

# GREEN SUPPLY CHAIN MANAGEMENT AND ORGANIZATIONAL PERFORMANCE: A STUDY OF SRI LANKAN APPAREL MANUFACTURING ORGANIZATIONS

**Piumal HERATH**

Department of Marketing, University of Jaffna, Sri Lanka

**Sivarajah RAJUMESH**

Department of Marketing , University of Jaffna, Sri Lanka

## Abstract

This study is based on green supply chain management techniques and their impact on organizational performance. The study introduces a novel approach to the Sri Lankan apparel industry and investigates if such practices have any effect on organizational performance. To test GSCM practices impact organizational performance, an online survey was carried out to middle-level managers using a sample size of 125 in the apparel manufacturing organizations in Sri Lanka. The findings revealed that GSCM procedures have an impact on organizational performance. However, the sub hypothesis produced the opposite effects as predicted. These findings imply that GSCM practices are more likely to have an impact on organizational performance, as evidenced by a substantial impact in multiple regression analysis. The study adds to the scholarly community by examining the influence of GSCM methods on organizational performance in the Sri Lankan apparel and manufacturing industry. This would also provide information into how green manufacturing processes work.

**Keywords:** Green supply chain management, sustainability, organizational performance, total quality management

## 1. INTRODUCTION

In general, the supply chain is a broader term than supply chain management (Lummus et al., 2001). The supply chain consists of activities and procedures that enable raw materials to be turned into finished goods and delivered to customers. Typical manufacturing firms begin by acquiring raw materials, processing them into components, and then completing the process. Subsequently, the finished goods will be delivered to the customer (Beamon, 1999; Mahadevan, 2015). The supply chain concept is not confined to manufacturing; it is also applied in the service industry (Sampson & Spring, 2012). Supply chains are more typically employed in service industries such as hotels, hospitals, and automobile manufacturing. Planning is a vital role that is interwoven with the supply chain. The supply chain usually deals with information, funds, and material flows. Careful integration of these functions is necessary to create more customer-appealing products or services. Supply chain management (SCM) holds significant importance in the manufacturing context because it engages in every operation process. SCM needs cooperation and integration of business processes and strategy adjustment to satisfy the supply chain's customers (Cramer et al., 2018; Hugo, 2008; Lundgren et al., 2013). This process includes the essential functions of manufacturing (purchasing, manufacturing, marketing, logistics, and information systems). This procedure is optimized for effectiveness, quality, and responsiveness. A business must define and adopt processes to establish a competitive advantage and generate performance. Lean production has been essential operation and management method for the past 50 years (Jasti & Kodali, 2015). Lean production refers to activities that use a low or no inventory of supplies, work in process, and finished goods to achieve high quality and high quantity (Chase & Robert, 2018). Environmental sustainability is the most recent addition to this list. The core of GSCM activities is environmental sustainability. Environmental sustainability is critical throughout the supply chain, not just within the firm (Vachon & Klassen, 2006). As a result, to build and operate a green-friendly supply chain, all supply chain participants must make a concerted effort. Green supply chain management (GSCM) is a novel concept in Sri Lanka; however, it is well known elsewhere. GSCM has received a lot of attention in industry and academia (Carter and Easton, 2011); because of the increased interest in these subjects, numerous academics have developed new knowledge and theories. GSCM has emerged as a result of demand, market issues, and the competitive character of the market, environmental challenges such as the loss of finite resources, pollution, global

warming, and diminished biodiversity are considerably more prevalent (Cramer et al., 2018; Hugo, 2008; Lundgren et al., 2013). To address these concerns, businesses have devised techniques to limit environmental depletion that are adopted at the supply chain level. GSCM is a concept that was developed to integrate the sustainable environmental process into traditional supply chain management practices. GSCM methods are thought to reduce waste, improve air quality, and limit the consumption of harmful materials (Kenneth W. Green et al., 2008). It was discovered that there is a lot of research done in developed countries on green supply chain methods, but not so much in developing countries like Sri Lanka. It was found that most Sri Lankan firms have initiated implementation, and most of them are considering adopting these practices (Jayarathna, 2016; Lakmali & Jayaratne, 2018). However, looking at the bigger picture, there is a gap in literature where variables such as Total Quality Management and Just in Time practices are omitted as primary sustainable practices, affecting the overall concept of sustainability. Therefore, this study considers these two variables along with the other sustainable practices to assess the impact of sustainable practices on organizational performance. It is essential to construct variables representing other improvement programs, such as TQM practices (Kenneth W. Green et al., 2012). In the Sri Lankan context, literature on green supply chain management practices is scarce.

### 1.1. Apparel Industry in Sri Lanka)

The apparel industry is one of the largest and strongest manufacturing subsectors in Sri Lanka, considering its contribution to the Gross Domestic Production (GDP) (International Trade Administration, 2021). This subsector also contributes to exports, foreign exchange earnings, and employment in Sri Lanka. Sri Lanka's apparel industry dates back approximately three decades (Abeysekara et al., 2019). The Sri Lankan apparel industry is renowned for its ethical practices and a solid commitment to its laborer's welfare (EDB, 2021a) The industry is in constant growth where it has evolved from traditional exports to tailoring designs to providing meaningful solutions and research and development. The apparel industry in Sri Lanka employs 15% of the country's workforce and direct employment to 300000 ~ 600000 people, contributing to most female employment in the country (EDB, 2021b). The industry requires low-skilled, and it is considered a labor-intensive industry. Because of these aspects, the country gets the comparative advantage of the low cost of production

