associated with collaboration between suppliers and factories.

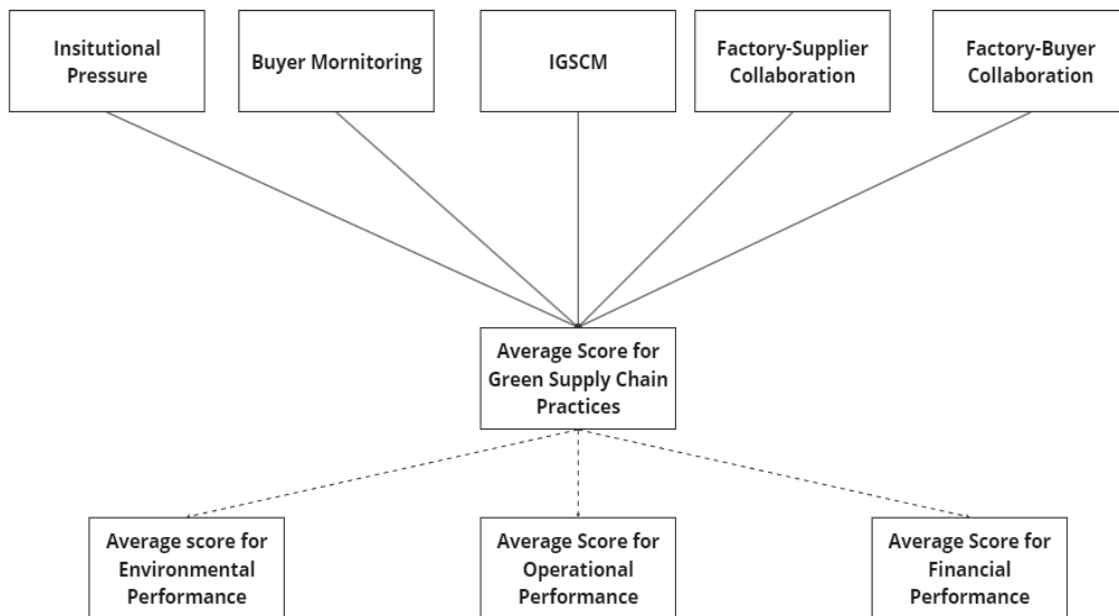
<sup>2</sup>The Bluesign standard offers an independent approval system for the textile industry, taking into account the whole production process, minimizing the impact on the environment and safeguarding human health. It also helps to decrease production costs, increase competitiveness and innovation, benefiting businesses (<https://www.bluesign.com/en>).



## 5.4 Green Supply Chain practices and firm performance

This section aims to examine how companies fare when they implement green supply chain practices and evaluate their outcomes by studying the performance of 13 distinct garment manufacturing firms using benchmarking method (Elmuti & Kathawala, 1997). Even though there are certain latent variables that do not show statistical significance in the path model (As referred to in the Figure 9), we choose to retain them in this section as they contribute to defining the extent of green supply chain practices within the context of thirteen garment manufacturing companies as critical success factors (Achanga et al., 2006). These factors also align with the findings on GSCM and firm performance in Pakistan (Ahmed et al., 2020). This inclusion is vital for gaining a comprehensive understanding of these companies' actual standings in relation to their practices versus performance. Figure 13 shows each factor related to green supply chain practices is given equal weight.

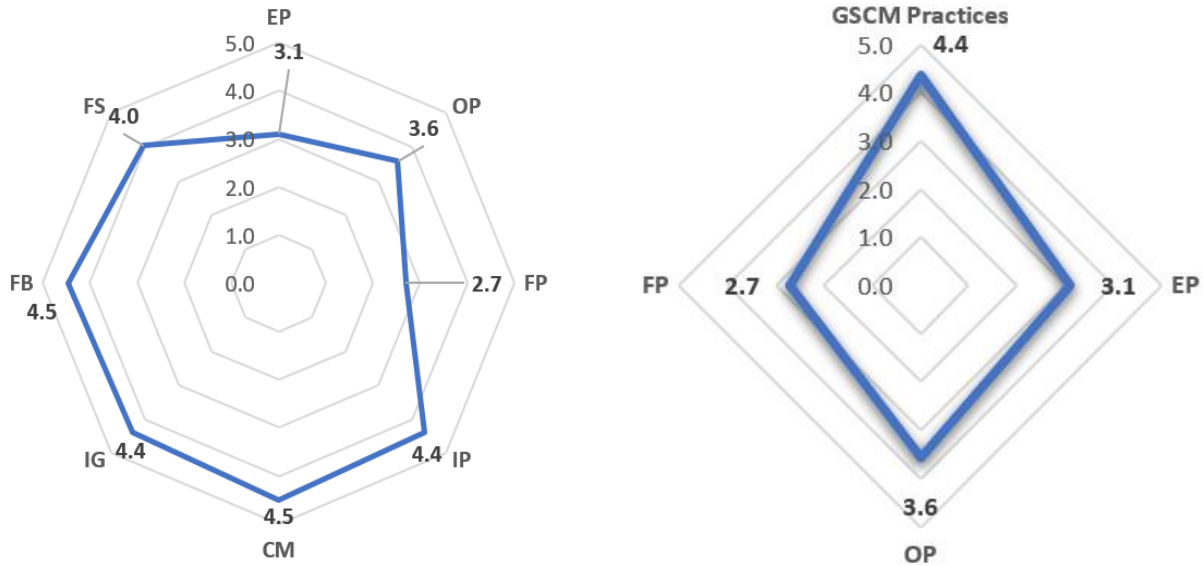
**Figure 13**  
**Determination of GSCM practices and firm performance**





### 5.4.1 Overall result

**Figure 14**  
An overall result from the survey



Note: GSCM practices scales (1=not at all, 2=a little, 3=to some degree, 4=relatively significant, 5=significant). Performance scales (1=not at all, 2=a little - below 20%, 3=to some degree - between 20% and below 40%, 4=relatively significant - from 40% to below 80%, 5=significant - above 80%).

Overall, 13 factories on average demonstrated compliance with environmentally sustainable supply chain practices, with the highest adherence observed in the case of IP (88%), CM (90%), IG (88%), FB (89%), and FS (81%) practices. The results revealed that the level of implementation of Integrated Green Supply Chain Management (IGSCM) practices scored an average of 4.4 on the 5-point scale, indicating a high level of adoption (88%) on average.

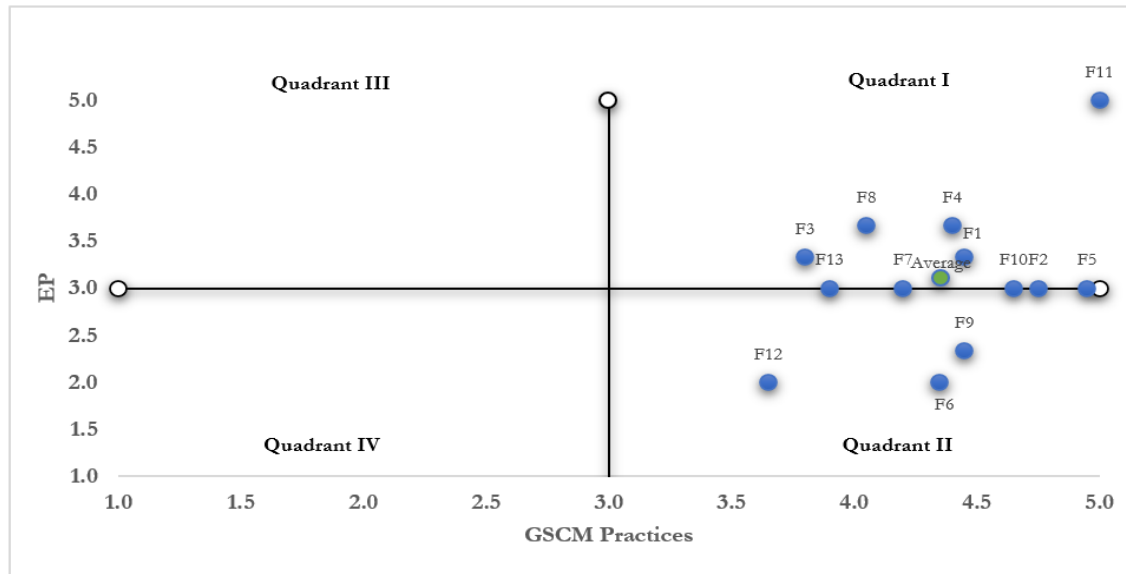
In the context of firm performance<sup>3</sup>, it is noteworthy that financial performance exhibited an average score of 2.7, signalling a substantial increase in profit and market share, amounting to as much as 40%, attributed to the implementation of green supply chain practices. As for operational performance, the average operational performance level stood at 3.6 (falling between 3 and 4), pointing to significant reductions in waste, spanning from 20% to nearly 80%, all while maintaining reliable customer delivery and minimizing waste through eco-friendly practices. In terms of environmental performance, the average score was 3.1, indicating a marked reduction in carbon dioxide emissions, waste generation, and energy consumption relative to production volume, with reductions ranging from 20% to under 40%. It emphasizes the favourable influence of environmentally sustainable supply chain practices on firm performance for these 13 garment companies in Vietnam.

In accordance with the classification from [Hanson et al. \(1994\)](#), top-performing companies are situated within quadrant I, whereas the lowest-performing ones are located in quadrant IV. Quadrant II is designated as the domain of "promising" companies, whereas quadrant III is characterized as comprising "vulnerable" companies. In the next chapter, we will delve into the details for three dimensions including environmental, operational, and financial performance.

<sup>3</sup> The factors influencing 'firm performance' are scored based on the loading factors in Table 6, where the significant factor loadings are evident.

## 5.4.2 Environmental Performance

**Figure 15**  
GSCM practices and environmental performance



Note: GSCM practices scales (1=not at all, 2=a little, 3=to some degree, 4=relatively significant, 5=significant). Performance scales (1=not at all, 2=a little - below 20%, 3=to some degree - between 20% and below 40%, 4=relatively significant - from 40% to below 80%, 5=significant - above 80%).

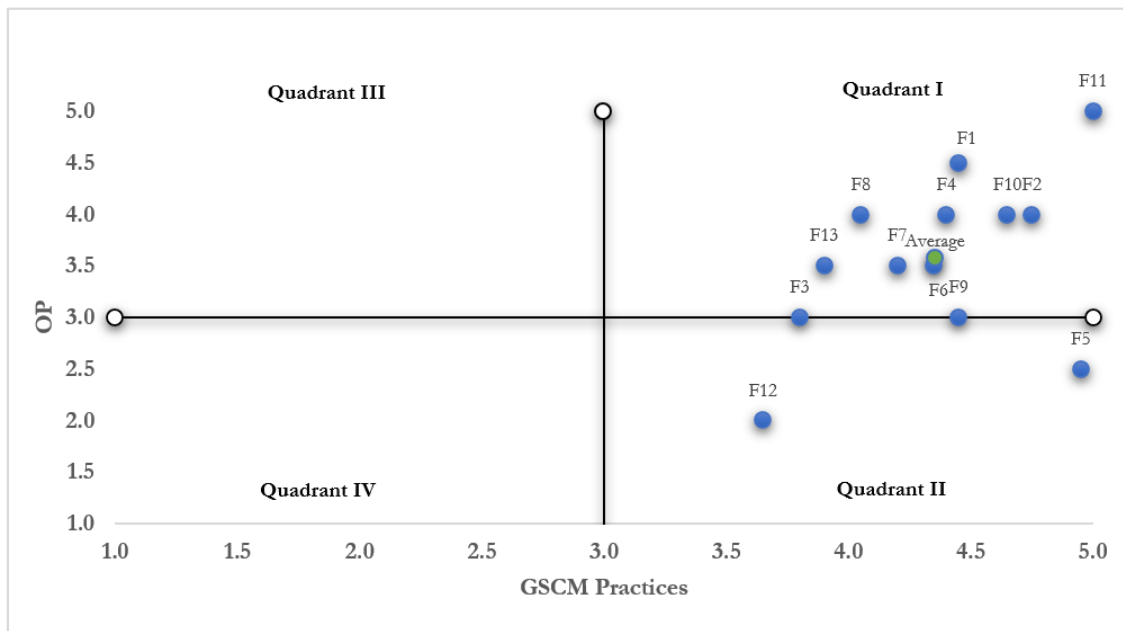
Within our examination of 13 distinct factories, the majority found their home in the esteemed confines of Quadrant I, representing top-tier performance, and the "promising" companies of Quadrant II. However, Factory 12, which is a Vietnamese garment manufacturing company, emerged as a distinctive exception, displaying the lowest levels of both green supply chain practices and environmental performance.

This discovery underscored a noteworthy observation: a Vietnamese garment factory (F12), when compared to 12 foreign companies, were still in the early stages of embracing the transition to green supply chain practices. Delving into environmental audit reports (detailed in Appendix 5) for factories 1, 4 (foreign companies), and 12 (a Vietnamese company) of buyer X, we observed a clear contrast. The environmental performance of foreign factories closely mirrored the data presented in Figure 13, showcasing robust compliance with environmental regulations from both institutional pressures and buyer X's monitor. In contrast, Factory 12 lagged behind, particularly in the domains of water usage, wastewater management, and emissions to the air. This shortfall appeared rooted in a limited awareness of environmental impacts and compliance requirements.

Addressing these shortcomings may necessitate the implementation of a costly environmental system, a challenge compounded by Factory 12's budget constraints, which currently hinder their ability to make this transformative shift. Emphasizing the crucial need for supportive policies to facilitate the transition of Vietnamese garment manufacturing companies toward a more sustainable and environmentally friendly system.

### 5.4.3 Operational Performance

Figure 16  
GSCM practices and operational performance



Note: GSCM practices scales (1=not at all, 2=a little, 3=to some degree, 4=relatively significant, 5=significant). Performance scales (1=not at all, 2=a little - below 20%, 3=to some degree - between 20% and below 40%, 4=relatively significant - from 40% to below 80%, 5=significant - above 80%).

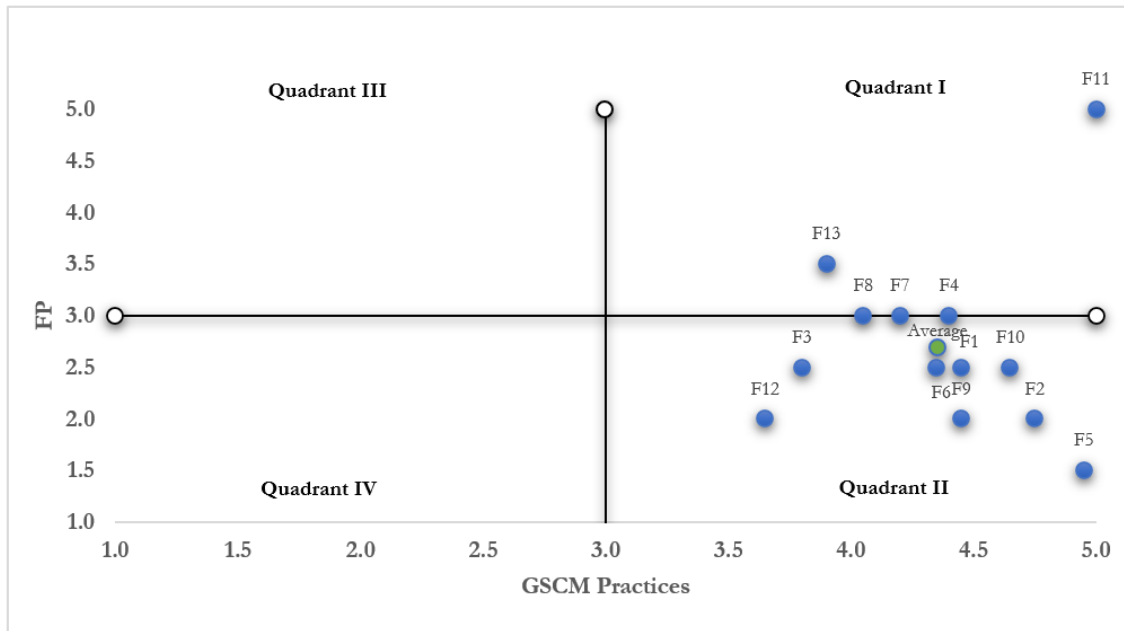
Similarly, most companies find their place in Quadrant I, but there are still two companies residing in Quadrant II. Factories F5 and F12 (a Vietnamese factory) stand out due to their relatively lower operational performance scores compared to their GSCM Practices scores. This suggests that, despite their commitment to green supply chain practices, they encounter challenges in optimizing their operational processes.

To enhance their overall performance, factories with high GSCM Practices scores but lower OP scores, such as F5 and F12, should consider strategies aimed at improving operational efficiency. These strategies may include process optimization, technology adoption, employee training, and enhancements in supply chain management.

Conversely, factories with high OP scores but lower GSCM Practices scores should focus on integrating more sustainable practices into their supply chain to further reduce their environmental impact.

## 5.4.4 Financial Performance

**Figure 17**  
GSCM practices and financial performance



Note: GSCM practices scales (1=not at all, 2=a little, 3=to some degree, 4=relatively significant, 5=significant). Performance scales (1=not at all, 2=a little - below 20%, 3=to some degree - between 20% and below 40%, 4=relatively significant - from 40% to below 80%, 5=significant - above 80%).

In terms of financial performance, these factories are distributed between Quadrant I and Quadrant II, with a slightly higher concentration in Quadrant II. On average, these factories display a strong commitment to green supply chain practices, yet financial performance varies, and some face financial challenges.

To enhance their overall financial performance, factories with high GSCM Practices scores but lower financial performance scores should explore strategies to address their financial difficulties. This could involve implementing cost-cutting measures, exploring revenue-enhancing initiatives, or even considering financial restructuring, recognizing that financial performance can be influenced by factors beyond sustainability practices.

It is essential to recognize that the relationship between GSCM practices and financial performance can be intricate, with external factors, market conditions, and industry-specific challenges impacting financial outcomes. As a result, a comprehensive approach to improving financial performance is essential, encompassing both sustainability efforts and broader financial strategies. Furthermore, companies operating in the garment manufacturing sector with a higher level of compliance are often in a favourable position to receive more favourable evaluations from their customers, leading to increased orders. This, in turn, contributes to the enhancement of their financial performance, as emphasized by the production manager at Buyer X.

# Chapter 6

## Conclusion

### 6.1 Theoretical implications

The study affirms that buyer monitoring and institutional pressures exert a positive and statistically significant influence on internal green supply chain practices, aligning with previous research. Our research underscores the positive impact of internal green supply chain practices on collaboration with buyers and suppliers in Vietnamese garment factories. We observed a significant improvement in environmental performance, emphasizing the benefits of sustainability. However, we found no significant effect on financial and operational performance, likely due to the early stages of green supply chain adoption in Vietnam.

Collaboration with buyers enhances operational performance but negatively affects financial performance, potentially due to increased costs. While there was no statistically significant impact on environmental performance, emphasizing environmental responsibility with buyers remains crucial.

Factory-supplier collaboration did not significantly impact performance, warranting further investigation with a larger sample size. Environmental performance complements operational performance, potentially benefiting financial performance, although the relationship is not statistically significant.

Notably, as the level of buyer-supplier collaboration increases, the positive influence on factory-supplier collaboration and subsequent operational performance becomes more pronounced. Conversely, when buyer-supplier collaboration is lower, it has a negative impact on both operational performance and factory-supplier collaboration. This emphasizes the pivotal role of the buyer as a central actor in orchestrating collaborations with various stakeholders to improve factory performance, particularly in terms of operational efficiency.

The adoption of eco-conscious practices has reduced waste and energy use, improving reliability, environmental commitment, and profitability. Our research highlights the importance of green supply chain practices and collaboration for sustainability and enhanced performance in the garment industry.

## 6.2 Policy implications

The findings of our study shed light on critical policy implications for Vietnam's Green Supply Chain Management framework. While the existing environmental protection laws of 2020 underline the importance of eco-friendly practices, they are embedded within a complex and unclear legal system. This complexity presents challenges for businesses, leading to delays and compliance difficulties. Therefore, it is imperative that Vietnam's ongoing efforts to improve the legal system continue, aligning with the broader national strategy for a more environmentally conscious economy. Additionally, recognizing the substantial influence of external factors, particularly the environmental standards of buyers' home countries and their long-term commitments, highlights the need for greater alignment between Vietnam's legal framework and international expectations to promote environmentally friendly supply chain practices. These actions will be instrumental in fostering sustainable and eco-friendly practices within the garment industry in Vietnam.

Moreover, the research findings, in conjunction with environmental audit reports, underscore the pressing requirement for enhanced compliance in areas such as water usage, wastewater management, and emissions at Vietnamese garment factories. These challenges stem from a limited awareness of environmental impacts and compliance obligations. Therefore, it is imperative to implement supportive policies that can facilitate and steer the transition of Vietnamese garment manufacturing companies towards a more sustainable and environmentally responsible system.

## 6.3 Practical implications

In this study of 13 factories, green supply chain practices are well-implemented, with an 88% compliance rate, leading to significant reductions in emissions and waste. Top-performing factories successfully integrate sustainability with environmental responsibility, but some struggle with environmental performance. Operational performance varies, and those with high green practice scores but lower operational performance should focus on optimization. Financially, one factory excels, while others face unrelated challenges, suggesting the need for cost-cutting, revenue strategies, or restructuring. Overall, aligning green practices with operational efficiency and addressing financial issues is essential for holistic performance improvement.

The study's findings strongly suggest that institutional and stakeholder pressures play a pivotal role in motivating companies to embrace green practices. To drive further progress in this direction and promote environmental sustainability, it is imperative for government bodies and other stakeholders to intensify their pressure on companies operating in Vietnam. This increased external pressure can effectively encourage firms to not only comply but also proactively adopt green supply chain management practices. Such collective efforts are essential for the betterment of the environment and ensuring a sustainable future.

In order to address and adhere to external demands for the implementation of environmentally friendly supply chain management practices, global buyers at the center of the supply chain must engage in collaborative efforts with their suppliers and maintain oversight of their suppliers. This collaborative approach is essential for effectively disseminating the pressure for green practices throughout the entire supply chain, thereby realizing a comprehensive and positive impact on sustainability.

## 6.4 Limitation of the study & future research directions

While our study has made significant contributions, it is essential to acknowledge its limitations. One key limitation pertains to the sample size used for the PLS-SEM analysis. Although PLS-SEM is recognized for its robustness with smaller samples, it is important to note that our sample size may have limitations regarding generalizability and statistical power. Larger samples would enhance the reliability and stability of our findings. Therefore, future research with a more extensive dataset is warranted to validate and strengthen the results obtained in this study. Moreover, it is important to acknowledge that our research, focusing on the case study between Buyer X and the garment manufacturing contracted with Buyer X, may not fully represent the entire region in the south of Vietnam. Future research endeavours would benefit from the inclusion of diverse geographical regions within Vietnam. This geographical diversity can offer a more comprehensive understanding of the adoption and influence of green supply chain practices in various regions of the country. Investigating different regions would facilitate the identification of regional variations in challenges, opportunities, and the effectiveness of sustainable supply chain practices, thereby contributing to a more nuanced and context-specific perspective on the topic.

Furthermore, another limitation of our research stems from the use of purposive sampling in the garment manufacturing survey. This approach introduces the potential for bias in data collection, as respondents may report their company's compliance with green supply chain practices based on their perceptions and personal preferences, potentially not fully reflecting the industry's actual state of compliance. To address this limitation, future research could benefit from employing random sampling techniques and standardized data collection methods to enhance objectivity and representation in data collection.

As we look to the future, there are various avenues for further research. Exploring the inclusion of third-party logistics actors in our research framework would provide a more comprehensive understanding of the dynamics in green supply chain practices. Additionally, expanding our focus to other specific industries or sectors, such as pharmaceuticals, automobiles, textiles, among others, could yield more specific and tailored policy implications.

Moreover, dissecting institutional pressure into its constituent elements, such as normative, coercive, and mimetic pressures, could provide more nuanced insights into their effects and implications. Lastly, considering firm size as a potential moderator in our research framework, particularly in the context of Vietnam, where a significant portion of companies are small and medium-sized enterprises (SMEs), would offer valuable insights into the challenges and opportunities faced by different entrepreneurs. This approach would not only enhance the comprehensiveness of our research but also provide practical guidance for SMEs in Vietnam seeking to adopt and benefit from sustainable supply chain practices.

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# Appendices

## Appendix 1: Environmental certification required by buyer X

Table 11  
Environmental certifications

Factory	Environmental Certifications	
	ISO 14001:2015	HIGG FEM
Factory 1		2021
Factory 2	2022	
Factory 3	2021	
Factory 4		2021
Factory 5		2022
Factory 6	2021	
Factory 7	2022	
Factory 8	2022	
Factory 9	2023	2021
Factory 10	2023	2021
Factory 11	2021	
Factory 12	2023	2021
Factory 13	2021	

Note: This table provided by Production Manager at buyer X. ISO 14001 is an internationally agreed standard that sets out the requirements for an environmental management system. The Higg Facility Environmental Module (Higg FEM) is a sustainability assessment tool that standardizes how facilities measure and evaluate their environmental performance.

# Appendix 2: Survey questions for garment factories.

Figure 18  
Consent form

10/26/23, 9:04 PM Stakeholder Collaboration and Green Supply Chain Management Survey - Khảo sát về sự phối hợp giữa các bên liên quan ...

## Stakeholder Collaboration and Green Supply Chain Management Survey - Khảo sát về sự phối hợp giữa các bên liên quan trong việc triển khai chuỗi cung ứng xanh trong sản xuất

**Consent Form for Participation in Research on Green Supply Chain Management.**  
Biểu mẫu Đồng ý Tham gia Nghiên cứu về Quản lý Chuỗi Cung ứng Xanh.

**Researcher:** Dat Huynh, Master's Student in Economics Development at International Institution of Social Study, Erasmus University Rotterdam.  
*Người nghiên cứu: Huỳnh Tấn Đạt, Sinh viên Thạc sĩ chuyên ngành Phát triển Kinh tế tại Viện nghiên cứu quốc tế về xã hội của Đại học Erasmus Rotterdam.*

**Study Purpose (Mục đích nghiên cứu):**  
This research aims to investigate the extent to which collaboration among stakeholders in green supply chain management strengthens a firm's sustainable performance. This survey is specifically targeted at manufacturing companies in Vietnam that offer outsourcing services to foreign companies.  
*Nghiên cứu này nhằm tìm hiểu mức độ mà sự hợp tác giữa các bên liên quan trong quản lý chuỗi cung ứng xanh củng cố hiệu suất bền vững của doanh nghiệp. Đối tượng của cuộc khảo sát này là các công ty sản xuất tại Việt Nam (các công ty cung cấp dịch vụ sản xuất hàng hóa cho các công ty nước ngoài).*

**Your data (Dữ liệu của bạn):**  
In this survey, you will be asked to rate your answers on a scale from 1 to 5. The study involves quantitative analysis, and the collected information will be used for running a PSL-SEM model for the research paper.  
*Trong cuộc khảo sát này, bạn sẽ được yêu cầu đánh giá câu trả lời của mình trên một thang điểm từ 1 đến 5. Nghiên cứu này liên quan đến phân tích số liệu số và thông tin thu thập sẽ được sử dụng để chạy mô hình PSL-SEM cho bài nghiên cứu.*

**Sharing and Retaining Your Data (Chia sẻ và lưu trữ dữ liệu của bạn):**  
Your data will be kept strictly confidential. Data will only be shared with individuals directly involved in this research (Dr. Elissaios and Dr. Hoai).  
*Dữ liệu của bạn và công ty sẽ được bảo mật nghiêm ngặt. Dữ liệu chỉ được chia sẻ với những người trực tiếp tham gia vào nghiên cứu này (bao gồm 2 giáo sư hướng dẫn của tôi: giáo sư Elissaios Papyrakis and giáo sư Nguyễn Trọng Hoài).*

**Informed Consent (Đồng ý tham gia):**

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**By providing your name and submitting this form, you give your consent to participate in this research. You have the right to withdraw from the study at any time and are not obligated to answer any questions you do not wish to answer.**  
*Bằng cách cung cấp tên của bạn và gửi biểu mẫu này, bạn đồng ý tham gia vào nghiên cứu này. Bạn có quyền rút lui khỏi nghiên cứu bất cứ lúc nào và không bị bắt buộc trả lời bất kỳ câu hỏi nào bạn không muốn trả lời.*

**Contact (liên hệ):**  
If you have any concerns or questions about this research, please contact us at 675707dh@eur.nl (Dat Huynh).  
*Nếu bạn có bất kỳ vấn đề hoặc câu hỏi nào về nghiên cứu này, xin vui lòng liên hệ chúng tôi qua địa chỉ email 675707dh@eur.nl (Đạt Huỳnh).*  
Zalo: +84765827297

**Your contribution has contributed to the success of the research and contributed to the economic development in Vietnam. Your information and opinions are extremely important and valuable for this research process. Thank you for your input and the precious time you have dedicated to our study. We hope that this research will provide useful information and contribute to the improvement of Vietnam's economy.**  
*Sự đóng góp của bạn đã góp phần vào sự thành công của bài nghiên cứu và đóng góp cho sự phát triển kinh tế tại Việt Nam. Những thông tin và ý kiến của bạn là cực kỳ quan trọng và giá trị đối với quá trình nghiên cứu này. Cảm ơn bạn vì sự đóng góp ý kiến và thời gian quý báu mà bạn đã dành cho nghiên cứu của chúng tôi. Chúng tôi hy vọng rằng nghiên cứu này sẽ đem lại thông tin hữu ích và giúp cải thiện kinh tế của Việt Nam.*

**\*\*\*Small gift (món quà nhỏ nhỏ):**  
After completing the survey, you will receive a small token of appreciation, an online shopping voucher will be sent to your email.  
*Sau khi hoàn thành khảo sát, bạn sẽ nhận được một phần quà nhỏ nhỏ là một voucher mua sắm online sẽ được gửi đến tài khoản email của bạn.*

**I SINCERELY THANK YOU FOR YOUR PARTICIPATION (TÔI XIN CHÂN THÀNH CẢM ƠN SỰ THAM GIA CỦA BẠN).**

\* Indicates required question

1. Email \*

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## Figure 19

### Survey questions for garment manufacturing companies

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**Before you start filling out the survey, here's some important information**  
(Trước khi bạn bắt đầu điền vào bản khảo sát, đây là một số thông tin quan trọng)

1. The survey consists of a total of 37 questions, and it should take approximately 20 to 30 minutes to complete.  
*Khảo sát này bao gồm tổng cộng 37 câu hỏi và dự kiến mất khoảng 20 - 30 phút để hoàn thành.*

2. In this survey, Green Supply Chain Management/Practice means that your company has embraced green supply chain practices as part of our commitment to environmental sustainability.  
*Quản lý/Thực tiễn Chuỗi Cung Ứng Xanh ám chỉ việc công ty của bạn áp dụng các thực tiễn có trách nhiệm với môi trường trong toàn bộ chuỗi cung ứng, thể hiện cam kết với bền vững*

For example, These practices involve a series of environmentally responsible measures throughout the entire supply chain, from sourcing raw materials to delivering finished products to customers. We prioritize sustainable sourcing by selecting suppliers who adhere to eco-friendly production methods, use renewable materials, and promote fair labor practices. Additionally, we implement efficient logistics and transportation systems to reduce greenhouse gas emissions and minimize environmental impacts during product distribution. In terms of manufacturing, we adopt energy-efficient processes, waste reduction strategies, and recycling programs to ensure responsible resource management. Green supply chain practices also extend to packaging, where we strive to use eco-friendly materials and minimize unnecessary packaging waste.  
*Ví dụ, Công ty của tôi ưu tiên việc cung cấp bền vững bằng cách lựa chọn nhà cung cấp sử dụng các nguyên liệu tái tạo và khuyến khích các thực tiễn lao động công bằng. Hệ thống vận chuyển và giao thông của chúng tôi được thiết kế để giảm lượng khí thải carbon và giảm thiểu tác động môi trường trong quá trình phân phối sản phẩm. Ở giai đoạn sản xuất, chúng tôi tập trung vào các quy trình tiết kiệm năng lượng, giảm thiểu chất thải và các chương trình tái chế. Chúng tôi sử dụng các vật liệu đóng gói thân thiện với môi trường và nỗ lực giảm thiểu lãng phí đóng gói không cần thiết. Bằng cách áp dụng những thực tiễn này, chúng tôi nhằm giảm thiểu dấu chân môi trường của mình, bảo vệ tài nguyên tự nhiên và đóng góp vào một ngành công nghiệp bền vững và có ý thức về môi trường.*

3. When we mention "Suppliers" in this context, we are referring to companies or entities that provide materials, such as fabric, buckles, foam, and more, to your company for manufacturing purposes.  
*Khi chúng tôi đề cập đến "Nhà cung cấp" trong ngữ cảnh này, chúng tôi ám chỉ đến các công ty hoặc nhà cung cấp các vật liệu như vải, khóa, mút, và nhiều loại nguyên liệu khác cho công ty của bạn để sản xuất.*

4. When we refer to "Customers," we mean the brands you work with, such as Osprey, VF, Adidas, Nike, Decathlon, etc. It does not pertain to end-use customers or consumers.  
*Trong khảo sát này, khi nhắc đến "Khách hàng" chúng tôi đề cập đến các thương hiệu mà bạn làm việc với, như Osprey, VF, Adidas, Nike, Decathlon, v.v. Không liên quan đến khách hàng cuối hoặc người tiêu dùng.*

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5. Some questions may require input from different departments in your company. If you are unsure of the answers, you can collaborate with your colleagues to provide the necessary information. At the end of section, please provide the names of the individuals involved in this survey. As a token of appreciation, I will send you a voucher gift, and your colleagues will receive theirs through their respective email addresses.  
*Một số câu hỏi có thể yêu cầu sự đóng góp từ các bộ phận khác nhau trong công ty của bạn. Nếu bạn không biết câu trả lời, bạn có thể hợp tác với đồng nghiệp của mình để cung cấp thông tin cần thiết. Khi kết thúc phần cuối cùng, bạn sẽ được gửi voucher mua hàng online cho bạn, và đồng nghiệp của bạn sẽ nhận mã của họ thông qua địa chỉ email của họ.*

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**Institutional Pressure (Áp lực từ các tổ chức)**

The firm must follow external stakeholders' demands and pressures imposed on the firm.  
*Công ty phải tuân thủ các yêu cầu và áp lực từ phía các bên liên quan bên ngoài được áp đặt lên công ty.*

For example, firms often face various pressures and expectations from external stakeholders such as customers, investors, governments, and non-governmental organizations (NGOs). These stakeholders may demand firms to adopt specific environmental, social, and governance (ESG) practices, adhere to certain regulations or standards, or implement sustainable initiatives. The firm's ability to comply with these institutional pressures and align its actions with the demands of external stakeholders plays a crucial role in shaping its reputation, competitiveness, and long-term sustainability. Firms may be required to disclose their environmental impact, implement responsible sourcing practices, and ensure fair labor practices. By responding to the demands of external stakeholders and integrating ESG considerations into their business operations, firms can build stronger relationships with customers, attract responsible investors, and gain regulatory support. Adhering to institutional pressures enhances a firm's social license to operate, demonstrates its commitment to corporate social responsibility, and contributes to a positive impact on society and the environment.  
*Ví dụ, các công ty thường đối mặt với nhiều áp lực và kỳ vọng từ các bên liên quan bên ngoài như khách hàng, nhà đầu tư, chính phủ và tổ chức phi chính phủ (NGO). Những bên liên quan này có thể yêu cầu các công ty áp dụng các thực tiễn môi trường, xã hội và quản trị (ESG) cụ thể, tuân thủ các quy định hoặc tiêu chuẩn nhất định hoặc triển khai các sáng kiến bền vững. Khả năng của công ty tuân theo những áp lực cơ quan này và điều chỉnh hành động của mình theo yêu cầu từ các bên liên quan bên ngoài đóng vai trò quan trọng trong việc hình thành danh tiếng, cạnh tranh và bền vững lâu dài. Công ty có thể được yêu cầu công bố tác động môi trường của mình, triển khai các thực tiễn mua sắm có trách nhiệm và đảm bảo thực tiễn lao động công bằng. Bằng cách đáp ứng các yêu cầu từ các bên liên quan bên ngoài và tích hợp các yếu tố ESG vào hoạt động kinh doanh, công ty có thể xây dựng các mối quan hệ mạnh mẽ với khách hàng, thu hút nhà đầu tư có trách nhiệm và nhận được sự hỗ trợ từ cơ quan quản lý. Tuân thủ áp lực cơ quan này tăng cường giấy phép xã hội hoạt động của công ty, thể hiện cam kết của nó với trách nhiệm xã hội doanh nghiệp và đóng góp vào tác động tích cực đối với xã hội và môi trường.*

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2. 1. Our company adheres to both national and local environmental laws and regulations in Vietnam, including those related to waste emissions, cleaner production, and more. \*  
*Tổ chức của chúng tôi tuân thủ cả luật và quy định về môi trường của cả quốc gia và địa phương tại Việt Nam, bao gồm các quy định về phát thải chất thải, sản xuất sạch, và nhiều khía cạnh khác.*

Mark only one oval.