Sri Lankan apparel manufacturers face stiff competition from other south Asian and south-eastern countries because of the comparatively low labor prices (Perera & Perera, 2013). The natural burden brought about by the Sri Lankan apparel industry and its inventory chains will require critical ideas and premonition. Ecological issues from local, regional, and worldwide ramifications of air emanations, vital waste removal, and regular asset use will be checked and overseen during these development phases. The scarcity of assets and this natural burden have caused the Sri Lankan administration to fix ecological guidelines or offer creative projects to address these issues. According to the world bank, the fashion industry accounts for more than 10% of global carbon emissions (Charpail, 2017). This significant contribution comes from dying and in the finishing stages of the apparel. This is caused by green gas emission that causes heat to get trapped on the earth's surface (Kweku et al., 2018). Therefore, many apparels focused manufacturing organizations strategically moved their objectives to face this rising global challenge. As a result, Sri Lanka has implemented the world's first custom-built green apparel factory and Asia's first carbon-neutral certified factory (Export Development of Board, 2020).

In the modern era, apparel manufacturing organizations give significant importance to environmental sustainability rather than profitability—however, not every manufacturing organization in Sri Lanka practices environmentally sustainable practices (Jayarathna, 2016). The primary expectation of implementing GSCM procedures is to improve environmental performance as measured by reductions in effluent waste, solid waste, air emissions, and the usage of toxic materials (Dong et al., 2021; Kenneth W. Green et al., 2012). Nevertheless, there is a concern about whether implementing such sustainable practices will contribute to improved market share and profitability. Investigating whether this adaptation of environmentally sustainable practices results in a win-win scenario or a trade-off between environmental and economic nature for the supply chain partners is crucial.

## 2. LITERATURE REVIEW

Sarkis (2012) defines SCM as having three major components: upstream activities, downstream activities, and internal organizational activities (midstream). Upstream operations are activities carried out prior to the manufacturing process, as well as flows and interactions involving purchasing and procurement services. Supplier collaboration, outsourcing, supplier selection, management, and development are all primary activities. The downstream actions in the SCM are the next component. Outbound logistics, transportation, distribution, marketing, packaging, and warehousing are the primary emphasis of these downstream activities (Sarkis, 2012). According to Somogyi, Nagy and Török (2009), the supply chain is an interconnected collection of processes and resources that begin with raw materials and extend through the delivery of goods and services to the ultimate customer. A supply chain is a network of actions and parties engaged in the movement of a product or service from supplier to a client (Somogyi et al., 2009). SCM aids in the transformation of natural resources, raw materials, and other components into the finished product provided at the supply chain's conclusion (Ho et al., 2009). A viable supply chain management is required since external groups have increased the organization's pressure (Zhu et al., 2013). The external groups' push causes manufacturers to streamline their manufacturing and identify suppliers who meet the requirements. GSCM is defined as 'integrating environmental thinking into supply-chain management, including product design, material sourcing, and selection, manufacturing processes, delivery of the final product to the consumers as well as end-of-life management of the product after its useful life' (Tseng et al., 2019; Zhu & Sarkis, 2004). As the name implies, the 'green' component represents the relationship between standard supply chain practices and the natural environment. The focus of this study is to elaborate on the environmental component of sustainability. GSCM is involved in a separate field due to integrating environmental concerns within the SCM (Sarkis, 2012).

According to Srivastava (2007), the supply chain's environmental consideration has often been ignored in the traditional supply chain. Organizations tend to focus more on cost reduction and different flows. Because of this omission, numerous academics and theorists have modified the conventional supply chain to include sustainability and streamline industries to be economically practical. According to Zhu, Sarkis, and Lai (2008), enterprises are driven to implement environmental management in today's globalized and competitive environment. As a result, the prevalence of such activities has dramatically increased.

According to Srivastava (2007), GSCM has its roots in environmental management and supply chain management literature. The component "green" conveys the notion of the supply chain management-natural environment link. Because the supply chain encompasses multiple partners, sustainability is integrated from the beginning to the finish (Zhu & Sarkis, 2004). GSCM is a complicated system in which industries must engage with suppliers and customers to improve the environmental performance of the supply chain. This environmental performance can be attained by implementing procedures, and the industry's priorities are as follows.

- Improving the reduction of excess materials in the manufacturing process.
- Suppliers' compliance with adapting environmental concerns
- Designing and innovating new materials products that would provide solutions for environmental issues
- Educating customers in sustainable matters and co-operate with them
- Refining suppliers' and customers' motives towards helping the organization develop new materials, components, and processes with environmental concerns.

It is evident that companies have already begun to perceive GSCM as a critical practice (Perotti et al., 2015). Since the manufacturing organizations in Sri Lanka lack experience, this adaptation has been delayed or in the initial stages (Jayarathna, 2016). The primary reasons for adopting GSCM would be to help the organization to save resources, eliminate waste, and improve productivity. Kopicki R et al. (1993) have suggested proactive, reactive, and value-seeking as three approaches for GSCM. The proactive approach accounts for the organization's resource minimization. Reactive means organizations deliberately place environmental laws to counter waste by recycling and designing new or modified green products. Companies integrate various

standards like ISO standardization and green purchasing (GP) into the business strategy in the value-seeking approach. However, this perspective has been changed from “greening as a burden” to “greening as a potential source of competition” (Van Hoek, 1999).

### 2.1. Hypothesis Development

Globally, there is an increasing need for green practices because of the market and regulatory pressures (Srivastava, 2007). There is literature on the impact of GSCM on organizational performance. Organizations in developing economies prioritize economic performance above all else (Zhu, Sarkis, and Lai, 2007). Various scholars have studied that demonstrate a beneficial association between GSCM practices and organizational performance (Vachon and Klassen, 2006; Green, Whitten, and Inman, 2008). According to some literature, there are no significant associations (De Giovanni & Esposito Vinzi, 2012), yet we discovered a mix of positive and negative relationships (Azevedo et al., 2011). According to the literature, when GSCM procedures are adopted, they can have various effects on performance (Azevedo et al., 2011). Organizations must follow GSCM guidelines, including disciplines, to execute the GSCM.