1 2 3 4 5

1. N      5. Significant (đáng kể)

3. What prompted the decision to go with this specific answer? Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?  
\_\_\_\_\_

4. 2. Our company follows the environmental regulations of the countries where our clients are located, including the US, UK, European countries, and others. \*  
*Tổ chức của chúng tôi tuân thủ các quy định môi trường của các nước mà khách hàng của chúng tôi đến từ, bao gồm Hoa Kỳ, Anh, các nước châu Âu, và những quốc gia khác.*

Mark only one oval.

1 2 3 4 5

1. N      5. Significant (đáng kể)

5. What prompted the decision to go with this specific answer? Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?  
\_\_\_\_\_

<https://docs.google.com/forms/d/1o1V4WMPjOHe9MSooxD5b7z2e4TLJOKKdoqPjXWY9/edit> 6/38

6. **3. Our organization's supply chain practices are affected by export regulations.** \*

Chuỗi cung ứng của tổ chức chúng tôi bị ảnh hưởng bởi các quy định xuất khẩu tại Việt Nam.

Mark only one oval.

1 2 3 4 5
1. N      5. Significant (đáng kể)

7. **What prompted the decision to go with this specific answer?**

Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

8. **4. Our main competitors, who have embraced an environmentally friendly approach, are viewed positively by customers.** \*

Các đối thủ chính của chúng tôi, những người đã thực hiện một chiến lược xanh, được khách hàng đánh giá tích cực.

Mark only one oval.

1 2 3 4 5
1. N      5. Significant (đáng kể)

9. **What prompted the decision to go with this specific answer?**

Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

10. **5. Our company can develop a better green strategy compared to other manufacturers of similar eco-friendly products.** \*

Tổ chức của chúng tôi có khả năng tạo ra một chiến lược xanh hiệu quả hơn so với các nhà sản xuất khác của các sản phẩm thân thiện với môi trường tương tự.

For instance, we have a team dedicated to researching and implementing environmentally friendly practices. We strive to use eco-friendly materials, optimize production processes to minimize waste, and reduce our carbon footprint. Our commitment to sustainability sets us apart from other manufacturers, making our green strategy more effective and appealing to customers who value environmental responsibility.

Ví dụ, chúng tôi có một nhóm chuyên nghiệp nghiên cứu và triển khai các thực tiễn thân thiện với môi trường. Chúng tôi cố gắng sử dụng các nguyên liệu thân thiện với môi trường, tối ưu hóa quy trình sản xuất để giảm thiểu chất thải và hạn chế khí thải nhà kính. Cam kết của chúng tôi với bền vững là điểm nổi bật so với các nhà sản xuất khác, làm cho chiến lược xanh của chúng tôi hiệu quả hơn và hấp dẫn với các khách hàng để cao trách nhiệm môi trường.

Mark only one oval.

1 2 3 4 5
1. N      5. Significant (đáng kể)

11. **What prompted the decision to go with this specific answer?**

Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

Customer Monitoring (Giám sát từ khách hàng)

Firm adopt certifications (ISO 14001 or HIGG FEM, etc...) as the result of the environmental monitoring of customers.

Công ty áp dụng các chứng nhận (ISO 14001 hoặc HIGG FEM, v.v.) là kết quả của việc giám sát môi trường từ khách hàng.

For example, companies often respond to the environmental expectations of their customers by adopting specific environmental certifications and standards. When customers monitor the environmental performance of their suppliers, they may require evidence of environmental compliance and sustainability efforts. In response to such monitoring and customer demands, firms may pursue certifications like ISO 14001 (Environmental Management System) or HIGG FEM (Higg Facility Environmental Module) to showcase their commitment to environmental responsibility and demonstrate compliance with recognized industry standards. These certifications provide tangible proof of a company's environmental initiatives and their alignment with global best practices. By obtaining environmental certifications, firms signal their dedication to sustainable practices and position themselves as environmentally conscious and responsible suppliers. The certifications can enhance the company's reputation, increase credibility with customers, and contribute to long-term customer satisfaction.

Additionally, these certifications can serve as valuable marketing tools, attracting environmentally conscious customers and stakeholders who prioritize working with environmentally responsible partners. Overall, adopting certifications in response to customer environmental monitoring showcases a company's willingness to meet customer expectations and align its operations with environmentally friendly practices.

Ví dụ, các công ty thường phản ứng với kỳ vọng môi trường của khách hàng bằng cách áp dụng các chứng nhận và tiêu chuẩn môi trường cụ thể. Khi khách hàng theo dõi hiệu suất môi trường của nhà cung cấp của họ, họ có thể yêu cầu bằng chứng về việc tuân thủ môi trường và những nỗ lực bền vững. Đáp ứng với việc giám sát này và yêu cầu của khách hàng, các công ty có thể theo đuổi chứng nhận như ISO 14001 (Hệ thống quản lý môi trường) hoặc HIGG FEM để thể hiện cam kết của họ với trách nhiệm môi trường và chứng minh tuân thủ các tiêu chuẩn ngành công nhận. Những chứng nhận này cung cấp bằng chứng cụ thể về các sáng kiến môi trường của công ty và sự phù hợp của chúng với các thực tiễn hàng đầu trên toàn cầu. Bằng cách thu được chứng nhận môi trường, các công ty thể hiện sự tận tụy của mình với các thực tiễn bền vững và định vị mình là các nhà cung cấp có ý thức và trách nhiệm về môi trường. Những chứng nhận này có thể cải thiện danh tiếng của công ty, tăng cường độ tin cậy với khách hàng và góp phần vào sự hài lòng của khách hàng lâu dài. Ngoài ra, những chứng nhận này còn có thể phục vụ như công cụ marketing quý giá, thu hút các khách hàng và các bên liên quan có ý thức về môi trường ưu tiên làm việc với các đối tác có trách nhiệm về môi trường. Tổng thể, việc áp dụng các chứng nhận phản ứng với giám sát môi trường của khách hàng thể hiện sự sẵn lòng của công ty đáp ứng kỳ vọng của khách hàng và đồng thời điều chỉnh hoạt động của mình với các thực tiễn thân thiện với môi trường.

12. **6. Our customers view environmental impacts as a vital aspect in supplier selection, including both their tier 1 suppliers and tier 2 suppliers.**

Khách hàng của chúng tôi xem xét tác động môi trường là một yếu tố quan trọng khi lựa chọn nhà cung cấp, bao gồm nhà cung cấp tier 1 như các nhà máy gia công, sản xuất hàng may mặc, và nhà cung cấp tier 2 như các công ty sản xuất vải, khóa, đai, v.v.

Mark only one oval.

1 2 3 4 5
1. N      5. Significant (đáng kể)

13. **What prompted the decision to go with this specific answer?**

Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

14. **7. Our customers have requested details about our adherence to environmental regulations.** \*

Khách hàng của chúng tôi đã yêu cầu thông tin về việc tuân thủ quy định môi trường của chúng tôi.

Mark only one oval.

1 2 3 4 5
1. N      5. Significant (đáng kể)

15. **What prompted the decision to go with this specific answer?**

Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

16. **8. Our customers strongly request that we ensure our suppliers implement environmentally friendly practices.** \*

Khách hàng của chúng tôi đã yêu cầu chúng tôi đảm bảo các nhà cung cấp của chúng ta áp dụng các thực tiễn thân thiện với môi trường

Mark only one oval.

1 2 3 4 5
1. N      5. Significant (đáng kể)

17. **What prompted the decision to go with this specific answer?**

Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

18. **9. Our customers have asked us to adopt an environmental management system (e.g., HIGG FEM, ISO 14001)** \*

Khách hàng của chúng tôi đã yêu cầu chúng tôi triển khai hệ thống quản lý môi trường (ví dụ: HIGG FEM, ISO 14001)

Mark only one oval.

1 2 3 4 5
1. N      5. Significant (đáng kể)

19. **What prompted the decision to go with this specific answer?**

Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

Internal Green Supply Chain Management (Quản Lý về chuỗi cung ứng xanh nội bộ)

Internal Green Supply Chain Management (GSCM) practices include adopting certifications like ISO 14001 or HIGG FEM, conducting environmental audits of departments, eco-labeling products, implementing a green procurement system, reducing greenhouse emissions, and ensuring green product compliance data.

Các thực tiễn Quản lý Chuỗi cung ứng Xanh (GSCM) nội bộ bao gồm việc áp dụng các chứng nhận như ISO 14001 hoặc HIGG FEM, tiến hành kiểm tra môi trường các phòng ban, đánh dấu sản phẩm bằng nhãn môi trường, triển khai hệ thống mua sắm xanh, giảm lượng khí thải nhà kính và đảm bảo dữ liệu tuân thủ sản phẩm xanh.

For example, our company is committed to integrating green practices into our internal supply chain management. To achieve this, we have adopted ISO 14001 or HIGG FEM certifications, which demonstrate our dedication to environmental management and sustainability. These certifications validate our efforts to comply with recognized environmental standards and guidelines. Additionally, we conduct periodic environmental audits of different departments within our organization to assess their environmental impact and identify areas for improvement. This enables us to proactively address environmental concerns and continually enhance our green practices. Eco-labeling is another crucial aspect of our internal GSCM, where we label our products to indicate their environmental attributes and promote transparency to customers. Our green procurement system focuses on sourcing materials and resources from suppliers who adhere to sustainable practices, further reinforcing our commitment to environmentally responsible sourcing. We actively work on reducing greenhouse emissions throughout our production processes, implementing energy-efficient technologies, and exploring renewable energy options. Moreover, we ensure that our products comply with green standards and regulations, collecting and managing green product compliance data to provide accurate information to customers and stakeholders. By integrating these practices into our internal GSCM, we strive to create a more sustainable and eco-friendly supply chain, minimizing environmental impact and contributing to a greener future.

Ví dụ, công ty của chúng tôi cam kết tích hợp các thực tiễn xanh vào quản lý chuỗi cung ứng nội bộ của chúng tôi. Để làm được điều này, chúng tôi đã áp dụng các chứng nhận ISO 14001 hoặc HIGG FEM, thể hiện sự cam kết của chúng tôi với quản lý môi trường và bền vững. Các chứng nhận này xác nhận nỗ lực của chúng tôi tuân thủ các tiêu chuẩn và hướng dẫn môi trường được công nhận. Ngoài ra, chúng tôi thường xuyên tiến hành kiểm tra môi trường các phòng ban trong tổ chức để đánh giá tác động môi trường của chúng và xác định các lĩnh vực cần cải thiện. Điều này giúp chúng tôi giải quyết một cách chủ động các vấn đề về môi trường và liên tục cải thiện các thực tiễn xanh của chúng tôi. Đánh dấu sản phẩm bằng nhãn môi trường là một khía cạnh quan trọng khác của GSCM nội bộ của chúng tôi, nơi chúng tôi đánh dấu các sản phẩm của mình để chỉ ra các đặc điểm môi trường của chúng và thúc đẩy tính minh bạch đối với khách hàng. Hệ thống mua sắm xanh của chúng tôi tập trung vào việc tìm nguồn cung cấp vật liệu và tài nguyên từ các nhà cung cấp tuân thủ các thực tiễn bền vững, từ đó củng cố cam kết của chúng tôi với việc mua hàng có trách nhiệm về môi trường. Chúng tôi tích cực làm việc để giảm lượng khí thải nhà kính trong suốt

quy trình sản xuất, triển khai công nghệ tiết kiệm năng lượng và tìm hiểu các lựa chọn năng lượng tái tạo. Hơn nữa, chúng tôi đảm bảo rằng sản phẩm của chúng tôi tuân thủ các tiêu chuẩn và quy định về môi trường, thu thập và quản lý dữ liệu tuân thủ sản phẩm xanh để cung cấp thông tin chính xác cho khách hàng và các bên liên quan. Bằng cách tích hợp những thực tiễn này vào GSCM nội bộ của chúng tôi, chúng tôi hướng đến việc tạo ra một chuỗi cung ứng bền vững và thân thiện với môi trường, giảm thiểu tác động môi trường và đóng góp vào tương lai xanh hơn.

20. **10. We have started using more environmentally friendly raw materials and components.** \*

Chúng tôi đã tăng việc sử dụng nguyên liệu và thành phần thân thiện với môi trường

Mark only one oval.

1 2 3 4 5
1. N      5. Significant (đáng kể)

21. **What prompted the decision to go with this specific answer?**

Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

22. **11. Being environmentally aware is a fundamental aspect of our company's culture.** \*

Việc chú trọng đến môi trường là một phần không thể thiếu trong văn hóa doanh nghiệp của chúng tôi.

Mark only one oval.

1 2 3 4 5
1. N      5. Significant (đáng kể)

23. **What prompted the decision to go with this specific answer?**

Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

24. **12. We conduct internal environmental audits to ensure our products meet the environmental goals.** \*

Chúng tôi thực hiện kiểm tra để sản xuất bảo vệ môi trường trong nội bộ để đảm bảo sản phẩm đáp ứng mục tiêu môi trường.

For example, we regularly assess our manufacturing processes, materials, and supply chain to identify any environmental impacts

Ví dụ, chúng tôi thường xuyên đánh giá quy trình sản xuất, nguyên liệu và chuỗi cung ứng để xác định bất kỳ tác động nào đối với môi trường.

Mark only one oval.

1 2 3 4 5
1. N      5. Significant (đáng kể)

25. **What prompted the decision to go with this specific answer?**

Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

26. **13. We collaborate across different departments to reduce environmental impacts.** \*

Chúng tôi hợp tác giữa các bộ phận khác nhau trong công ty để giảm thiểu tác động đến môi trường.

For example, our production, design, and logistics teams join forces to find innovative ways to reduce energy consumption, optimize material usage, and enhance waste management.

Các nhóm sản xuất, thiết kế và logistics cùng nhau tìm kiếm các cách sáng tạo để giảm tiêu thụ năng lượng, tối ưu hóa sử dụng nguyên liệu và cải thiện quản lý chất thải

Mark only one oval.

1 2 3 4 5
1. N      5. Significant (đáng kể)

27. What prompted the decision to go with this specific answer?  
Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

**Environmental collaboration with customer (Sự phối hợp về môi trường với khách hàng)**

By working together with customers towards a common goal of implementing green practices, we have successfully materialized a coordinated supply chain.

Bằng cách cùng hợp tác với khách hàng với mục tiêu chung triển khai các thực tiễn xanh, chúng tôi đã thành công trong việc hiện thực hóa một chuỗi cung ứng được phối hợp.

For example, our company recognized the importance of aligning our efforts with the expectations and sustainability goals of our customers. By collaborating closely with our customers, we aimed to create a coordinated supply chain that prioritizes green practices and environmental responsibility. Together with our customers, we identified shared environmental objectives, such as reducing carbon emissions, minimizing waste, and promoting sustainable sourcing. Through effective communication and joint planning, we established clear expectations and responsibilities for each participant in the supply chain. This collaborative approach allowed us to integrate green initiatives into every stage of the supply chain, from raw material sourcing to manufacturing, transportation, and distribution. By working towards a common goal of implementing green practices, we have been able to optimize the entire supply chain for sustainability, efficiency, and environmental performance. This coordinated effort not only benefits our organization and our customers but also contributes to a positive impact on the environment and society. Materializing a coordinated supply chain with shared green practices has strengthened our relationship with customers, increased trust, and positioned us as a responsible and reliable partner in the industry. Moreover, it has enabled us to collectively contribute to a greener and more sustainable future by fostering a collaborative and environmentally conscious supply chain ecosystem.

Ví dụ, công ty của chúng tôi đã nhận ra sự quan trọng của việc điều hòa những nỗ lực của chúng tôi với kỳ vọng và mục tiêu bền vững của khách hàng. Bằng cách hợp tác chặt chẽ với khách hàng, chúng tôi hướng đến việc tạo ra một chuỗi cung ứng được phối hợp, ưu tiên các thực tiễn xanh và trách nhiệm môi trường. Cùng với khách hàng, chúng tôi xác định các mục tiêu môi trường chung, chẳng hạn như giảm lượng khí thải carbon, giảm thiểu chất thải và thúc đẩy mua sắm bền vững. Thông qua giao tiếp hiệu quả và kế hoạch chung, chúng tôi đề ra kỳ vọng và trách nhiệm rõ ràng cho mỗi bên tham gia trong chuỗi cung ứng. Tiếp cận hợp tác này cho phép chúng tôi tích hợp các sáng kiến xanh vào mọi giai đoạn của chuỗi cung ứng, từ nguồn cung vật liệu đến sản xuất, vận chuyển và phân phối. Bằng cách hướng đến mục tiêu chung triển khai các thực tiễn xanh, chúng tôi đã thực hiện tối ưu hóa toàn bộ chuỗi cung ứng cho tính bền vững, hiệu quả và hiệu suất môi trường. Nỗ lực phối hợp này không chỉ có lợi cho tổ chức của chúng tôi và khách hàng mà còn đóng góp vào tác động tích cực đối với môi trường và xã hội. Hiện thực hóa một chuỗi cung ứng được phối hợp với các thực tiễn xanh chung đã củng cố mối quan hệ của chúng tôi với khách hàng, tăng độ tin cậy và định vị chúng tôi là một đối tác có trách nhiệm và đáng tin cậy trong ngành. Hơn nữa, nó đã cho phép chúng tôi cùng nhau đóng góp vào một tương lai xanh hơn và bền vững.

10/26/23, 9:04 PM Stakeholder Collaboration and Green Supply Chain Management Survey - Khảo sát về sự phối hợp giữa các bên liên quan ...  
bằng cách thúc đẩy một hệ sinh thái chuỗi cung ứng hợp tác và có ý thức về môi trường.

28. 14. We collaborate with our customers to incorporate environmental considerations in product design. \*

Chúng tôi hợp tác với khách hàng để tích hợp các yếu tố môi trường trong thiết kế sản phẩm

Mark only one oval.

1 2 3 4 5  
1. N      5. Significant (đáng kể)

29. What prompted the decision to go with this specific answer?  
Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

30. 15. Our company and our customers share a common understanding of environmental responsibilities. \*

Công ty của chúng tôi và khách hàng của chúng tôi có một hiểu biết chung về trách nhiệm môi trường.

For example, our company actively engages with our customers to discuss and address environmental concerns

Ví dụ, công ty của chúng tôi tích cực tham gia với khách hàng để thảo luận và giải quyết các vấn đề về môi trường.

Mark only one oval.

1 2 3 4 5  
1. N      5. Significant (đáng kể)

31. What prompted the decision to go with this specific answer?  
Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

32. 16. Our company collaborates with customers to minimize environmental impact in our operations. \*

Công ty của chúng tôi hợp tác với khách hàng để giảm thiểu tác động môi trường trong hoạt động sản xuất của chúng tôi.

Mark only one oval.

1 2 3 4 5  
1. N      5. Significant (đáng kể)

33. What prompted the decision to go with this specific answer?  
Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

34. 17. Our company develops strategies to address Green Supply Chain Management (GSCM) issues in collaboration with customers. \*

Công ty của chúng tôi phát triển chiến lược để giải quyết các vấn đề quản lý chuỗi cung ứng xanh (GSCM) thông qua sự hợp tác với khách hàng.

Mark only one oval.

1 2 3 4 5  
1. N      5. Significant (đáng kể)

35. What prompted the decision to go with this specific answer?  
Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

36. **18. Our company and customers work together to achieve common environmental goals.** \*  
Công ty của chúng tôi và khách hàng làm việc cùng nhau để đạt được các mục tiêu môi trường chung.

Mark only one oval.

1 2 3 4 5  
1. N      5. Significant (đáng kể)

37. **What prompted the decision to go with this specific answer?**  
Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

**Environmental collaboration with supplier (Sự hợp tác về môi trường với nhà cung cấp)**

Collaboration with suppliers on environmental initiatives.

Hợp tác với nhà cung cấp trong các sáng kiến về môi trường.

For example, our company actively engages in environmental collaboration with our suppliers. This collaboration involves working together with our suppliers to implement green practices and reduce the environmental impact throughout the supply chain. We communicate our commitment to sustainability and environmentally responsible practices, encouraging our suppliers to adopt similar principles. By sharing knowledge, expertise, and resources, we collectively address environmental challenges and find innovative solutions. Our environmental collaboration with suppliers ensures that we are aligned with shared goals and actively contribute to a greener and more sustainable supply chain.

Ví dụ, công ty của chúng tôi tích cực tham gia hợp tác với nhà cung cấp trong các sáng kiến về môi trường. Hợp tác này bao gồm việc cùng nhà cung cấp triển khai các thực tiễn xanh và giảm thiểu tác động môi trường trong toàn bộ chuỗi cung ứng. Chúng tôi truyền đạt cam kết của mình với bền vững và các thực tiễn có trách nhiệm về môi trường, khuyến khích nhà cung cấp của chúng tôi áp dụng các nguyên tắc tương tự. Bằng cách chia sẻ kiến thức, chuyên môn và tài nguyên, chúng tôi cùng nhau giải quyết các thách thức môi trường và tìm ra các giải pháp sáng tạo. Hợp tác về môi trường với nhà cung cấp đảm bảo rằng chúng tôi cùng nhau hướng tới các mục tiêu chung và đóng góp tích cực vào một chuỗi cung ứng xanh hơn và bền vững hơn.

42. **21. Our company collaborates with suppliers to minimize the environmental impact of operations.** \*  
Công ty chúng tôi hợp tác với nhà cung cấp để giảm tác động môi trường trong sản xuất.

Mark only one oval.

1 2 3 4 5  
1. N      5. Significant (đáng kể)

43. **What prompted the decision to go with this specific answer?**  
Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

38. **19. We have collaborated with our suppliers to consider environmental factors in product design.** \*  
Chúng tôi đã hợp tác với nhà cung cấp của chúng tôi để xem xét các yếu tố môi trường trong thiết kế sản phẩm.

Mark only one oval.

1 2 3 4 5  
1. N      5. Significant (đáng kể)

39. **What prompted the decision to go with this specific answer?**  
Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

40. **20. Our company and suppliers share a clear understanding of environmental responsibilities.** \*  
Công ty chúng tôi và nhà cung cấp có sự hiểu biết rõ ràng về trách nhiệm trong các vấn đề môi trường.

Mark only one oval.

1 2 3 4 5  
1. N      5. Significant (đáng kể)

41. **What prompted the decision to go with this specific answer?**  
Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

44. **22. Our company develops strategies to address green supply chain management(GSCM)-related issues with suppliers.** \*  
Công ty chúng tôi lên kế hoạch để giải quyết các vấn đề liên quan đến quản lý chuỗi cung ứng xanh (GSCM) với nhà cung cấp.

GSCM definition (Giải thích cho GSCM)

GSCM involves a series of environmentally responsible measures throughout the entire supply chain, from sourcing raw materials to delivering finished products to customers.

Quản lý chuỗi cung ứng xanh liên quan đến việc thực hiện các biện pháp có trách nhiệm với môi trường trong toàn bộ quy trình cung ứng, từ nguồn cung cấp nguyên liệu đến việc giao sản phẩm hoàn thiện cho khách hàng. Chúng tôi ưu tiên việc cung ứng bền vững bằng cách lựa chọn các nhà cung cấp tuân thủ các phương pháp sản xuất thân thiện với môi trường, sử dụng nguyên liệu tái sinh và thúc đẩy các phương thức lao động công bằng.

For example, together with suppliers, we develop plans to implement eco-friendly initiatives, reduce carbon emissions, and enhance resource efficiency throughout the supply chain. This collaborative approach allows us to align our GSCM strategies with the priorities and objectives of our customers, ensuring mutual commitment to environmentally responsible practices.

Làm việc cùng với nhà cung cấp, chúng tôi phát triển kế hoạch triển khai các sáng kiến thân thiện với môi trường, giảm lượng khí thải carbon và nâng cao hiệu quả sử dụng tài nguyên trong toàn bộ chuỗi cung ứng. Tiếp cận hợp tác này cho phép chúng tôi điều chỉnh chiến lược GSCM của mình với các ưu tiên và mục tiêu của khách hàng, đảm bảo cam kết chung với các thực tiễn có trách nhiệm với môi trường.

Mark only one oval.

1 2 3 4 5  
1. N      5. Significant (đáng kể)

45. **What prompted the decision to go with this specific answer?**  
Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_



46. 23. Our company and suppliers jointly provide resources, skills, and knowledge to strengthen GSCM. Công ty chúng tôi và các nhà cung cấp hợp tác nhau để nâng cao Quản lý Chuỗi cung ứng Xanh (GSCM) bằng cách kết hợp nguồn lực, kỹ năng và kiến thức.

Mark only one oval.

1 2 3 4 5
1. N [radio] [radio] [radio] [radio] [radio] 5. Significant (đáng kể)

47. What prompted the decision to go with this specific answer? Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

48. 24. Our company and suppliers work together to achieve shared environmental objectives. Công ty chúng tôi và các nhà cung cấp hợp tác nhau để đạt được các mục tiêu môi trường chung.

Mark only one oval.

1 2 3 4 5
1. N [radio] [radio] [radio] [radio] [radio] 5. Significant (đáng kể)

49. What prompted the decision to go with this specific answer? Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

thái, điều này giúp đưa chất thải ra khỏi các bãi chôn và khuyến khích kinh tế vòng tròn. Hơn nữa, cam kết của chúng tôi với bền vững bao gồm thay thế các chất độc hại bằng các lựa chọn thân thiện với môi trường. Chúng tôi cẩn thận đánh giá các vật liệu được sử dụng trong sản phẩm của chúng tôi và chọn các lựa chọn an toàn với môi trường, chẳng hạn như vải hữu cơ hoặc tái chế và các chất nhuộm không độc hại. Bằng cách áp dụng những chiến lược này, chúng tôi đóng góp vào quy trình sản xuất xanh hơn, giảm tác động môi trường và đảm bảo một hành tinh khỏe mạnh cho thế hệ tương lai.

50. 25. We have reduced carbon dioxide emissions relative to our production volume. Khí thải carbon dioxide tính theo khối lượng sản xuất đã giảm.

Mark only one oval.

[radio] 1. Not at all (Hoàn toàn không)
[radio] 2. A little (một chút - dưới 20%)
[radio] 3. To some degree (đến một mức độ nào đó - từ 20% đến dưới 40%)
[radio] 4. Relatively significant (Tương đối đáng kể - từ 40% đến dưới 80%)
[radio] 5. Significant (đáng kể - nhiều hơn 80%)

51. What prompted the decision to go with this specific answer? Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

52. 26. We have reduced waste relative to our production volume. Chất thải tính theo khối lượng sản xuất đã giảm.

Mark only one oval.

[radio] 1. Not at all (Hoàn toàn không)
[radio] 2. A little (một chút - dưới 20%)
[radio] 3. To some degree (đến một mức độ nào đó - từ 20% đến dưới 40%)
[radio] 4. Relatively significant (Tương đối đáng kể - từ 40% đến dưới 80%)
[radio] 5. Significant (đáng kể - nhiều hơn 80%)

Environmental performance (Hiệu suất về môi trường)

THESE QUESTIONS ARE DESIGNED TO SEE IF IMPLEMENTING GREEN SUPPLY CHAIN IN PRODUCTION IS EFFECTIVE FOR THE MANUFACTURING PLANT OR NOT. YOU SHOULD EXCLUDE ANY ECONOMIC CRISIS OR COVID-19 IMPACTS WHEN ANSWERING THESE QUESTIONS.

NHỮNG CÂU HỎI NÀY ĐƯỢC THIẾT KẾ ĐỂ XEM VIỆC ÁP DỤNG CHUỖI CUNG ỨNG XANH VÀO SẢN XUẤT CÓ MANG LẠI HIỆU QUẢ CHO NHÀ MÁY SẢN XUẤT HAY KHÔNG. BẠN NÊN LOẠI TRỪ BẤT KỲ KHỦNG HOẢNG KINH TẾ HOẶC ẢNH HƯỞNG CỦA COVID-19 NÀO KHI TRẢ LỜI NHỮNG CÂU HỎI NÀY.

THESE QUESTIONS ARE INTENDED FOR THE HSE (HEALTH, SAFETY AND ENVIRONMENT) AND PRODUCTION DEPARTMENTS. FEEL FREE TO DISCUSS WITH YOUR COLLEAGUES TO PROVIDE THE ANSWERS AND FILL THEIR INFORMATION AT THE END OF THE SECTION.

NHỮNG CÂU HỎI NÀY DÀNH CHO CÁC BỘ PHẬN HSE (SỨC KHỎE, AN TOÀN VÀ MÔI TRƯỜNG) VÀ SẢN XUẤT. BẠN CÓ THỂ THẢO LUẬN VỚI ĐỒNG NGHIỆP ĐỂ TRẢ LỜI VÀ ĐIỀN THÔNG TIN CỦA HỌ VÀO CỘT PHẦN CÂU HỎI ĐỂ NHẬN VOUCHER.

Manufacturing firms can reduce hazardous air emissions, water, and solid waste, as well as minimize the consumption of toxic materials.

Các công ty sản xuất có thể giảm lượng khí thải gây hại vào không khí, nước và chất thải rắn, cũng như giảm tiêu thụ các chất độc hại.

For example, our company has implemented various measures to curb down environmental impacts. We focus on reducing hazardous air emissions by using energy-efficient machinery and optimizing production processes. This includes investing in modern technology that minimizes harmful emissions, such as volatile organic compounds (VOCs) and particulate matter. Additionally, we have adopted water conservation practices, such as recycling and reusing water in our production processes, to minimize water wastage. To address solid waste, we have implemented waste segregation and recycling programs, diverting waste away from landfills and promoting a circular economy. Moreover, our commitment to sustainability includes replacing toxic materials with eco-friendly alternatives. We carefully evaluate the materials used in our products and opt for environmentally safe alternatives, such as organic or recycled fabrics and non-toxic dyes. By adopting these strategies, we contribute to a greener manufacturing process, reducing our environmental footprint and ensuring a healthier planet for future generations.

Ví dụ, công ty của chúng tôi đã triển khai nhiều biện pháp để hạn chế tác động môi trường. Chúng tôi tập trung vào giảm lượng khí thải gây hại vào không khí bằng cách sử dụng máy móc tiết kiệm năng lượng và tối ưu hóa quy trình sản xuất. Điều này bao gồm đầu tư vào công nghệ hiện đại giảm thiểu khí thải gây hại, chẳng hạn như các hợp chất hữu cơ bay hơi (VOC) và hạt bụi. Bên cạnh đó, chúng tôi đã áp dụng các thực tiễn tiết kiệm nước, chẳng hạn như tái chế và sử dụng lại nước trong quy trình sản xuất, để giảm thiểu lãng phí nước. Để giải quyết vấn đề chất thải rắn, chúng tôi triển khai chương trình phân loại và tái chế chất

53. What prompted the decision to go with this specific answer? Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

54. 27. We have reduced energy consumption relative to our production volume. Tiêu thụ năng lượng tính theo khối lượng sản xuất đã giảm.

Mark only one oval.

[radio] 1. Not at all (Hoàn toàn không)
[radio] 2. A little (một chút - dưới 20%)
[radio] 3. To some degree (đến một mức độ nào đó - từ 20% đến dưới 40%)
[radio] 4. Relatively significant (Tương đối đáng kể - từ 40% đến dưới 80%)
[radio] 5. Significant (đáng kể - nhiều hơn 80%)

55. What prompted the decision to go with this specific answer? Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

56. 28. We have reduced water consumption relative to our production volume. Tiêu thụ nước tính theo khối lượng sản xuất đã giảm.

Mark only one oval.

[radio] 1. Not at all (Hoàn toàn không)
[radio] 2. A little (một chút - dưới 20%)
[radio] 3. To some degree (đến một mức độ nào đó - từ 20% đến dưới 40%)
[radio] 4. Relatively significant (Tương đối đáng kể - từ 40% đến dưới 80%)
[radio] 5. Significant (đáng kể - nhiều hơn 80%)

57. What prompted the decision to go with this specific answer? Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

**Financial performance (Hiệu suất về tài chính)**

**THESE QUESTIONS ARE DESIGNED TO SEE IF IMPLEMENTING GREEN SUPPLY CHAIN IN PRODUCTION IS EFFECTIVE FOR THE MANUFACTURING PLANT OR NOT. YOU SHOULD EXCLUDE ANY ECONOMIC CRISIS OR COVID-19 IMPACTS WHEN ANSWERING THESE QUESTIONS.**

NHỮNG CÂU HỎI NÀY ĐƯỢC THIẾT KẾ ĐỂ XEM VIỆC ÁP DỤNG CHUỖI CUNG ỨNG XANH VÀO SẢN XUẤT CÓ MANG LẠI HIỆU QUẢ CHO NHÀ MÁY SẢN XUẤT HAY KHÔNG. BẠN NÊN LOẠI TRỪ BẤT KỲ KHỦNG HOẢNG KINH TẾ HOẶC ẢNH HƯỞNG CỦA COVID-19 NÀO KHI TRẢ LỜI NHỮNG CÂU HỎI NÀY.

**THESE QUESTIONS ARE INTENDED FOR THE HSE (HEALTH, SAFETY, AND ENVIRONMENT) AND SALES DEPARTMENTS. FEEL FREE TO DISCUSS WITH YOUR COLLEAGUES TO PROVIDE THE ANSWERS AND FILL THEIR INFORMATION AT THE END OF THE SECTION.**

NHỮNG CÂU HỎI NÀY DÀNH CHO CÁC BỘ PHẬN HSE (SỨC KHỎE, AN TOÀN VÀ MÔI TRƯỜNG) VÀ KINH DOANH. BẠN CÓ THỂ THẢO LUẬN VỚI ĐỒNG NGHIỆP ĐỂ TRẢ LỜI VÀ ĐIỀN THÔNG TIN CỦA HỌ VÀO CỘT PHẦN CÂU HỎI ĐỂ NHẬN VOUCHER.

A company's financial performance is reflected in the decrease in waste and rework, enhanced productivity, and higher return on assets.

Hiệu suất tài chính của một công ty được phản ánh qua sự giảm thiểu lãng phí và làm lại, tăng năng suất và lợi nhuận trên tài sản tăng cao.

For example, our company's commitment to implementing green practices and optimizing processes has resulted in significant financial benefits. By reducing wastages and rework, we have lowered production costs and improved resource efficiency. This has a direct positive impact on our bottom line, as we are able to produce more with fewer resources, maximizing our operational efficiency. Additionally, the emphasis on productivity improvement has led to streamlined operations and faster turnaround times, enabling us to meet customer demands promptly and efficiently. Our investment in employee training, process optimization, and automation has contributed to improved productivity levels and reduced production time. Moreover, our focus on environmental responsibility has led to the efficient use of resources, minimizing waste and material consumption. This not only reduces our production costs but also aligns with our sustainability goals. The efficient utilization of resources and reduced waste also contributes to a positive impact on the environment, further enhancing our reputation as a socially responsible company. Furthermore, the financial performance of our company is reflected in the higher return on assets (ROA). By optimizing processes and adopting green practices, we have maximized the value generated from our assets, resulting in a more favorable return on investment. These financial improvements indicate the successful integration of green practices into our business model, leading to sustainable growth and enhanced financial performance.