#### 2.1.1. Green Purchasing

Green purchasing primarily focuses on supplier cooperation to produce environmentally sustainable products (Zhu et al., 2008). Lee (2008) defines green purchasing as green supply chain organizations with the intention of buying, paying attention to suppliers' green practices, particularly in small and medium-sized enterprises. The buying organization may implement training, environmental information sharing, and joint research to identify if the supplier is adopting green practices. Many organizations would require their suppliers to adopt ecological systems like ISO 14001 (Laosirihongthong, Adebajo, and Choon Tan, 2013). Other aspects of green purchasing discussed in the literature are recycling, resource reuse, and resource reduction facilitation. According to Zhu et al. (2008), Green purchasing focuses on co-operating with suppliers to develop sustainable products for the environment.

Green et al. (2012) found that green purchasing (GP) does not significantly impact environmental performance but economic performance. Zhu *et al.* (2007) argue that GP does not affect substantially Environmental performance. Supplier selection plays a significant part in green purchasing. It was found that the environmental impact of GP may lie with the supplier rather than the manufacturer while positively impacting the economic performance of the manufacturer (Green et al., 2019).

Therefore, the researcher can hypothesize the impact of green purchasing on the performance of the organization as follows,

**H1: There is a significant and positive impact of green purchasing on organizational performance**

#### 2.1.2. Eco-Design

Buyukozakan and Cifici (2012) have found that 80% of product-related environmental impacts can be influenced during the designing process. Eco-design can be divided into two- product-related design and packaging-related design (Laosirihongthong et al., 2013). Klassen and McLaughlin (1996) state that Environmental sustainability starts during product design. This study measures product-related eco-design and its proportion that contains recycled materials.

The packaging-related eco-design measures if the packaging is reusable and recyclable (Foschi et al., 2020). Manufacturers must design products that use the least resources, allow for the reuse, recycling, and regeneration of component materials and components, and prevent or limit the use of unsafe substances during the manufacturing phase (Zhu et al., 2008). Since the designers focus on reducing the design's environmental effects, the eco-friendly method emphasizing investment recovery will have a clear and beneficial impact on environmental results (Kenneth W. Green et al., 2012).

Eco-design aims to reduce a product's environmental effects while maintaining other design requirements such as cost and functionality (Sanyé-Mengual et al., 2014). Since the designers focus on reducing the design's environmental effects, the eco-friendly method emphasizing investment recovery will have a clear and

beneficial impact on environmental results (Kenneth W. Green et al., 2012). It has been found that eco-design positively impacts the green supply chain's performance (Diabat & Govindan, 2011). This study's green purchasing measurement scale is mainly adopted from Zhu et al. (2008). According to Green et al. (2012) Eco-design negatively impacts the economic performance of organizations.

In conclusion, the researcher can hypothesize the impact of organizational performance on performance as follows.

**H2: There is a significant and positive impact of eco-design on organizational performance**

**2.1.3. Cooperation with Customers**

According to (Zhu, Sarkis, and Lai, 2008), cooperation with customers is needed to produce environmentally friendly products using cleaner processes. In terms of eco-design, production, packaging, and transportation, GSCM provides collaboration with customers. (Green, Whitten, and Inman, 2008). Hamprecht et al. (2005) found that environmental controls with other quality controls within the information system extend throughout the supply chain. Recent research also shows that customer pressure is a primary operator for organizations implementing and improving environmental image and practices.

According to Green, Whitten and Inman (2008), cooperation with customers is positively associated with environmental and economic performance, ultimately resulting in a positive association with organizational performance; however, it does not directly impact financial performance. Instead, cooperation with customers indirectly affects economic performance through environmental performance. Many researchers did not find customers' cooperation significantly associated with environmental and economic performance (Kenneth W. Green et al., 2008; Zhu et al., 2007). In conclusion, the researcher can hypothesize the impact as follows.

**H3: There is a significant and positive impact of cooperation with customers on organizational performance**

**2.1.4. Investment Recovery**

Investment recovery is defined as "profits from the sale of excess inventory, scrap and used materials, and excess capital equipment." The primary goal of investment recovery is to maximize the value of expired or excess products (Susanty et al., 2018). In current operations, managers are more concerned with recovering junk, surplus, and obsolete resources and assets. This method has grown in popularity recently as businesses confront stringent environmental regulations and high disposal expenses. As a result, every manager at every level of the supply chain should search for ways to recoup their expenditures through recycling, remanufacturing, mending, and reconfiguration. (Shah & Siddiqui, 2019) Investment Recovery (IR), according to Green *et al.* (2012), has a direct impact on environmental performance but has no direct impact on economic performance. Using a Chinese sample, Zhu, Sarkis and Lai (2007) discovered that IR positively influences financial arrangements under significant pressure from competitors and authorities.

On the other hand, Green et al. (2012) found the opposite using a US sample. Zhu et al. (2007) discovered that IR had a beneficial impact on economic performance but found no significant association with environmental performance. "[Recovery of investment] has gotten far less attention in China than in other countries such as the United States and Germany." (Zhu et al., 2008) As a result, the researcher can make the following assumptions about the impact:

**H4: There is a significant and positive impact of Investment recovery on organizational performance.**

**2.1.5. Just in Time (JIT) and Total Quality Management (TQM)**

Just in time is a continuously evolving philosophy. Just in time system philosophy can emphasize that the products are presented only when needed (Jermisittiparsert et al., 2019). Just in time is employed by organizations to reduce costs and improve efficiency and performance. The ultimate purpose of the JIT is to produce the minimum possible work. The benefits of implementing the JIT system are widely established. Hassan et al. (2012) noted that JIT removes processes that add no value to the goods/services (Jermisittiparsert et al., 2019). When embraced by manufacturing enterprises, the ideal mix of JIT implementation may give a

competitive advantage. When the collection of practices is individually applied, a proper implementation may result in greater environmental sustainability (Kenneth W. Green et al., 2019b). Total quality management is defined as “a program of continuous improvement that encompasses the distinctive elements of customer attention, product design, and statistical process control (Flynn et al., 1995; Kenneth W. Green et al., 2019a) Three words containing “total quality management” have meanings, according to Jermsittiparsert et al. (2019). Total commitment indicates that everyone in the organization is committed to a broad context of quality. Quality implies that consumer satisfaction has been attained. Management refers to all managers at all levels of management who promote and implement a quality-oriented corporate culture. One of the focuses of the JIT is to eliminate all wastes in all the processes (Green et al., 2014). To flourish in the marketplace, developing customer focus through market orientation is a greater good, and JIT implementation is an essential prequel to this customer focus development. Thus, market orientation informs the organization what products and services the customer desires (Green et al., 2019a) and can be further used to identify and eliminate all forms of waste. When consumers express a need for environmental sustainability, an organization’s ability to adapt quickly to changing consumer needs help it develop environmental sustainability programs. An eco-friendly process can create goods and services (Carvalho et al., 2011). Two empirical studies can be identified that show the relationships between market orientation and JIT (K. W. Green & Inman, 2005; Zelbst et al., 2010). According to their findings, both studies show correlations in statistical analysis on manufacturing samples from the US. Therefore, the researcher can hypothesize that JIT implementation could improve organizational performance based on the previous literature. JIT provides information that aids in removing excess inventories and encourages exchanging inventory levels and location information among SCM partners (Green et al., 2014; Zhu et al., 2007).

Compared to the JIT, TQM possesses the same importance regarding customer focus. Zelbst et al. (2010) indicate a strong positive correlation between market orientation and TQM. Again, this literature was based on a statistical analysis of the sample collected from the US manufacturing organizations. According to this literature, the researcher could consider TQM and JIT as antecedents to the GSCM practices. Implementing proper TQM and JIT practices could positively impact the GSCM practices resulting in positive organizational performance.

In conclusion, the researcher can hypothesize the TQM and JIT impact on an organization’s performance as follows,

**H5: There is a significant and positive impact of just in time on organizational performance.**

**H6: There is a significant and positive impact of total quality management on organizational performance.**

#### 2.1.6. Organizational Performance

Organizational performance is measured using financial and marketing performance averages compared to the benchmark industry average (Green & Inman, 2005). The cost of saving the environment should be supplemented to improve economic performance.

Both environmental and economic performances should lead to improved efficiency and environmental economics and operational performance. This improvement would aid organizations in reflecting the ability to satisfy the changing consumer demand. The overall implication of environmental, economic, and operational implications would improve financial marketing performance (Green et al., 2012). The organizational environment consists of environmental, economic, and operational performance.

Industrial activities are the basis for the heavy burden put on by humans on the environment. Government regulations function as a barrier to this challenge. Some companies benefit immensely by adopting conscious and initiative-taking behavior towards the environment (Tieka, 1995). “Environmental performance relates the ability of manufacturing plants to reduce air emissions, effluent waste, and solid wastes and the ability to decrease consumption of hazardous and toxic materials” (Zhu et al., 2008). Zhu & Sarkis (2004) found a positive relationship between practicing GSCM practices and improvements in environmental performance. So as the Rothenberg (2000). Preuss (2001) identified a possibility of a “green multiplier effect,” which means GSCM results extend to suppliers’ tiers regarding green purchasing. Primary practices such as green

purchasing, eco-design, and customer cooperation positively impact environmental performance. Various studies have identified multiple drivers of GSCM practices that affect environmental performance (Diabat & Govindan, 2011).

The operational performance focuses on the capabilities of manufacturing plants in terms of efficiency of the production process and delivery of products to the customer (Zhu et al., 2008). This criterion would lead to a performance in reduced inventory levels, scrap rates, improved product quality, increased product lines, and improved capacity utilization (Green et al., 2017). Manufacturing firm's ability to reduce costs involving purchased materials, energy, waste, and environmental fines (Zhu et al., 2008). The focus is on minimizing the wastage associated with the production process. This reduced cost would lead to resulting in improved economic performance. Researchers found that GSCM practices would lead to a competitive edge and better economic performance (Green et al., 2012). Many studies demonstrate a relationship between green supply chains and economic performance (Purba Rao, 2005). They have also found that GSCM practices lead to competitiveness and better economic performance. Winning environmental awards by the organization aids organizations in their stock prices, improving their valuation and recognition.

Based on the evidence above, the researcher can conclude the following hypothesis about GSCM practices' impact on organizational performance.

**H7: Green supply chain management practices positively impact organizational performance.**

### 3. METHODOLOGY

A causal research approach was used in conjunction with a conclusive research design. This quantitative study is conducted via an online survey in the Sri Lankan Apparel industry. An online survey was used to mitigate the issues of contracting COVID-19 and considering the respondent's convenience and safety. The questionnaire has been made by making minor adjustments and without changing the original contexts used by previous authors. The initial part of the questionnaire consists of profiling variables and the following consists of questions related to the GSCM practices. All the responses were measured on a five-point Likert scale starting from one to five.