Ví dụ, cam kết của công ty chúng tôi đối với việc triển khai các thực tiễn xanh và tối ưu hóa quy trình đã đem lại lợi ích tài chính đáng kể. Bằng cách giảm lãng phí và làm lại, chúng tôi đã giảm chi phí sản xuất và nâng cao hiệu quả sử dụng tài nguyên. Điều này có tác động tích cực trực tiếp đến lợi nhuận của chúng tôi, khi chúng tôi có thể sản xuất nhiều hơn với ít tài nguyên hơn, tối đa hóa hiệu quả vận hành của chúng tôi. Ngoài ra, việc tập trung vào cải tiến năng suất đã dẫn đến việc tối ưu hóa hoạt động và rút ngắn thời gian hoàn thành, giúp chúng tôi đáp ứng yêu cầu của khách hàng một cách nhanh chóng và hiệu quả. Đầu tư vào đào tạo nhân viên, tối ưu hóa quy trình và tự động hóa đã đóng góp vào việc nâng cao mức độ năng suất và giảm thời gian sản xuất. Hơn nữa, sự tập trung vào trách nhiệm môi trường đã dẫn đến việc sử dụng tài nguyên một cách hiệu quả, giảm thiểu lãng phí và tiêu thụ vật liệu. Điều này không chỉ giảm chi phí sản xuất mà còn phù hợp với mục tiêu bền vững của chúng tôi. Việc sử dụng tài nguyên hiệu quả và giảm thiểu lãng phí cũng đóng góp vào tác động tích cực đối với môi trường, tăng cường thêm danh tiếng của chúng tôi như một công ty có trách nhiệm xã hội. Hơn nữa, hiệu suất tài chính của công ty chúng tôi được phản ánh qua tỷ suất lợi nhuận trên tài sản (ROA) cao hơn. Bằng cách tối ưu hóa quy trình và áp dụng các thực tiễn xanh, chúng tôi đã tối đa hóa giá trị sinh lời từ tài sản của chúng tôi, dẫn đến mức lợi nhuận đầu tư thuận lợi hơn. Những cải thiện tài chính này cho thấy việc tích hợp thành công các thực tiễn xanh vào mô hình kinh doanh của chúng tôi, dẫn đến sự tăng trưởng bền vững và cải thiện hiệu suất tài chính.

29. Our turnover has increased due to the adoption of green supply chain practices.

Bằng cách áp dụng các thực tiễn chuỗi cung ứng xanh, doanh thu của chúng tôi đã tăng.

Mark only one oval.

- 1. Not at all (Hoàn toàn không)
- 2. A little (một chút - dưới 20%)
- 3. To some degree (đến một mức độ nào đó - từ 20% đến dưới 40%)
- 4. Relatively significant (Tương đối đáng kể - từ 40% đến dưới 80%)
- 5. Significant (đáng kể - nhiều hơn 80%)

30. What prompted the decision to go with this specific answer?

Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

30. Our profit has increased as a result of adopting green supply chain practices.

Bằng cách áp dụng các thực tiễn chuỗi cung ứng xanh, lợi nhuận của chúng tôi đã tăng.

Mark only one oval.

- 1. Not at all (Hoàn toàn không)
- 2. A little (một chút - dưới 20%)
- 3. To some degree (đến một mức độ nào đó - từ 20% đến dưới 40%)
- 4. Relatively significant (Tương đối đáng kể - từ 40% đến dưới 80%)
- 5. Significant (đáng kể - nhiều hơn 80%)

31. What prompted the decision to go with this specific answer?

Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

31. Our market share has grown as a result of adopting green supply chain practices.

Bằng cách áp dụng các thực tiễn chuỗi cung ứng xanh, thị phần của chúng tôi đã tăng.

Mark only one oval.

- 1. Not at all (Hoàn toàn không)
- 2. A little (một chút - dưới 20%)
- 3. To some degree (đến một mức độ nào đó - từ 20% đến dưới 40%)
- 4. Relatively significant (Tương đối đáng kể - từ 40% đến dưới 80%)
- 5. Significant (đáng kể - nhiều hơn 80%)

32. What prompted the decision to go with this specific answer?

Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

32. Our return-on-assets has improved as a result of adopting green supply chain practices.

Bằng cách áp dụng các thực tiễn chuỗi cung ứng xanh, tỷ suất lợi nhuận trên tài sản của chúng tôi đã tăng.

Mark only one oval.

- 1. Not at all (Hoàn toàn không)
- 2. A little (một chút - dưới 20%)
- 3. To some degree (đến một mức độ nào đó - từ 20% đến dưới 40%)
- 4. Relatively significant (Tương đối đáng kể - từ 40% đến dưới 80%)
- 5. Significant (đáng kể - nhiều hơn 80%)

33. What prompted the decision to go with this specific answer?

Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

**Operational performance (Hiệu suất về vận hành)**

**THESE QUESTIONS ARE DESIGNED TO SEE IF IMPLEMENTING GREEN SUPPLY CHAIN IN PRODUCTION IS EFFECTIVE FOR THE MANUFACTURING PLANT OR NOT. YOU SHOULD EXCLUDE ANY ECONOMIC CRISIS OR COVID-19 IMPACTS WHEN ANSWERING THESE QUESTIONS.**

NHỮNG CÂU HỎI NÀY ĐƯỢC THIẾT KẾ ĐỂ XEM VIỆC ÁP DỤNG CHUỖI CUNG ỨNG XANH VÀO SẢN XUẤT CÓ MANG LẠI HIỆU QUẢ CHO NHÀ MÁY SẢN XUẤT HAY KHÔNG. BẠN NÊN LOẠI TRỪ BẤT KỲ KHỦNG HOẢNG KINH TẾ HOẶC ẢNH HƯỞNG CỦA COVID-19 NẾU KHI TRẢ LỜI NHỮNG CÂU HỎI NÀY.

**THESE QUESTIONS ARE INTENDED FOR THE HSE (HEALTH, SAFETY, AND ENVIRONMENT) AND PRODUCTION DEPARTMENTS. FEEL FREE TO DISCUSS WITH YOUR COLLEAGUES TO PROVIDE THE ANSWERS AND FILL THEIR INFORMATION AT THE END OF THE SECTION.**

NHỮNG CÂU HỎI NÀY DÀNH CHO CÁC BỘ PHẬN HSE (SỨC KHỎE, AN TOÀN VÀ MÔI TRƯỜNG) VÀ SẢN XUẤT. BẠN CÓ THỂ THẢO LUẬN VỚI ĐỒNG NGHIỆP ĐỂ TRẢ LỜI VÀ ĐIỀN THÔNG TIN CỦA HỌ VÀO CUỐI PHẦN CÂU HỎI ĐỂ NHẬN VOUCHER.

Enhance and optimize operational performance in terms of delivery, flexibility, cost, and quality.

Tăng cường và tối ưu hiệu suất vận hành về giao hàng, tính linh hoạt, chi phí và chất lượng.

For example, our company continuously strives to improve operational performance to meet customer expectations effectively. We focus on enhancing delivery efficiency by implementing better logistics and supply chain management, ensuring timely delivery of products to customers. Additionally, we work on increasing flexibility in our production processes to adapt quickly to changing market demands and customer preferences. By incorporating lean manufacturing principles, we reduce lead times and improve production agility, enabling us to respond swiftly to customer needs. Cost optimization is another critical aspect of our operational improvement strategy. We identify areas of potential cost reduction, such as efficient inventory management, waste reduction, and energy-saving practices. These measures help us maintain competitive pricing while also contributing to environmental sustainability. Lastly, quality is of utmost importance, and we continually invest in quality control and assurance processes. By ensuring strict adherence to quality standards throughout the production cycle, we deliver products that meet or exceed customer expectations consistently. Through ongoing efforts to enhance operational performance, we not only strengthen our position in the market but also build lasting relationships with satisfied customers who trust our ability to deliver reliable, flexible, cost-effective, and high-quality products.

Ví dụ, công ty của chúng tôi liên tục nỗ lực cải thiện hiệu suất vận hành để đáp ứng hiệu quả các mong đợi của khách hàng. Chúng tôi tập trung vào việc nâng cao hiệu quả giao hàng

bằng cách triển khai quản lý vận chuyển và chuỗi cung ứng tối hơn, đảm bảo giao hàng sản phẩm đúng hạn cho khách hàng. Ngoài ra, chúng tôi làm việc để tăng cường tính linh hoạt trong quy trình sản xuất để thích nghi nhanh chóng với các yêu cầu thay đổi của thị trường và sở thích của khách hàng. Bằng cách tích hợp các nguyên tắc sản xuất tinh gọn (Lean Production), chúng tôi giảm thời gian chờ và nâng cao tính linh hoạt trong sản xuất, giúp chúng tôi đáp ứng nhanh chóng các nhu cầu của khách hàng. Tối ưu hóa chi phí là một khía cạnh quan trọng khác của chiến lược cải thiện hiệu suất vận hành của chúng tôi. Chúng tôi xác định các lĩnh vực có tiềm năng giảm chi phí, chẳng hạn như quản lý tồn kho hiệu quả, giảm thiểu lãng phí và các thực tiễn tiết kiệm năng lượng. Những biện pháp này giúp chúng tôi duy trì mức giá cạnh tranh trong khi đóng góp vào bền vững môi trường. Cuối cùng, chất lượng là yếu tố cực kỳ quan trọng, và chúng tôi liên tục đầu tư vào quy trình kiểm soát và bảo đảm chất lượng. Bằng cách đảm bảo tuân thủ nghiêm ngặt các tiêu chuẩn chất lượng trong suốt chu kỳ sản xuất, chúng tôi cung cấp các sản phẩm đáp ứng hoặc vượt quá mong đợi của khách hàng một cách nhất quán. Thông qua những nỗ lực không ngừng để cải thiện hiệu suất vận hành, chúng tôi không chỉ củng cố vị thế của mình trên thị trường mà còn xây dựng các mối quan hệ bền vững với khách hàng khi lòng tin tưởng vào khả năng cung cấp các sản phẩm đáng tin cậy, linh hoạt, có hiệu quả và chi phí và chất lượng cao.

66. **33. We ensure dependable delivery to our customers while upholding green practices.**

Chúng tôi đảm bảo việc giao hàng đáng tin cậy cho khách hàng của mình đồng thời duy trì các thực tiễn xanh.

Mark only one oval.

- 1. Not at all (Hoàn toàn không)
- 2. A little (một chút)
- 3. To some degree (đến một mức độ nào đó)
- 4. Relatively significant (Tương đối đáng kể)
- 5. Significant (đáng kể)

67. **What prompted the decision to go with this specific answer?**

Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

68. **34. We manufacture products with cost-efficiency while upholding green practices.**

Chúng tôi sản xuất sản phẩm với hiệu quả chi phí thấp đồng thời duy trì các thực tiễn xanh.

Mark only one oval.

- 1. Not at all (Hoàn toàn không)
- 2. A little (một chút)
- 3. To some degree (đến một mức độ nào đó)
- 4. Relatively significant (Tương đối đáng kể)
- 5. Significant (đáng kể)

69. **What prompted the decision to go with this specific answer?**

Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

70. **35. We manufacture products of consistent quality with minimal defects while upholding green practices.**

Chúng tôi sản xuất sản phẩm chất lượng đồng đều với số lượng lỗi tối thiểu đồng thời duy trì các thực tiễn xanh.

Mark only one oval.

- 1. Not at all (Hoàn toàn không)
- 2. A little (một chút)
- 3. To some degree (đến một mức độ nào đó)
- 4. Relatively significant (Tương đối đáng kể)
- 5. Significant (đáng kể)

71. **What prompted the decision to go with this specific answer?**

Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_

72. **36. We have minimized waste in our production processes while upholding green practices.**

Chúng tôi đã giảm thiểu lãng phí trong quá trình sản xuất đồng thời duy trì các thực tiễn xanh.

Mark only one oval.

- 1. Not at all (Hoàn toàn không)
- 2. A little (một chút - dưới 20%)
- 3. To some degree (đến một mức độ nào đó - từ 20% đến dưới 40%)
- 4. Relatively significant (Tương đối đáng kể - từ 40% đến dưới 80%)
- 5. Significant (đáng kể - nhiều hơn 80%)

73. **What prompted the decision to go with this specific answer?**

Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?

\_\_\_\_\_



74. **37. We create high-performance products that fulfill customer requirements while upholding green practices.**  
*Chúng tôi tạo ra các sản phẩm hiệu suất cao đáp ứng yêu cầu của khách hàng đồng thời duy trì các thực tiễn xanh.*

**For example, our company is committed to producing top-quality products that not only meet but also exceed customer expectations. We invest in research and development to create innovative designs and use high-quality materials to ensure the durability and performance of our products.**

*Vi dụ, công ty của chúng tôi sản xuất các sản phẩm chất lượng cao không chỉ đáp ứng mà còn vượt qua mong đợi của khách hàng. Chúng tôi đầu tư vào nghiên cứu và phát triển để tạo ra những thiết kế đổi mới và sử dụng các nguyên liệu chất lượng cao để đảm bảo độ bền và hiệu suất của sản phẩm.*

Mark only one oval.

- 1. Not at all (Hoàn toàn không)
- 2. A little (một chút)
- 3. To some degree (đến một mức độ nào đó)
- 4. Relatively significant (Tương đối đáng kể)
- 5. Significant (đáng kể)

75. **What prompted the decision to go with this specific answer?**  
*Điều gì đã thúc đẩy bạn quyết định đưa ra câu trả lời này?*

**Participant Details (Thông tin người trả lời)**

76. **What is your full name? (Họ và tên đầy đủ của bạn?) \***

77. **What is your gender? (Giới tính của bạn?) \***

Mark only one oval.

- Male (Nam)
- Female (Nữ)

78. **Who do you work for? (Bạn đang làm việc cho công ty nào?) \***

79. **Firm Size (Quy mô công ty) \***

Mark only one oval.

- Less than 50 employees
- 51-100 employees
- 101-499 employees
- 500-1000 employees
- More than 1000 employees

80. **What sector does your company operate in? (Lĩnh vực hoạt động của công ty bạn là gì? Ví dụ: Sản xuất Balo, túi xách) \***

81. **What is your occupation? (Chức danh bạn đang làm là gì?) \***

82. **Designation (Chức vụ / Vị trí) \***

Mark only one oval.

- Top Level Manager (Quản lý cấp cao)
- Middle Level Manager (Quản lý cấp trung)
- Low Level Manager (Quản lý cấp thấp)

83. **Who is the person in your company assisting you with answering the survey? \***  
**Please provide their Name, Occupation, and Email address (Ai sẽ giúp bạn trong công ty trả lời khảo sát? Vui lòng cung cấp tên, chức vụ và địa chỉ email của họ - Ví dụ: Nguyễn Văn A - Quản lý sản xuất - nguyenvana@gmail.com)**

### **Appendix 3: Interview questions for garment factories**

1. As far as I know, the state currently has the 2020 Environmental Protection Law, which is used as a legal framework related to green economic development. Is this correct, or are there other laws (related to Green Economy) that the government requires us to comply with?
2. Regarding green products, also known as "green labels" issued by the Ministry of Natural Resources and Environment, do these apply to products in your business sector? I understand that buyer X has "Bluesign" products, which are similar as a green product certification. But what support or benefits does the "green label" certification provide to "Bluesign" or your company?
3. With government regulations on green production and environmental protection, are there any obstacles that currently affect your company's business operations?
4. The government is implementing a new legal framework for green economic development. Do you have knowledge of this upcoming law, and what are your thoughts on it? Do you find it challenging, favourable, exciting, or concerning?
5. Regarding compliance with state environmental regulations, in addition to that, customers also conduct environmental audits at the factory. Does complying with environmental protection laws fully support meeting the environmental requirements from customers? In your opinion, to what extent does compliance with environmental protection laws aid in meeting the environmental requirements of customers?
6. VCCI: The Vietnam Chamber of Commerce and Industry has a set of criteria called CSI to measure sustainable business development. Are we aware of these criteria, and are they currently in use?
7. Apart from government regulations, the Vietnam textile and garment association (VITAS), do they have any requirements for us to adhere to in terms of green production, or do we have any commitments to green production with them?

# Appendix 4: Survey questions for buyer X

Figure 20  
Survey questions for buyer X

## Stakeholder Collaboration and Green Supply Chain Management Survey - Khảo sát về sự phối hợp giữa các bên liên quan trong việc triển khai chuỗi cung ứng xanh trong sản xuất

Consent Form for Participation in Research on Green Supply Chain Management.  
Biểu mẫu Đồng ý Tham gia Nghiên cứu về Quản lý Chuỗi Cung ứng Xanh.

**Researcher:** Dai Huynh, Master's Student in Economics Development at International Institution of Social Study, Erasmus University Rotterdam.  
Người nghiên cứu: Huỳnh Tấn Đạt, Sinh viên Thạc sĩ chuyên ngành Phát triển Kinh tế tại Viện nghiên cứu quốc tế và xã hội của Đại học Erasmus Rotterdam.

**Study Purpose (Mục đích nghiên cứu):**  
This research aims to investigate the extent to which collaboration among stakeholders in green supply chain management strengthens a firm's sustainable performance. This survey is specifically targeted at manufacturing companies in Vietnam that offer outsourcing services to foreign companies.  
Nghiên cứu này nhằm tìm hiểu mức độ mà sự hợp tác giữa các bên liên quan trong quản lý chuỗi cung ứng xanh cũng có hiệu suất bền vững của doanh nghiệp. Đối tượng của cuộc khảo sát này là các công ty sản xuất tại Việt Nam (các công ty cung cấp dịch vụ sản xuất hàng hóa cho các công ty nước ngoài).

**Your Data (Dữ liệu của bạn):**  
In this survey, you will be asked to rate your answers on a scale from 1 to 5. The study involves quantitative analysis, and the collected information will be used for running a PLS-SEM model for the research paper.  
Trong cuộc khảo sát này, bạn sẽ được yêu cầu đánh giá câu trả lời của mình trên một thang điểm từ 1 đến 5. Nghiên cứu này liên quan đến phân tích số liệu và thông tin thu thập sẽ được sử dụng để chạy mô hình PLS-SEM cho bài nghiên cứu.