As the topic implies, the population for this study is selected from apparel manufacturing organizations in Sri Lanka. To make the analysis more appropriate and relevant, exporting major apparel companies in Sri Lanka have been chosen to conduct the study (EDB, 2021).

The respondent's position in the organization was collected to analyze the data validity and reliability of the study's data. Position in the organizational hierarchy may indicate their knowledge and experience in green supply chain management. This variable is purely nominal. Approximate number of employees has been collected to determine the significance of the manufacturing organization to the economy. Thus, the results supplement the researcher in identifying how significant an impact adopting green supply chain management can have on the environment and the economy.

A pilot study was in need since the questionnaire was adopted from different authors, and those studies were based on foreign territories. Therefore, a pilot study was conducted to assess the suitability of the questionnaire in the context of the Sri Lankan apparel industry. This study used 15 respondents (n=15) from major apparel manufacturing companies in Sri Lanka. Cronbach alpha values for all measurement scales exceed the recommended level of 0.70 (Overall 0.961), indicating adequate reliability (Garver & Mentzer, 1999). The pilot study was concluded by changing the terms used in the questions and adding more fields to the profiling variables "what is your position in the organization?" and the "Approximate number of employees." The researcher used the probability sampling method, Simple random sampling, where sample units were randomly chosen. Each sampling unit had an equal chance of being elected.

According to Dheerasinghe (2009), more than 1060 garment factories exist in Sri Lanka. Among these factories, green supply chain management implementation is significantly less. According to the Export Development of Board (2020), apparel manufacturers who practice green initiatives were selected for further analysis. Three minimum managerial level employees (this varied according to the organizational capacity) from each apparel

manufacturing organization were chosen. A sample of 125 employees from 40 organizations was selected using a random sampling technique.

The primary data collection started on 17<sup>th</sup> May 2021 and ended on 20<sup>th</sup> September 2021. Respondents were approached via email and LinkedIn messages. A self-administered questionnaire was used to infer the required data. The researcher made every aspect of the agreement clear and declared the rights of the researcher and the respondent on the first page. Respondents were allowed to withdraw at any time during the process and had the right to question the researcher. The expected response rate was at least 50%, and a total of 273 higher and middle-level managers were contacted, out of which 147 responded. Securing a 53% response rate. Twenty-two responses were removed during the analysis because of missing data. A sample size of 125 was successfully administered. The data acquired is statistically examined using regression analysis.

### 3.1. Variable measures

Measurement scales are either directly taken from or modified based on scales identified in the existing literature (Flynn et al., 1995; K. W. Green & Inman, 2005; Zhu et al., 2008). Following a traditional two-wave mailing procedure, data were collected from a sample of experts (plant-level managers). Many studies have been conducted using the same operationalization (Green et al., 2012, 2014, 2019a). The control variables such as just in time and total quality management were included in the study. These variables have been used in many prior studies (Kenneth W. Green et al., 2019a; Jermsittiparsert et al., 2019) and are correlated with organizational performance.

TABLE 1 - VARIABLE MEASUREMENT

Variable	Measures	Label
<b>Green Purchasing</b>	Eco Labeling, Environmental audit of suppliers, supplier ISO 14000, Second tier supplier evaluation, Supplier design for environment, Cooperation with suppliers	GP
<b>Cooperation With Customers</b>	eco- design, cleaner design, green packaging, using less energy during product transport	CWC
<b>Eco – Design</b>	reduced consumption of material/ energy, reuse, recycle, recovery of material and parts, Avoid or reduce the use of hazardous processes	ED
<b>Investment Recovery</b>	Excess inventories/materials, Sale of scrap and used materials, Sale of surplus capital equipment	IR
<b>Total Quality Management</b>	Customer focus, product design, Statistical process control	TQM
<b>Just in Time</b>	Kanban, Lot size reduction, set up time reduction, JIT scheduling	JIT
<b>Organizational Performance</b>	Average (return on investment over the past three years, profit over the past three years, return on sales over the past three years, market share growth over the past three years, sales volume growth over the past three years, sales (in dollars) growth over the past three years) and Profit growth over the past three years.	OP

To explore the impact of green supply chain management practices on organizational performance, a regression model was generated.

$$OP = \beta_0 + \beta_1 GP + \beta_2 CWC + \beta_3 ED + \beta_4 IR + \beta_5 TQM + \beta_6 JIT$$