**Sharing and Retaining Your Data (Chia sẻ và lưu trữ dữ liệu của bạn):**  
Your data will be kept strictly confidential. Data will only be shared with individuals directly involved in this research (Dr. Elissaios and Dr. Khanh).  
Dữ liệu của bạn và công ty sẽ được bảo mật nghiêm ngặt. Dữ liệu chỉ được chia sẻ với những người trực tiếp tham gia vào nghiên cứu này (bao gồm 2 giáo sư hướng dẫn của tác giả: giáo sư Elissaios Psaropoulos và giáo sư Nguyễn Trọng Hoà).

**Informed Consent (Đồng ý tham gia):**  
By providing your name and submitting this form, you give your consent to participate in this research. You have the right to withdraw from the study at any time and are not obligated to answer any questions you do not wish to answer.  
Bằng cách cung cấp tên của bạn và gửi biểu mẫu này, bạn đồng ý tham gia vào nghiên cứu này. Bạn có quyền rút lui khỏi nghiên cứu bất cứ lúc nào và không bị bắt buộc trả lời bất kỳ câu hỏi nào bạn không muốn trả lời.

**Contact (Liên hệ):**  
If you have any concerns or questions about this research, please contact us at 675707db@eur.nl (Dai Huynh).  
Nếu bạn có bất kỳ vấn đề hoặc câu hỏi nào về nghiên cứu này, xin vui lòng liên hệ chúng tôi qua địa chỉ email 675707db@eur.nl (Dai Huynh).  
Zalo: +84765827297

Your contribution has contributed to the success of the research and contributed to the economic development in Vietnam. Your information and opinions are extremely important and valuable for this research process. Thank you for your input and the precious time you have dedicated to our study. We hope that this research will provide useful information and contribute to the improvement of Vietnam's economy.  
Sự đóng góp của bạn đã góp phần vào sự thành công của bài nghiên cứu và đóng góp cho sự phát triển kinh tế tại Việt Nam. Những thông tin và ý kiến của bạn là cực kỳ quan trọng và giá trị đối với quá trình nghiên cứu này. Cảm ơn bạn vì sự đóng góp ý kiến và thời gian quý báu mà bạn đã dành cho nghiên cứu của chúng tôi. Chúng tôi hy vọng rằng nghiên cứu này sẽ đem lại thông tin hữu ích và góp phần phát triển kinh tế của Việt Nam.

\*\*\*Small gift (món quà nhỏ nhỏ):  
After completing the survey, you will receive a small token of appreciation, an online shopping voucher will be sent to your email. Câu trả lời hoàn thành khảo sát, bạn sẽ nhận được một phần quà nhỏ nhỏ (chìa khóa là một voucher mua sắm online) sẽ được gửi đến tài khoản email của bạn.

I SINCERELY THANK YOU FOR YOUR PARTICIPATION [TÔI XIN CHÂN THÀNH CẢM ƠN SỰ THAM GIA CỦA BẠN].

\* Indicates required question.

5. What prompted the decision to go with this specific answer? (Đâu là lý do thúc đẩy để bạn quyết định đưa ra câu trả lời này?)

6. 3. Our company collaborates with suppliers T2 to minimize the environmental impact of operations. (Công ty chúng tôi hợp tác với nhà cung cấp T2 để giảm tác động môi trường trong sản xuất.)

7. What prompted the decision to go with this specific answer? (Đâu là lý do thúc đẩy để bạn quyết định đưa ra câu trả lời này?)

8. 4. Our company develops strategies to address green supply chain management (GSCM)-related issues with suppliers T2. (Công ty chúng tôi lên kế hoạch để giải quyết các vấn đề liên quan đến quản lý chuỗi cung ứng xanh (GSCM) bằng cách kết hợp nguồn lực, kỹ năng và kiến thức.)

9. What prompted the decision to go with this specific answer? (Đâu là lý do thúc đẩy để bạn quyết định đưa ra câu trả lời này?)

10. 5. Our company and suppliers T2 jointly provide resources, skills, and knowledge to strengthen GSCM. (Công ty chúng tôi và các nhà cung cấp T2 hợp tác nhau để nâng cao Quản lý Chuỗi cung ứng Xanh (GSCM) bằng cách kết hợp nguồn lực, kỹ năng và kiến thức.)

11. What prompted the decision to go with this specific answer? (Đâu là lý do thúc đẩy để bạn quyết định đưa ra câu trả lời này?)

1. Email \*

Before you start filling out the survey, here's some important information (Trước khi bạn bắt đầu điền vào bản khảo sát, đây là một số thông tin quan trọng)

1. The survey consists of a total of 6 questions for 13 factories, and it should take approximately 45 minutes to complete. (Khảo sát này bao gồm tổng cộng 6 câu hỏi và dự kiến mất khoảng 5 phút để hoàn thành.)

2. In this survey, Green Supply Chain Management/Practice means that your company has embraced green supply chain practices as part of our commitment to environmental sustainability. (Trong bài nghiên cứu này, Quản lý Chuỗi Cung Ứng Xanh ám chỉ việc công ty của bạn áp dụng các thực tiễn có trách nhiệm với môi trường trong toàn bộ chuỗi cung ứng, thể hiện cam kết với bền vững.)

For example, These practices involve a series of environmentally responsible measures throughout the entire supply chain, from sourcing raw materials to delivering finished products to customers. We prioritize sustainable sourcing by selecting suppliers who adhere to eco-friendly production methods, use renewable materials, and promote fair labor practices. Additionally, we implement efficient logistics and transportation systems to reduce greenhouse gas emissions and minimize environmental impacts during product distribution. In terms of manufacturing, we adopt energy-efficient processes, waste reduction strategies, and recycling programs to ensure responsible resource management. Green supply chain practices also extend to packaging, where we strive to use eco-friendly materials and minimize unnecessary packaging waste.

Ví dụ, Công ty của tôi ưu tiên việc cung cấp bền vững bằng cách lựa chọn nhà cung cấp sử dụng các nguyên liệu tái tạo và khuyến khích các thực tiễn sản xuất thân thiện với môi trường và giao thông của chúng tôi được thiết kế để giảm lượng khí thải carbon và giảm tác động tác động môi trường trong quá trình phân phối sản phẩm. Ở giai đoạn sản xuất, chúng tôi tập trung vào các quy trình tiết kiệm năng lượng, giảm thiểu chất thải và các chương trình tái chế. Chúng tôi sử dụng các vật liệu đóng gói thân thiện với môi trường và nỗ lực giảm thiểu lãng phí đóng gói không cần thiết. Bằng cách áp dụng những thực tiễn này, chúng tôi nhằm giảm thiểu tác động môi trường của mình, bảo vệ tài nguyên tự nhiên và đóng góp vào một ngành công nghiệp bền vững và có ý thức về môi trường.

Buyer-Suppliers Tier-2 Collaboration with manufacturing companies (Sự hợp tác giữa nhà khách hàng và nhà cung cấp T2)

Evaluate the collaboration between buyer-supplier T2 with each garment manufacturing company (from factory 1 to factory 13)

2. 1. We have collaborated with our suppliers T2 to consider environmental factors in product design. (Chúng tôi đã hợp tác với nhà cung cấp T2 của chúng tôi để xem xét các yếu tố môi trường trong thiết kế sản phẩm.)

3. What prompted the decision to go with this specific answer? (Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?)

4. 2. Our company and suppliers T2 share a clear understanding of environmental responsibilities. (Công ty chúng tôi và nhà cung cấp T2 có sự hiểu biết rõ ràng về trách nhiệm trong các vấn đề môi trường.)

5. What prompted the decision to go with this specific answer? (Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?)

Participant Details (Thông tin người trả lời)

12. 6. Our company and suppliers T2 work together to achieve shared environmental objectives. (Công ty chúng tôi và các nhà cung cấp T2 hợp tác nhau để đạt được các mục tiêu môi trường chung.)

13. What prompted the decision to go with this specific answer? (Điều gì đã thúc đẩy để bạn quyết định đưa ra câu trả lời này?)

14. What is your full name? (Họ và tên đầy đủ của bạn?)

15. Who do you work for? (Bạn đang làm việc cho công ty nào?)

16. What sector does your company operate in? (Lĩnh vực hoạt động của công ty bạn là gì? Ví dụ: Sản xuất Balo, túi xách)

17. What is your occupation? (Chức danh bạn đang làm là gì?)

Note: the survey was completed by the production manager at Buyer X for a total of 13 factories, with each factory answering 6 questions. In total, there are 13 responses.

# Appendix 5: Environmental audit from buyer X

Figure 21  
Environmental audit summary for factory 1

<b>Name: Buyer X</b>	<b>Environmental Audit Summary</b>
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Factory Name	Factory 1	Audit Start Date	10/7/2022	Auditor Name	xx
Factory Address	xx	Audit End Date	10/15/2022	Audit Performance	High Performance
Factory Contact	xx	Audit Firm			

SECTION #	SECTIONS DESCRIPTION	Weighting	Actual Points	Section Score
1	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	25%	97	24
2	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	15%	65	10
3	WATER USE	15%	90	14
4	WASTEWATER	15%	93	14
5	EMISSIONS TO AIR	15%	25	4
6	WASTE MANAGEMENT	15%	70	11
<b>Final Score</b>			76	
<b>Performance Level</b>			<b>High Performance</b>	

The performance level is based on the final score:

Performance Level	Final Score
High Performance	75-100
Moderate Performance	65-74
Low Performance	0-64

Levels are Weighted Differently

Level 1	Awareness and understanding of sources and systems	Foundational	25% of the total possible points. (Unless the applicability questions stop you at Level 1, then Level 1 is worth 100% of total possible points.)
Level 2	Setting targets and tracking progress	Progressive	50% of the total possible points.
Level 3	Setting targets and tracking progress	Aspirational	25% of the total possible points.

**Calculating Points for Each Checkpoints**  
 For each "yes" answer, full points  
 For each "partial yes" answer, half points  
 For each "no" answer, zero points

Remark: The default value is 3, please reselect the choice to No or N/A accordingly, please fill up the DESCRIPTION column with violations identified when it's applicable.

#	Section	Sub-Sections	Checkpoint Description	Answer	Actual Score	Max Score
<b>1.0 ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM</b>						
1.1	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 1	There is no government-issued environmental violation records, Institute of Public & Environmental Affairs (IPE), actions of remove the records.	Yes	5.0%	5.0%
1.2	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 1	Name, job title, working hour of environmental management and function of all the members of management with environmental management roles Environmental Management staffs job descriptions records	Yes	5.0%	5.0%
1.3	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 1	Environmental strategy including future environmental priorities, goals, and actions for 3+ years. The facility should develop and maintain a significant environmental impact lists	Yes	5.0%	5.0%
1.4	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 1	The program or system for reviewing and monitoring environmental permit status and renewal and ensure compliance, Permit lists, documentation of program or system; Documented system for identifying, monitoring and periodically verifying all laws, regulations, standards, codes etc. for significant environment impacts	Yes	5.0%	5.0%
1.5	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 1	The facility should have a process to ensure all environmental related equipment are well maintained according to schedule, and records should be kept for tracking.	Partial Yes	2.5%	5.0%
1.6	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 2	Internal communication plans for environmental strategy, training records for environmental strategy Review environmental strategy with facilities management team each calendar year	Yes	25.0%	25.0%
1.7	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 2	List of environmental management staffs, job description of the environment management staffs, process to ensure the staffs' ability match the job, staffs training records, certificates, annual assessment records Ability for environmental management staffs	Yes	25.0%	25.0%
1.8	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 3	Training plan, training records for environmental strategy Promote awareness of environmental strategy to employees	Yes	5.0%	5.0%
1.9	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 3	The facility should develop a mechanism to evaluate facility environmental performance or leverage 3rd party tools such as Higg.	Yes	5.0%	5.0%
1.10	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 3	The facility should maintain a complete subcontractors list that indicates which subcontractors have/ do not have environmental management system	Yes	5.0%	5.0%
1.11	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 3	Evidence of environmental improvement in local context, local stakeholders and dates of engaged, picture, article, media, supported project or organization list Engage in environmental improvement in local context	Yes	5.0%	5.0%
1.12	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 3	Do you report GHG emissions data to the CDP? If yes please record the recent year CDP score, total direct GHG emissions, total scope 2& 3 GHG emission in the "notes" column.	N/A	0.0%	0.0%
					<b>92.5%</b>	<b>95.0%</b>

2.0 ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS						
2.1	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	Level 1	Maintain a list of all sources of energy use on site, frequency and method of measurement for each source of energy, for each source of direct energy use, describe where it is used Copies of utility bills (or meter readings) for all energy sources listed covering the full calendar year, picture of energy meters used to monitor the consumption of the main energy sources	Yes	25.0%	25.0%
2.2	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	Level 2	Facility tracks energy consumption data per year used for setting energy reduction targets Base line for each energy use (noting the year of the baseline). All data clearly labeled with time frame (year) and units of measure eg kWh, liters etc.	Yes	10.0%	10.0%
2.3	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	Level 2	Most energy consuming processes or operations Assessing methodology, ranking of processes or services that consume the most energy (with energy consumption value, copy of an energy audit conducted by an energy management specialist (if available)	Yes	10.0%	10.0%
2.4	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	Level 2	Targets for improving energy use or GHG emission Energy resource, targets for improving, timeline, plan for reach the target etc. Plan for improving energy use or GHG emission; detailed implementation plan *Reduction target with the following: - target name - target type (absolute or normalized) - base year and target year - % reduction from base year - metric for normalized target (e.g. piece of garment produced) - frequency of reviewing the target Briefly describe the plan or strategies for air emission reduction, state: - Department/ person responsible for the plan - Timeframe of the plan (e.g. 5-year) - Year that the plan was implemented (e.g. 2010)* Air emissions target, reduction plan and strategy	Partial Yes	5.0%	10.0%
2.5	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	Level 2	Relevant utility bills or records of the consumption for last year and relevant utility bills for this year are tracked and compared to the baseline	Yes	10.0%	10.0%
2.6	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	Level 2	Scope 3 GHG emissions inventory including boundaries and methodology applied Calculate the scope 3 green gas (GHG) emissions	Partial Yes	5.0%	10.0%
2.7	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	Level 3	The facility set a Science-Based Target according to the SBTi.	No	0.0%	25.0%
				<b>0</b>	<b>65.0%</b>	<b>100.0%</b>

3.0 WATER USE						
3.1	WATER USE	Level 1	List of all sources of water use including quantity, tracking method, frequency of measurement	Yes	12.5%	12.5%
3.2	WATER USE	Level 1	Water purchase record/bills List of water meter and location	Yes	12.5%	12.5%
3.3	WATER USE	Level 2	Baselines for water use of each water source including year, calculation method and process Communication record with employees on the baselines for water use	Yes	10.0%	10.0%
3.4	WATER USE	Level 2	Water assessment to identify which processes or operations use the most water Water pipeline drawing/diagram/flowchart Water meter recording and water pipelines/tanks inspection record	Yes	10.0%	10.0%
3.5	WATER USE	Level 2	Targets for reducing water use of each water source including calculation method and process Review records for the progress of the set targets Communication record with employees on the targets for reducing water use	Yes	10.0%	10.0%
3.6	WATER USE	Level 2	Procedure and responsibility to catch the targets for reducing water use Water audit or assessment done by external party identifying water reduction opportunities and implementation dates Water reduction plan listing specific projects, target reductions, dates, and progress	Partial Yes	5.0%	10.0%
3.7	WATER USE	Level 2	Water tracking reports and consumption records to show water reductions New equipment or efficiency improvements that demonstrate that water reductions Awards or certificates for water efficiency achievements	Partial Yes	5.0%	10.0%
3.8	WATER USE	Level 3	Water balance or another analysis report	Yes	25.0%	25.0%
				0	90.0%	100.0%
4.0 WASTEWATER						
4.1	WASTEWATER	Level 1	Wastewater production source and quantity monitoring record Invoices for wastewater discharge estimation Wastewater pipeline drawing/diagram/flowchart Water meter recording and wastewater pipelines/tanks inspection record	Yes	5.0%	5.0%
4.2	WASTEWATER	Level 1	Wastewater guideline(s) (ZDHC/BSR) or permit (S) Wastewater test reports Onsite WTP technical flow chart Onsite WTP operation and monitoring record	Yes	5.0%	5.0%
4.3	WASTEWATER	Level 1	Name and contact information of the offsite wastewater treatment plant Service contract with the offsite wastewater treatment plant Offsite WTP technical flow chart Back-up plan/flow chart of emergency situation related to wastewater O-chart and responsibility of the back-up plan	Yes	5.0%	5.0%
4.4	WASTEWATER	Level 1	Inventory of sludge amounts, types (non-hazardous and hazardous) and dispose method Sludge analysis or test results (if non-hazardous is selected) Permits or manifests for proper disposal or land application Invoices or delivery records for off-site disposal	Partial Yes	2.5%	5.0%
4.5	WASTEWATER	Level 1	Documentation (process, schematics of equipment, procedures, responsible persons, etc.) for septic wastewater treatment Septic tank location and pipeline Septic tank aCInd pipeline inspection record Disposal records/invoices for septic tank contents removal A time-bound plan for upgrading septic tank with more modern wastewater treatment approach	Partial Yes	2.5%	5.0%
4.6	WASTEWATER	Level 2	Recent wastewater quality test results from the offsite wastewater treatment plant Recent documentation for requesting offsite wastewater quality results	Yes	50.0%	50.0%
4.7	WASTEWATER	Level 3	Records/quantity demonstrating closed-loop recycling (process water to process water) Location where water is captured for recycling and the location where recycled water is used Processing technical and flow chart of recycled water Water recycling equipment operation and monitoring record	N/A	0.0%	0.0%
				0	70.0%	75.0%