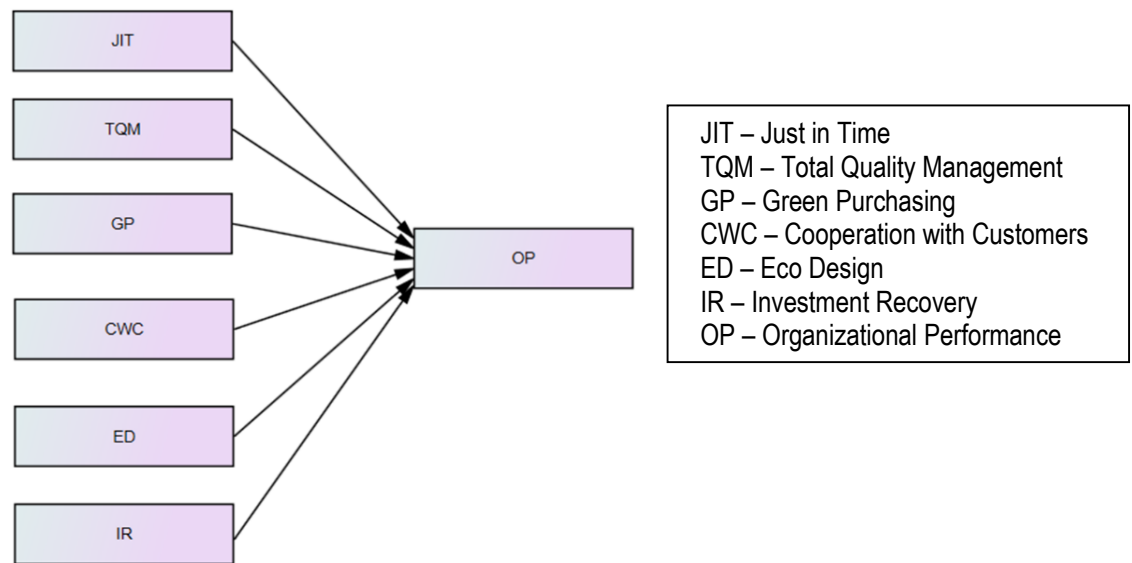


FIGURE 1 - CONCEPTUAL FRAMEWORK

#### 4. ANALYSIS

Table 2 presents the characteristics of the respondents. A reliability test was executed to identify the internal reliability of the constructs. Quality and consistency of the data are assessed in a reliability test. Cronbach's alpha for this study amounts to 0.957, which indicates much stronger internal reliability. The lowest Cronbach's alpha coefficient is for customer cooperation (0.893), and the highest is for Organizational performance (0.955) (Table 3).

TABLE 2 - CHARACTERISTICS OF RESPONDENTS (SAMPLE SIZE, N = 125)

	Frequency	Percent
<b>Approximate number of employees in the organization</b>		
0 - 499	16	12.8
1000 - 1999	17	13.6
2000 - 4999	26	20.8
500 - 999	19	15.2
5000 or more	47	37.6
<b>Position held at the organization</b>		
Area Manager	3	2.4
Financial Manager	5	4.0
General Manager	16	12.8
Industrial Waste Manager	1	.8
Information Systems Manager	4	3.2
Logistics Manager	4	3.2
Merchandising Manager	28	22.4
Operations Manager	28	22.4
Other	4	3.2
Plant Manager	4	3.2
Purchasing Manager	3	2.4
Quality Manager	13	10.4
Supply Chain Manager	12	9.6

TABLE 3 - CRONBACH'S ALPHA (RELIABILITY STUDY)

Variable	Cronbach's Alpha
Just in Time (JIT)	0.912
Total Quality Management (TQM)	0.945
Green Purchasing (GP)	0.850
Cooperation with Customer (CWC)	0.893
Eco-Design (ED)	0.848
Investment Recovery (IR)	0.924
Organizational Performance (OP)	0.955

TABLE 4 - VARIANCE INFLATION FACTORS (VIF) AND TOLERANCE TEST

Coefficients <sup>a</sup>			
Model		Collinearity Statistics	
		Tolerance	VIF
1	Just In Time	.442	2.263
	Total Quality Management	.401	2.495
	Green Purchasing	.435	2.301
	Eco-Design	.385	2.595
	Investment Recovery	.600	1.668
	CWC	.899	1.112

a. Dependent Variable: Organizational Performance

#### 4.1. Regression Analysis

Table 5 and Table 6 present the results of the regression analysis.

TABLE 5 - REGRESSION MODEL SUMMARY

Model Summary						
Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate	Durbin-Watson
1	.615 <sup>a</sup>	.379	.347		.635	1.724

a. Predictors: (Constant), CWC, Eco-Design, Just In Time, Investment Recovery, Green Purchasing, Total Quality Management

b. Dependent Variable: Organizational Performance

TABLE 6 - REGRESSION COEFFICIENTS

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.683	.360		1.893	.061
	Just In Time	.109	.114	.104	.952	.343
	Total Quality Management	.292	.116	.290	2.527	.013
	Green Purchasing	-.042	.087	-.053	-.486	.628
	Eco-Design	.258	.096	.315	2.694	.008
	Investment Recovery	.033	.057	.053	.568	.571
	CWC	.070	.055	.097	1.270	.206

a. Dependent Variable: Organizational Performance

The regression model summary can measure the impact of green supply chain management practices on organizational performance. Table 5 summarizes the model, with the R Square statistics, 0.398, having a statistical significance of P0.05. This means that green supply chain management strategies predicted 39.8% of the variations in organizational performance. The Durbin-Watson score was 1.876 and ranged between +1 and +3, indicating that the observations were independent.

According to the coefficient table (Table 6), the unstandardized coefficient, B1, for the JIT is .109. This suggests that for every unit improvement in JIT, organizational performance improves by .109 times. The unstandardized Coefficient, B3 for GP, is equal to -.042, which suggests that for every unit increase in GP, organizational performance decreases by .042. The unstandardized Coefficient, B4 for ED, is equal to .258, which suggests that for every unit increase in ED, organizational performance increases by .258 times. The unstandardized Coefficient, B5, for IR is equal to .033, which means that for every unit increase in IR, organizational performance increases by .033. The unstandardized Coefficient, B6 for CWC, is equal to .070, which means that for each unit increase of CWC, there is an increase in organizational performance of .070 times. As shown in the coefficient table of regression, three of the variables are statistically significant. Namely, TQM (0.013) ED (0.008) is statistically significant with P<0.05.

The above results show that GSCM practices have unstandardized coefficients of -.042, .258, .070, .258, .109, .292, respectively. The following regression equation can be built from the available data for predicting organizational performance from GSCM practices.

$$\hat{Y} = 0.683 + (0.109)X_1 + (0.292)X_2 - (0.042)X_3 + (0.258)X_4 + (0.033)X_5 + (0.070)X_6$$

$\hat{Y}$  – Organizational Performance

$X_1$  – Just In Time

$X_2$  – Total Quality Management

$X_3$  – Green Purchasing

$X_4$  – Eco – Design

$X_5$  – Investment Recovery

$X_6$  – Cooperation with Customers

A summary of the Hypothesis testing can be viewed below.