6.0 EMISSIONS TO AIR						
5.1	EMISSIONS TO AIR	Level 1	"List the main sources of emissions to air, state: - Name of the emission source presented on-site (e.g. coal boiler) - The quantity of pollutant emitted from the sources listed and the dates/timeframe (if known or estimated); - Any control devices (e.g. abatement equipment) installed; - Whether the particular emission is legally regulated. If yes, state the name of the regulation." Air emissions inventory/ Air emissions testing report (e.g., boiler exhaust air quality testing, power plant air quality)	Yes	12.5%	12.5%
5.2	EMISSIONS TO AIR	Level 1	The frequency of air emission testing at the emission source (not indoors or outdoors ambient air) Air emissions testing report (from certified professional or laboratory, showing the type, source, quality and quantity of air pollutants present at site) The testing reports have been kept for tracking and verification	Yes	12.5%	12.5%
5.3	EMISSIONS TO AIR	Level 2	List of pollutants reduced due to measures taken at the facility improve air quality (e.g. SOx, NOx, PM, etc.) The absolute or normalized amount of pollutants reduced. For normalized reduction, state the metric for normalization The current, baseline year and baseline emission level Time period which the facility achieved air emission reduction List of all measures the site has carried out that have contributed to reduced air emissions. Air emissions improvement implementation or action plan/ Air emission quality test demonstrating the results of air emissions reduction measures	No	0.0%	50.0%
5.4	EMISSIONS TO AIR	Level 3	Description of any practices, programs, technology, or methods considered to be a "leading practice" for managing and significantly reducing air emissions	No	0.0%	25.0%
				0	25.0%	100.0%
6.0 WASTE MANAGEMENT						
6.1	WASTE MANAGEMENT	Level 1	"Information on all waste streams on-site, state: - Name of the waste stream - Type of waste - Method of tracking waste - The disposal method - Description of the source of waste (e.g. source of the waste)" Waste inventory/ Annual waste disposal/recycling record	Yes	5.0%	5.0%
6.2	WASTE MANAGEMENT	Level 1	Total amount of solid waste generated at the site and the corresponding unit of measure Annual waste disposal/recycling record	Yes	5.0%	5.0%
6.3	WASTE MANAGEMENT	Level 1	Total amount of hazardous waste generated at the site and the corresponding unit of measure Annual waste disposal/recycling record	Yes	5.0%	5.0%
6.4	WASTE MANAGEMENT	Level 1	Total amount of waste generated that is recycled instead of being disposed and the corresponding unit of measure Annual waste disposal/recycling record	No	0.0%	5.0%
6.5	WASTE MANAGEMENT	Level 1	"Provide details of the training, including: - Date of the last training - Name and title of the person (or company) that conducted the training - Topics covered in the training, and the personnel trained" Training materials and record for waste handling and segregation training	Yes	5.0%	5.0%
6.6	WASTE MANAGEMENT	Level 2	Reduction target with the following:- target name, - target type (absolute or normalized) , - base year and target year, - % reduction from base year - Metric for normalized target (e.g. piece of garment produced),- frequency of reviewing the target Briefly describe the plan or strategies for waste reduction, state: - Department/ person responsible for the plan, - Timeframe of the plan (e.g. 5-year), - Year that the plan was implemented (e.g. 2010) If the factory answer "yes" to sub question "Does your site have a recycling program in place to reduce waste?", Briefly describe the recycling program in place, state: - Year that the program was implemented,- Department/ person responsible for the plan,- Type of waste covered by the plan Waste reduction target and strategies/ Waste management plan	Partial Yes	25.0%	50.0%
6.7	WASTE MANAGEMENT	Level 3	List the types of waste reduced due to measures taken at the facility to reduce waste (i.e. the source of waste and the name of the waste stream) The absolute or normalized amount of waste reduced. For normalized reduction, state the metric for normalization The baseline year and baseline waste quantity Time period which the facility achieved waste reduction List all measures the site has carried out that have contributed to waste reduction. Waste reduction implementation or action plan/ Waste disposal/recycling record demonstrating the results of waste reduction measures	Yes	12.5%	12.5%
6.8	WASTE MANAGEMENT	Level 3	Description of any practices, programs, technology, or methods considered to be a "leading practice" for managing and significantly reducing waste	Yes	12.5%	12.5%
					70.0%	100.0%



**Figure 22**  
**Environmental audit summary for factory 4**

Name: Buyer X	<h2 style="margin: 0;">Environmental Audit Summary</h2>
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Factory Name	Factory 4	Audit Start Date	Oct 06th 2022	Auditor Name	xx
Factory Address	xx	Audit End Date	Oct 10th 2022	Audit Performance	High Performance
Factory Contact	xx	Audit Firm	xx		

**1. Audit Score**

SECTION #	SECTIONS DESCRIPTION	Weighting	Actual Points	Section Score
1	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	25%	92	23
2	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	15%	78	12
3	WATER USE	15%	90	14
4	WASTEWATER	15%	97	15
5	EMISSIONS TO AIR	15%	38	6
6	WASTE MANAGEMENT	15%	94	14
<b>Final Score</b>			82	
<b>Performance Level</b>			<b>High Performance</b>	

The performance level is based on the final score.

Performance Level	Final Score
High Performance	75-100
Moderate Performance	65-74
Low Performance	0-64

**Levels are Weighted Differently**

Level 1	Awareness and understanding of sources and systems	Foundational	25% of the total possible points. <small>(Unless the applicability questions stop you at Level 1, then Level 1 is worth 100% of total possible points.</small>
Level 2	Setting targets and tracking progress	Progressive	50% of the total possible points.
Level 3	Setting targets and tracking progress	Aspirational	25% of the total possible points.

**Calculating Points for Each Checkpoints**

- For each 'yes' answer, full points
- For each 'partial yes' answer, half points
- For each 'no' answer, zero points

Remark: The default value is 3, please reselect the choice to No or N/A accordingly, please fill up the DESCRIPTION column with violations identified when it's applicable.

#	Section	Sub-Sections	Checkpoint Description	Answer	Actual Score	Max Score
<b>1.0</b>	<b>ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM</b>					
1.1	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 1	There is no government-issued environmental violation records, Institute of Public & Environmental Affairs (IPE), actions of remove the records.	Yes	5.0%	5.0%
1.2	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 1	Name, job title, working hour of environmental management and function of all the members of management with environmental management roles Environmental Management staffs job descriptions records	Yes	5.0%	5.0%
1.3	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 1	Environmental strategy including future environmental priorities, goals, and actions for 3+ years. The facility should develop and maintain a significant environmental impact lists	Yes	5.0%	5.0%
1.4	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 1	The program or system for reviewing and monitoring environmental permit status and renewal and ensure compliance, Permit lists, documentation of program or system; Documented system for identifying, monitoring and periodically verifying all laws, regulations, standards, codes etc. for significant environment impacts	Yes	5.0%	5.0%
1.5	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 1	The facility should have a process to ensure all environmental related equipment are well maintained according to schedule, and records should be kept for tracking.	Yes	5.0%	5.0%
1.6	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 2	Internal communication plans for environmental strategy, training records for environmental strategy Review environmental strategy with facilities management team each calendar year	Yes	25.0%	25.0%
1.7	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 2	List of environmental management staffs, job description of the environment management staffs, process to ensure the staffs' ability match the job, staffs training records, certificates, annual assessment records Ability for environmental management staffs	Yes	25.0%	25.0%
1.8	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 3	Training plan, training records for environmental strategy Promote awareness of environmental strategy to employees	Yes	5.0%	5.0%
1.9	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 3	The facility should develop a mechanism to evaluate facility environmental performance or leverage 3rd party tools such as Higg.	Yes	5.0%	5.0%
1.10	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 3	The facility should maintain a complete subcontractors list that indicates which subcontractors have/ do not have environmental management system	Partial Yes	2.5%	5.0%
1.11	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 3	Evidence of environmental improvement in local context, local stakeholders and dates of engaged, picture, article, media, supported project or organization list Engage in environmental improvement in local context	No	0.0%	5.0%
1.12	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 3	Do you report GHG emissions data to the CDP? If yes please record the recent year CDP score, total direct GHG emissions, total scope 2 & 3 GHG emission in the 'notes' column.	N/A	0.0%	0.0%
					<b>87.5%</b>	<b>95.0%</b>



2.0 ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS						
2.1	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	Level 1	Maintain a list of all sources of energy use on site, frequency and method of measurement for each source of energy, for each source of direct energy use, describe where it is used Copies of utility bills (or meter readings) for all energy sources listed covering the full calendar year, picture of energy meters used to monitor the consumption of the main energy sources	Yes	25.0%	25.0%
2.2	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	Level 2	Facility tracks energy consumption data per year used for setting energy reduction targets Base line for each energy use (noting the year of the baseline). All data clearly labeled with time frame (year) and units of measure eg kWh, liters etc.	Yes	10.0%	10.0%
2.3	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	Level 2	Most energy consuming processes or operations Assessing methodology, ranking of processes or services that consume the most energy (with energy consumption value, copy of an energy audit conducted by an energy management specialist (if available)	Yes	10.0%	10.0%
2.4	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	Level 2	Targets for improving energy use or GHG emission Energy resource, targets for improving, timeline, plan for reach the target etc. Plan for improving energy use or GHG emission; detailed implementation plan *Reduction target with the following: - target name - target type (absolute or normalized) - base year and target year - % reduction from base year - metric for normalized target (e.g. piece of garment produced) - frequency of reviewing the target Briefly describe the plan or strategies for air emission reduction, state: - Department/ person responsible for the plan - Timeframe of the plan (e.g. 5-year) - Year that the plan was implemented (e.g. 2010)* Air emissions target, reduction plan and strategy	Yes	10.0%	10.0%
2.5	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	Level 2	Relevant utility bills or records of the consumption for last year and relevant utility bills for this year are tracked and compared to the baseline	Yes	10.0%	10.0%
2.6	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	Level 2	Scope 3 GHG emissions inventory including boundaries and methodology applied Calculate the scope 3 green gas (GHG) emissions	No	0.0%	10.0%
2.7	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	Level 3	The facility set a Science-Based Target according to the SBTi.	Partial Yes	12.5%	25.0%
				0	77.5%	100.0%

3.0 WATER USE						
3.1	WATER USE	Level 1	List of all sources of water use including quantity, tracking method, frequency of measurement	Yes	12.5%	12.5%
3.2	WATER USE	Level 1	Water purchase record/bills List of water meter and location	Yes	12.5%	12.5%
3.3	WATER USE	Level 2	Baselines for water use of each water source including year, calculation method and process Communication record with employees on the baselines for water use	Yes	10.0%	10.0%
3.4	WATER USE	Level 2	Water assessment to identify which processes or operations use the most water Water pipeline drawing/diagram/flowchart Water meter recording and water pipelines/tanks inspection record	Yes	10.0%	10.0%
3.5	WATER USE	Level 2	Targets for reducing water use of each water source including calculation method and process Review records for the progress of the set targets Communication record with employees on the targets for reducing water use	Yes	10.0%	10.0%
3.6	WATER USE	Level 2	Procedure and responsibility to catch the targets for reducing water use Water audit or assessment done by external party identifying water reduction opportunities and implementation dates Water reduction plan listing specific projects, target reductions, dates, and progress	Yes	10.0%	10.0%
3.7	WATER USE	Level 2	Water tracking reports and consumption records to show water reductions New equipment or efficiency improvements that demonstrate that water reductions Awards or certificates for water efficiency achievements	No	0.0%	10.0%
3.8	WATER USE	Level 3	Water balance or another analysis report	Yes	25.0%	25.0%
				0	90.0%	100.0%
4.0 WASTEWATER						
4.1	WASTEWATER	Level 1	Wastewater production source and quantity monitoring record Invoices for wastewater discharge estimation Wastewater pipeline drawing/diagram/flowchart Water meter recording and wastewater pipelines/tanks inspection record	Yes	5.0%	5.0%
4.2	WASTEWATER	Level 1	Wastewater guideline(s) (ZDHC/BSR) or permit (S) Wastewater test reports Onsite WTP technical flow chart Onsite WTP operation and monitoring record	Yes	5.0%	5.0%
4.3	WASTEWATER	Level 1	Name and contact information of the offsite wastewater treatment plant Service contract with the offsite wastewater treatment plant Offsite WTP technical flow chart Back-up plan/flow chart of emergency situation related to wastewater O-chart and responsibility of the back-up plan	Yes	5.0%	5.0%
4.4	WASTEWATER	Level 1	Inventory of sludge amounts, types (non-hazardous and hazardous) and dispose method Sludge analysis or test results (if non-hazardous is selected) Permits or manifests for proper disposal or land application Invoices or delivery records for off-site disposal	Yes	5.0%	5.0%
4.5	WASTEWATER	Level 1	Documentation (process, schematics of equipment, procedures, responsible persons, etc.) for septic wastewater treatment Septic tank location and pipeline Septic tank and pipeline inspection record Disposal records/invoices for septic tank contents removal A time-bound plan for upgrading septic tank with more modern wastewater treatment approach	Partial Yes	2.5%	5.0%
4.6	WASTEWATER	Level 2	Recent wastewater quality test results from the offsite wastewater treatment plant Recent documentation for requesting offsite wastewater quality results	Yes	50.0%	50.0%
4.7	WASTEWATER	Level 3	Records/quantity demonstrating closed-loop recycling (process water to process water) Location where water is captured for recycling and the location where recycled water is used Processing technical and flow chart of recycled water Water recycling equipment operation and monitoring record	N/A	0.0%	0.0%
				0	72.5%	75.0%

5.0 EMISSIONS TO AIR						
5.1	EMISSIONS TO AIR	Level 1	<p>"List the main sources of emissions to air, state:            - Name of the emission source presented on-site (e.g. coal boiler)            -The quantity of pollutant emitted from the sources listed and the dates/timeframe            (if known or estimated);            - Any control devices (e.g. abatement equipment) installed;            - Whether the particular emission is legally regulated. If yes, state the name of the regulation."            Air emissions inventory/ Air emissions testing report (e.g., boiler exhaust air quality testing, power plant air quality)</p>	Yes	12.5%	12.5%
5.2	EMISSIONS TO AIR	Level 1	<p>The frequency of air emission testing at the emission source (not indoors or outdoors ambient air)            Air emissions testing report (from certified professional or laboratory, showing the type, source, quality and quantity of air pollutants present at site)            The testing reports have been kept for tracking and verification</p>	Yes	12.5%	12.5%
5.3	EMISSIONS TO AIR	Level 2	<p>List of pollutants reduced due to measures taken at the facility improve air quality (e.g. SOx, NOx, PM, etc.)            The absolute or normalized amount of pollutants reduced. For normalized reduction, state the metric for normalization            The current, baseline year and baseline emission level            Time period which the facility achieved air emission reduction            List of all measures the site has carried out that have contributed to reduced air emissions.            Air emissions improvement implementation or action plan/ Air emission quality test demonstrating the results of air emissions reduction measures</p>	Partial Yes	12.5%	50.0%
5.4	EMISSIONS TO AIR	Level 3	<p>Description of any practices, programs, technology, or methods considered to be a "leading practice" for managing and significantly reducing air emissions</p>	N/A	0.0%	0.0%
				<b>0</b>	<b>37.5%</b>	<b>75.0%</b>

6.0 WASTE MANAGEMENT						
6.1	WASTE MANAGEMENT	Level 1	"Information on all waste streams on-site, state: - Name of the waste stream - Type of waste - Method of tracking waste - The disposal method - Description of the source of waste (e.g. source of the waste)" Waste inventory/ Annual waste disposal/recycling record	Yes	5.0%	5.0%
6.2	WASTE MANAGEMENT	Level 1	Total amount of solid waste generated at the site and the corresponding unit of measure Annual waste disposal/recycling record	Yes	5.0%	5.0%
6.3	WASTE MANAGEMENT	Level 1	Total amount of hazardous waste generated at the site and the corresponding unit of measure Annual waste disposal/recycling record	Yes	5.0%	5.0%
6.4	WASTE MANAGEMENT	Level 1	Total amount of waste generated that is recycled instead of being disposed and the corresponding unit of measure Annual waste disposal/recycling record	Yes	5.0%	5.0%
6.5	WASTE MANAGEMENT	Level 1	"Provide details of the training, including: - Date of the last training - Name and title of the person (or company) that conducted the training - Topics covered in the training, and the personnel trained" Training materials and record for waste handling and segregation training	Yes	5.0%	5.0%
6.6	WASTE MANAGEMENT	Level 2	Reduction target with the following:- target name, - target type (absolute or normalized) , - base year and target year , - % reduction from base year - metric for normalized target (e.g. piece of garment produced), - frequency of reviewing the target Briefly describe the plan or strategies for waste reduction, state: - Department/ person responsible for the plan,- Timeframe of the plan (e.g. 5-year),- Year that the plan was implemented (e.g. 2010) If the factory answer "yes" to sub question "Does your site have a recycling program in place to reduce waste?", Briefly describe the recycling program in place, state: - Year that the program was implemented,- Department/ person responsible for the plan,- Type of waste covered by the plan Waste reduction target and strategies/ Waste management plan	Yes	50.0%	50.0%
6.7	WASTE MANAGEMENT	Level 3	List the types of waste reduced due to measures taken at the facility to reduce waste (i.e. the source of waste and the name of the waste stream) The absolute or normalized amount of waste reduced. For normalized reduction, state the metric for normalization The baseline year and baseline waste quantity Time period which the facility achieved waste reduction List all measures the site has carried out that have contributed to waste reduction. Waste reduction implementation or action plan/ Waste disposal/recycling record demonstrating the results of waste reduction measures	Partial Yes	6.3%	12.5%
6.8	WASTE MANAGEMENT	Level 3	Description of any practices, programs, technology, or methods considered to be a "leading practice" for managing and significantly reducing waste	Yes	12.5%	12.5%
					<b>93.8%</b>	<b>100.0%</b>

**Figure 23**  
**Environmental audit summary for factory 12**

<b>Name: Buyer X</b>		<b>Environmental Audit Summary</b>			
Factory Name	Factory 12	Audit Start Date	10/3/2022	Auditor Name	xx
Factory Address	xx	Audit End Date	10/14/2022	Audit Performance	Moderate Performance
Factory Contact	xx	Audit Firm			

**1. Audit Score**

SECTION #	SECTIONS DESCRIPTION	Weighting	Actual Points	Section Score
1	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	25%	90	23
2	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	15%	65	10
3	WATER USE	15%	60	9
4	WASTEWATER	15%	39	6
5	EMISSIONS TO AIR	15%	50	8
6	WASTE MANAGEMENT	15%	83	12
<b>Final Score</b>			67	
<b>Performance Level</b>			<b>Moderate Performance</b>	

The performance level is based on the final score:

Performance Level	Final Score
High Performance	75-100
Moderate Performance	65-74
Low Performance	0-64

Levels are Weighted Differently

Level 1	Awareness and understanding of sources and systems	Foundational	25% of the total possible points. (Unless the applicability questions stop you at Level 1, then Level 1 is worth 100% of total possible points.)
Level 2	Setting targets and tracking progress	Progressive	50% of the total possible points.
Level 3	Setting targets and tracking progress	Aspirational	25% of the total possible points.