TABLE 7 - HYPOTHESES SUMMARY

No	Hypothesis	Regression		Supported/ Unsupported
		B	Sig	
H1	Green purchasing positively impacts organizational performance.	-0.042	0.628	Not supported
H2	Eco-design positively impacts organizational performance.	0.258	0.008	<b>Supported</b>
H3	Cooperation with customers positively impacts organizational performance.	0.070	0.206	Not supported
H4	Investment recovery positively impacts organizational performance.	0.033	0.571	Not supported
H5	JIT positively impact green supply chain management.	0.109	0.343	Not supported
H6	TQM positively impacts green supply chain management.	0.292	0.013	<b>Supported</b>

## 5. DISCUSSIONS

The study's demographic analysis shows that most of the respondents, 37.6% of those who responded to the questionnaire, work for organizations with more than 5000 employees. This demographic attempt explains the organization's size. This reflects the weight each organization has on the study and the impact of the organization's size on the study.

A multiple regression analysis was used to determine the influence of GSCM procedures on organizational performance. The regression analysis results show that GSCM practices contribute considerably to organizational performance, which is significant at the 0.05 level ( $F=11.990$ ;  $P0.05$ ). The corrected  $r$  square is 0.347, indicating that GSCM practices can predict 34.7% of the overall variable in organizational performance. However, the findings show that only Eco-design and Total Quality Management have a meaningful impact on organizational performance. Furthermore, because of this, the researcher only accepted two of the six possibilities. H2 and H6 were accepted, but the rest were not. The primary aim of this research is to determine the influence of GSCM techniques on organizational performance. However, data analysis revealed that green supply chain management methods impact organizational performance. Total quality management and Eco-design have a considerable impact on organizational performance, however the other four variables, green purchasing, customer cooperation, investment recovery, and just in time, have no significant impact. Previous research studies based on various industries, including automobiles, food, and beverages, and tea processing, among others, back up this claim. As mentioned in the literature review, most studies show a positive relationship between the two constructs.

This study can be supported by many recent theories that many authors and researchers have tested. These theories have been tested in multiple countries and major economies like US and China. For instant, according to Green et al. (2012), their discussion on the impact of green supply chain management practices and organizational performance in the US context has a reasonably positive impact. This has been the same in the Chinese sample, where Zhu & Sarkis (2004) determined a positive impact of green supply chain management practices on organizational performance. However, these two studies focus on two aspects of organizational performance: economic and environmental performance. In this study, organizational performance is considered one variable and measures corporate profits with industrial averages.

Muma (2014) discovered that GSCM procedures favorably influence organizational performance in one of their research projects. Much other research has also revealed that the involvement of all supply chain participants most likely has a good effect on organizational performance (Green et al., 2012; Zhu & Sarkis, 2004). Previous research has found that GSCM positively impacts organizational performance in the Asian environment (Zhu and Sarkis, 2004; Laosirihongthong, Adebajo and Choon Tan, 2013).

According to the study's findings, environmental sustainability must first be recognized as a strategic necessity. As a result, top-level management must seek to make environmental sustainability a critical component of the firm. They must create environmentally friendly processes and provide environmentally friendly products and services, which must be communicated to all levels of the business

Eco-design is considered costlier for the organization to implement. It involves redesigning existing products to suit the sustainability criteria, enabling the organization to reuse, recycle, save material, and reduce hazardous products. According to Green et al. (2012), eco-design was positively related with environmental performance but adversely connected with economic performance in a US sample that examined industrial organizational performance. According to the findings of this study, eco-design has a direct and positive impact on organizational performance. This phenomenon suggests that eco-design results in cost-effective/saving activities such as lower energy consumption and trash discharge and treatment costs. Environmental design is in place due to buyer pressure in markets such as the United States, United Kingdom, and Europe, which consistently demand eco products. Furthermore, the global focus on global warming and environmental preservation has compelled many manufacturing businesses to adopt environmentally friendly production processes. The study revealed that Total quality management significantly impacts organizational performance and is positively associated with organizational performance. This finding can be further explained, aligned with the study conducted by Hassan et al. (2012) findings. According to Hassan et al. (2012), there is a positive impact of TQM practices on a firm's performance, and this study is based on Pakistan's manufacturing

organizations. These results are evident in many other studies (Brah et al., 2000). Since apparel is a quality-based industry, organizations have been forced to obtain certification to be highly competitive.

Green purchasing does not significantly impact organizational performance, which is evident in several studies. A study conducted by Green et al. (2012) has found that green purchasing does not significantly impact environmental performance. However, significantly impacting on economic performance. It is argued that green purchasing lies with the supplier rather manufacturer. Therefore, Organizational performances are not significantly affected by green purchasing (Zhu & Sarkis, 2004). The study reveals that green purchasing is still in a phase where organizations consider implementation. This can be regarded as one of the reasons why green purchasing does not display a significant impact on organizational performance.