**Calculating Points for Each Checkpoint**

For each "yes" answer, full points  
For each "partial yes" answer, half points  
For each "no" answer, zero points

Remark: The default value is 3, please reselect the choice to No or N/A accordingly, please fill up the DESCRIPTION column with violations identified when it's applicable.

#	Section	Sub-Sections	Checkpoint Description	Answer	Actual Score	Max Score
<b>1.0 ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM</b>						
1.1	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 1	There is no government-issued environmental violation records, Institute of Public & Environmental Affairs (IPE), actions of remove the records.	Yes	5.0%	5.0%
1.2	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 1	Name, job title, working hour of environmental management and function of all the members of management with environmental management roles Environmental Management staffs job descriptions records	Yes	5.0%	5.0%
1.3	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 1	Environmental strategy including future environmental priorities, goals, and actions for 3+ years. The facility should develop and maintain a significant environmental impact lists	Yes	5.0%	5.0%
1.4	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 1	The program or system for reviewing and monitoring environmental permit status and renewal and ensure compliance, Permit lists, documentation of program or system; Documented system for identifying, monitoring and periodically verifying all laws, regulations, standards, codes etc. for significant environment impacts	Yes	5.0%	5.0%
1.5	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 1	The facility should have a process to ensure all environmental related equipment are well maintained according to schedule, and records should be kept for tracking.	Yes	5.0%	5.0%
1.6	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 2	Internal communication plans for environmental strategy, training records for environmental strategy Review environmental strategy with facilities management team each calendar year	Yes	25.0%	25.0%
1.7	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 2	List of environmental management staffs, job description of the environment management staffs, process to ensure the staffs' ability match the job, staffs training records, certificates, annual assessment records Ability for environmental management staffs	Yes	25.0%	25.0%
1.8	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 3	Training plan, training records for environmental strategy Promote awareness of environmental strategy to employees	Yes	5.0%	5.0%
1.9	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 3	The facility should develop a mechanism to evaluate facility environmental performance or leverage 3rd party tools such as Higg.	Yes	5.0%	5.0%
1.10	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 3	The facility should maintain a complete subcontractors list that indicates which subcontractors have/ do not have environmental management system	Yes	5.0%	5.0%
1.11	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 3	Evidence of environmental improvement in local context, local stakeholders and dates of engaged, picture, article, media, supported project or organization list Engage in environmental improvement in local context	No	0.0%	5.0%
1.12	ENVIRONMENTAL MANAGEMENT SYSTEM OR PROGRAM	Level 3	Do you report GHG emissions data to the CDP?if yes please record the recent year CDP score, total direct GHG emissions, total scope 2& 3 GHG emission in the "notes" column.	No	0.0%	5.0%
					<b>90.0%</b>	<b>100.0%</b>

2.0 ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS						
2.1	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	Level 1	Maintain a list of all sources of energy use on site, frequency and method of measurement for each source of energy, for each source of direct energy use, describe where it is used Copies of utility bills (or meter readings) for all energy sources listed covering the full calendar year, picture of energy meters used to monitor the consumption of the main energy sources	Yes	25.0%	25.0%
2.2	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	Level 2	Facility tracks energy consumption data per year used for setting energy reduction targets Base line for each energy use (noting the year of the baseline). All data clearly labeled with time frame (year) and units of measure eg kWh, liters etc.	Yes	10.0%	10.0%
2.3	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	Level 2	Most energy consuming processes or operations Assessing methodology, ranking of processes or services that consume the most energy (with energy consumption value, copy of an energy audit conducted by an energy management specialist (if available)	Yes	10.0%	10.0%
2.4	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	Level 2	Targets for improving energy use or GHG emission Energy resource, targets for improving, timeline, plan for reach the target etc. Plan for improving energy use or GHG emission; detailed implementation plan "Reduction target with the following: - target name - target type (absolute or normalized) - base year and target year - % reduction from base year - metric for normalized target (e.g. piece of garment produced) - frequency of reviewing the target Briefly describe the plan or strategies for air emission reduction, state: - Department/ person responsible for the plan - Timeframe of the plan (e.g. 5-year) - Year that the plan was implemented (e.g. 2010)" Air emissions target, reduction plan and strategy	Yes	10.0%	10.0%
2.5	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	Level 2	Relevant utility bills or records of the consumption for last year and relevant utility bills for this year are tracked and compared to the baseline	Yes	10.0%	10.0%
2.6	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	Level 2	Scope 3 GHG emissions inventory including boundaries and methodology applied Calculate the scope 3 green gas (GHG) emissions	No	0.0%	10.0%
2.7	ENERGY USE & GREEN HOUSE GAS (GHG) EMISSIONS	Level 3	The facility set a Science-Based Target according to the SBTi.	No	0.0%	25.0%
				0	65.0%	100.0%
3.0 WATER USE						
3.1	WATER USE	Level 1	List of all sources of water use including quantity, tracking method, frequency of measurement	Yes	12.5%	12.5%
3.2	WATER USE	Level 1	Water purchase record/bills List of water meter and location	Yes	12.5%	12.5%
3.3	WATER USE	Level 2	Baselines for water use of each water source including year, calculation method and process Communication record with employees on the baselines for water use	Yes	10.0%	10.0%
3.4	WATER USE	Level 2	Water assessment to identify which processes or operations use the most water Water pipeline drawing/diagram/flowchart Water meter recording and water pipelines/tanks inspection record	Yes	10.0%	10.0%
3.5	WATER USE	Level 2	Targets for reducing water use of each water source including calculation method and process Review records for the progress of the set targets Communication record with employees on the targets for reducing water use	Partial Yes	5.0%	10.0%
3.6	WATER USE	Level 2	Procedure and responsibility to catch the targets for reducing water use Water audit or assessment done by external party identifying water reduction opportunities and implementation dates Water reduction plan listing specific projects, target reductions, dates, and progress	Partial Yes	5.0%	10.0%
3.7	WATER USE	Level 2	Water tracking reports and consumption records to show water reductions New equipment or efficiency improvements that demonstrate that water reductions Awards or certificates for water efficiency achievements	Partial Yes	5.0%	10.0%
3.8	WATER USE	Level 3	Water balance or another analysis report	No	0.0%	25.0%
				0	60.0%	100.0%

4.0 WASTEWATER						
4.1	WASTEWATER	Level 1	Wastewater production source and quantity monitoring record Invoices for wastewater discharge estimation Wastewater pipeline drawing/diagram/flowchart Water meter recording and wastewater pipelines/tanks inspection record	Yes	5.0%	5.0%
4.2	WASTEWATER	Level 1	Wastewater guideline(s) (ZDHC/BSR) or permit (S) Wastewater test reports Onsite WTP technical flow chart Onsite WTP operation and monitoring record	Yes	5.0%	5.0%
4.3	WASTEWATER	Level 1	Name and contact information of the offsite wastewater treatment plant Service contract with the offsite wastewater treatment plant Offsite WTP technical flow chart Back-up plan/flow chart of emergency situation related to wastewater O-chart and responsibility of the back-up plan	N/A	0.0%	0.0%
4.4	WASTEWATER	Level 1	Inventory of sludge amounts, types (non-hazardous and hazardous) and dispose method Sludge analysis or test results (if non-hazardous is selected) Permits or manifests for proper disposal or land application Invoices or delivery records for off-site disposal	Yes	5.0%	5.0%
4.5	WASTEWATER	Level 1	Documentation (process, schematics of equipment, procedures, responsible persons, etc.) for septic wastewater treatment Septic tank location and pipeline Septic tank and pipeline inspection record Disposal records/invoices for septic tank contents removal A time-bound plan for upgrading septic tank with more modern wastewater treatment approach	Partial Yes	2.5%	5.0%
4.6	WASTEWATER	Level 2	Recent wastewater quality test results from the offsite wastewater treatment plant Recent documentation for requesting offsite wastewater quality results	N/A	0.0%	0.0%
4.7	WASTEWATER	Level 3	Records/quantity demonstrating closed-loop recycling (process water to process water) Location where water is captured for recycling and the location where recycled water is used Processing technical and flow chart of recycled water Water recycling equipment operation and monitoring record	No	0.0%	25.0%
				0	17.5%	45.0%
5.0 EMISSIONS TO AIR						
5.1	EMISSIONS TO AIR	Level 1	"List the main sources of emissions to air, state: - Name of the emission source presented on-site (e.g. coal boiler) -The quantity of pollutant emitted from the sources listed and the dates/timeframe (if known or estimated); - Any control devices (e.g. abatement equipment) installed; - Whether the particular emission is legally regulated. If yes, state the name of the regulation." Air emissions inventory/ Air emissions testing report (e.g., boiler exhaust air quality testing, power plant air quality)	Yes	12.5%	12.5%
5.2	EMISSIONS TO AIR	Level 1	The frequency of air emission testing at the emission source (not indoors or outdoors ambient air) Air emissions testing report (from certified professional or laboratory, showing the type, source, quality and quantity of air pollutants present at site) The testing reports have been kept for tracking and verification	Yes	12.5%	12.5%
5.3	EMISSIONS TO AIR	Level 2	List of pollutants reduced due to measures taken at the facility improve air quality (e.g. SOx, NOx, PM, etc.) The absolute or normalized amount of pollutants reduced. For normalized reduction, state the metric for normalization The current, baseline year and baseline emission level Time period which the facility achieved air emission reduction List of all measures the site has carried out that have contributed to reduced air emissions. Air emissions improvement implementation or action plan/ Air emission quality test demonstrating the results of air emissions reduction measures	Partial Yes	12.5%	50.0%
5.4	EMISSIONS TO AIR	Level 3	Description of any practices, programs, technology, or methods considered to be a "leading practice" for managing and significantly reducing air emissions	Partial Yes	12.5%	25.0%
				0	50.0%	100.0%

6.0 WASTE MANAGEMENT						
6.1	WASTE MANAGEMENT	Level 1	<p>Information on all waste streams on-site, state:</p> <ul style="list-style-type: none"> <li>- Name of the waste stream</li> <li>- Type of waste</li> <li>- Method of tracking waste</li> <li>- The disposal method</li> <li>- Description of the source of waste (e.g. source of the waste)"</li> </ul> <p>Waste inventory/ Annual waste disposal/recycling record</p>	Yes	5.0%	5.0%
6.2	WASTE MANAGEMENT	Level 1	Total amount of solid waste generated at the site and the corresponding unit of measure Annual waste disposal/recycling record	Yes	5.0%	5.0%
6.3	WASTE MANAGEMENT	Level 1	Total amount of hazardous waste generated at the site and the corresponding unit of measure Annual waste disposal/recycling record	Yes	5.0%	5.0%
6.4	WASTE MANAGEMENT	Level 1	Total amount of waste generated that is recycled instead of being disposed and the corresponding unit of measure Annual waste disposal/recycling record	No	0.0%	5.0%
6.5	WASTE MANAGEMENT	Level 1	<p>Provide details of the training, including:</p> <ul style="list-style-type: none"> <li>- Date of the last training</li> <li>- Name and title of the person (or company) that conducted the training</li> <li>- Topics covered in the training, and the personnel trained"</li> </ul> <p>Training materials and record for waste handling and segregation training</p>	Yes	5.0%	5.0%
6.6	WASTE MANAGEMENT	Level 2	<p>Reduction target with the following:- target name, - target type (absolute or normalized) , - base year and target year , - % reduction from base year</p> <ul style="list-style-type: none"> <li>- metric for normalized target (e.g. piece of garment produced),- frequency of reviewing the target</li> </ul> <p>Briefly describe the plan or strategies for waste reduction, state:</p> <ul style="list-style-type: none"> <li>- Department/ person responsible for the plan,- Timeframe of the plan (e.g. 5-year),- Year that the plan was implemented (e.g. 2010)</li> </ul> <p>If the factory answer "yes" to sub question "Does your site have a recycling program in place to reduce waste?", Briefly describe the recycling program in place, state:</p> <ul style="list-style-type: none"> <li>- Year that the program was implemented,- Department/ person responsible for the plan,- Type of waste covered by the plan</li> </ul> <p>Waste reduction target and strategies/ Waste management plan</p>	Yes	50.0%	50.0%
6.7	WASTE MANAGEMENT	Level 3	<p>List the types of waste reduced due to measures taken at the facility to reduce waste (i.e. the source of waste and the name of the waste stream)</p> <p>The absolute or normalized amount of waste reduced. For normalized reduction, state the metric for normalization</p> <p>The baseline year and baseline waste quantity</p> <p>Time period which the facility achieved waste reduction</p> <p>List all measures the site has carried out that have contributed to waste reduction.</p> <p>Waste reduction implementation or action plan/ Waste disposal/recycling record demonstrating the results of waste reduction measures</p>	Partial Yes	6.3%	12.5%
6.8	WASTE MANAGEMENT	Level 3	Description of any practices, programs, technology, or methods considered to be a "leading practice" for managing and significantly reducing waste	Partial Yes	6.3%	12.5%
					<b>82.5%</b>	<b>100.0%</b>



## Appendix 6: 41 items designed to assess performance outcomes

**Table 12**  
**41 constructed items**

No.	Code	Items	Mean	Median	Standard deviation	Cramer-von Mises p value
1	IP1	Our company follows national and local environmental laws and regulations in Vietnam, international environmental regulations, the environmental regulations of the countries where our clients are located, including the US, UK, European countries, and others.	4.385	4	0.625	0.001
2	IP2	Our organization's supply chain practices are affected by export regulations.	3.769	4	0.89	0.054
3	IP3	Our main competitors, who have embraced an environmentally friendly approach, are viewed positively by customers.	4.385	5	0.836	0.001
4	CM1	Our customers view environmental impacts as a vital aspect in supplier selection.	4.538	5	0.746	0
5	CM2	Our customers have requested details about our adherence to environmental regulations	4.615	5	0.625	0
6	CM3	Our customers strongly request that we ensure our suppliers implement environmentally friendly practices.	4.385	4	0.487	0
7	CM4	Our customers have asked us to adopt an environmental management system (e.g., HIGG FEM, ISO 14000)	4.538	5	0.634	0
8	IG1	We have started using more environmentally friendly raw materials and components	4.538	5	0.634	0
9	IG2	Being environmentally aware is a fundamental aspect of our company's culture	4.538	5	0.499	0
10	IG3	We conduct internal environmental audits to ensure our products meet the environmental goals.	4.231	4	0.576	0
11	IG4	We collaborate across different departments to reduce environmental impacts	4.077	4	0.73	0
12	FB1	We collaborate with our customers to incorporate environmental considerations in product design.	4.077	4	1.141	0.008
13	FB2	Our company and our customers share a common understanding of environmental responsibilities.	4.538	5	0.634	0
14	FB3	Our company collaborates with customers to minimize environmental impact in our operations.	4.385	4	0.625	0.001
15	FB4	Our company develops strategies to address Green Supply Chain Management (GSCM) issues in collaboration with customers.	4.308	4	0.722	0.004
16	FB5	Our company and customers work together to achieve common environmental goals.	4.308	4	0.606	0.001
17	FS1	We have collaborated with our suppliers to consider environmental factors in product design.	3.692	4	1.136	0.015
18	FS2	Our company and suppliers share a clear understanding of environmental responsibilities.	4.308	4	0.821	0.002
19	FS3	Our company collaborates with suppliers to minimize the environmental impact of operations.	4.154	4	0.662	0.002

20	FS4	Our company develops strategies to address green supply chain management (GSCM)-related issues with suppliers.	4	4	0.784	0
21	FS5	Our company and suppliers jointly provide resources, skills, and knowledge to strengthen GSCM.	3.846	4	0.769	0
22	FS6	Our company and suppliers work together to achieve shared environmental objectives.	4.077	4	0.73	0
23	EP1	We have reduced carbon dioxide emissions relative to our production volume.	3.154	3	0.863	0.024
24	EP2	We have reduced waste relative to our production volume.	3.231	3	0.89	0.054
25	EP3	We have reduced energy consumption relative to our production volume.	2.923	3	0.917	0.022
26	EP4	We have reduced water consumption relative to our production volume.	2.923	3	1.141	0.058
27	FP1	Our turnover has increased due to the adoption of green supply chain practices.	2.769	2	0.973	0.002
28	FP2	Our profit has increased as a result of adopting green supply chain practices.	2.692	3	0.991	0.032
29	FP3	Our market share has grown as a result of adopting green supply chain practices.	2.692	3	0.821	0.002
30	FP4	Our return-on-assets has improved as a result of adopting green supply chain practices.	2.462	2	0.843	0
31	OP1	We ensure dependable delivery to our customers while upholding green practices.	3.846	4	0.863	0.024
32	OP2	We manufacture products with cost-efficiency while upholding green practices.	3.077	3	1.206	0.188
33	OP3	We manufacture products of consistent quality with minimal defects while upholding green practices.	3.462	4	1.151	0.018
34	OP4	We have minimized waste in our production processes while upholding green practices.	3.308	3	0.91	0.046
35	OP5	We create high-performance products that fulfill customer requirements while upholding green practices.	3.538	4	1.009	0.015
36	BS1	We (buyer) have collaborated with our suppliers to consider environmental factors in product design.	4.692	5	0.462	0
37	BS2	Our company (buyer) and suppliers share a clear understanding of environmental responsibilities.	4.615	5	0.487	0
38	BS3	Our company (buyer) collaborates with suppliers to minimize the environmental impact of operations.	4.385	4	0.487	0
39	BS4	Our company (buyer) develops strategies to address green supply chain management (GSCM)-related issues with suppliers.	4.538	5	0.499	0
40	BS5	Our company (buyer) and suppliers jointly provide resources, skills, and knowledge to strengthen GSCM.	4.538	5	0.499	0
41	BS6	Our company (buyer) and suppliers work together to achieve shared environmental objectives.	4.538	5	0.499	0

Note: ISO 14001 is an internationally agreed standard that sets out the requirements for an environmental management system. The Higg Facility Environmental Module (Higg FEM) is a sustainability assessment tool that standardizes how facilities measure and evaluate their environmental performance.