Customer cooperation does not substantially impact organizational performance in Sri Lankan clothing. However, according to Green et al. (2012) 's US sample, customer collaboration had a considerable impact on environmental performance but no significant impact on economic performance. However, Zhu et al. (2007) discovered that cooperation with consumers has no substantial impact on the environment or financial performance in a Chinese sample centered on Chinese manufacturing businesses. Conclusion: Given that China and Sri Lanka are both developing countries operating on the Asian continent, it is clear that these results are fairly accurate in the Sri Lankan context. However, this sample only includes the Apparel industry, whereas the Chinese sample includes several industries that contradict the findings. Investment recovery has no significant impact on organizational performance, as the results demonstrate. US and Germany indicate that investment recovery is vital to GSCM practices. However, with the higher prices and the levy of taxes imposed by the government in Sri Lanka, it is heavily constrained to carry out a proper recycling system. This is evident in China (Zhu et al., 2007). Sri Lanka lacks essential technologies that make recycling and recovery convenient (Dharmasiri, 2019). Sri Lankan apparel industry has given less attention to investment recovery, which is similar to China, where also given less attention (Zhu et al., 2007).

Just In time does not have a significant value, indicating that the impact on the organizational performance is not significant. Green et al. (2014) has posted the same results that indicate no significant impact on organizational performance. In the Sri Lankan context, many practices like Kanban and Lot size-reduction practices are still in the initiating stages for the responses received

## 6. CONCLUSIONS

Being environmentally friendly has become a necessity in the modern era. Most developed and developing countries have already taken up many drastic changes and implemented green initiatives to save the earth. This has become so intuitive that these practices are rooted in businesses and their supply chains. With increased competition and constant pressure from the demand side, many supply chains adopted green supply chain management practices. These green initiatives are pivotal in modern manufacturing organizations and their performance levels.

This study gives an elaborative insight into how each GSCM practice impacts an organization's performance. Therefore, this study investigated the impact of green supply chain management practices on organizational performance.

### ***Study reveals that Total Quality Management Impacts Organizational Performance in the apparel manufacturing industry in Sri Lanka***

According to Flynn et al. (1995), TQM's dimensions are customer focus, product design, and Statistical process control. The researcher can identify that organizations value customer feedback, quality inquiries, and customer input from the study. Quality has been given absolute priority when designing products. For example, organizations have already taken measures to reduce parts and materials when producing and designing products. Statistical methods used in organizations helps organizations to keep track, maintain and control better effective production. TQM strategy integrates and coordinates business processes across the entire supply chain. The supply chain can better serve its ultimate customers because of this end-to-end integration and coordination (K. Green et al., 2014).

The primary finding from this study related to TQM is that it can be observed that a high level of implementation of quality control demonstrates a higher level of quality performance, which ultimately affects overall organizational performance. According to this study, the apparel industry has a higher impact index on quality control practices such as TQM. Results show that the level of quality control within an organization increases as the size of the organization increases (in terms of the number of employees). The probability of implementing TQM practices in a larger organization is higher since the ability to execute them is higher (in terms of revenue, time, and resources). The Sri Lankan apparel industry constantly deals with international standards, customers, and clients, which force them to have quality control practices.

### ***Study reveals that Eco-Design impacts Organizational Performance in the apparel manufacturing industry in Sri Lanka***

According to Zhu et al. (2008), the eco-design constructs measure the material savings when designing a product, recyclability/reusability and recovery of material design, design of goods which does not include hazardous or harmful material or process. When creating a product in manufacturing organizations, these aspects are considered when adapting to eco-designing as a green supply chain management practice. Many studies cited that when eco-design in practice, it negatively impacts its economic performance (Zhu et al., 2008, 2012).

This eco-design practice seemed to bring manufacturing organizations' attention after the emergent pressure of scarcity of resources, such as labour and material. Factors of production tend to be more expensive in the current state of the economy in Sri Lanka. As a result, organizations that consume less material and produce less recycled materials tend to be more profitable. This has been the case in China, too, where increased resource scarcity led many supply chain partners to adopt eco-designing practices to mitigate expensive inputs and losses. Particularly in the Apparel industry, scrap pieces are sold at a profit to acquire losses.

The participation of the Sri Lankan Apparel Industry in this essential industrial practice depends on adopting these practices. Many of these approaches are still in the early stages of implementation in most sectors we researched. In response to pressure from overseas consumers and partners and increasingly rigorous local environmental rules, Sri Lankan garment manufacturers are projected to enhance their adoption of the five primary categories of GSCM practices. The literature shows that implementing these strategies can result in significant environmental and economic benefits. However, due to the implementation of these principles, Sri Lankan garment manufacturers lack the knowledge, expertise, and instruments required to improve their environmental performance effectively and efficiently. The apparel industry in Sri Lanka has the highest adoption of green practices with a relatively long history of international business experience. Based on the result, it can be concluded that the reason for the contradictory results of GSCM on organizational performance is because Sri Lankan manufacturing organizations are still in their infancy. Lack of experience and knowledge supplements the results.

## **7. RECOMMENDATIONS FOR FUTURE RESEARCHERS**

The study only reflects six green supply chain management practices and demonstrates 34.7% of the impact on organizational performance. Research can be carried out to identify other variables that impact organizational performance. Findings can give a more generalizable output to all the manufacturing organizations in Sri Lanka. More prominent and impactful organizations can be involved in the study. Involving a moderator variable to identify the external pressures that the organizations have on organizational performance when implementing these practices. Moderators such as current occurrences like COVID-19 and economic crisis would be helpful to assess the external pressure that deviates organizational performance. A more comprehensive route analysis or structural equation model connecting GSCM techniques could reveal more about the intricate structure of these numerous linkages. Furthermore, there are still uncertainties about the impact of specific GSCM performance impacts on the individual, and organizational functions, as well as the most relevant performance measures for evaluating the internal and external elements of GSCM implementation (Bai and Sarkis 2010b)

## REFERENCES

- Abeyssekara, N., Wang, H., & Kuruppuarachchi, D. (2019). Effect of supply-chain resilience on firm performance and competitive advantage: A study of the Sri Lankan apparel industry. *Business Process Management Journal*, 25(7), 1673–1695. <https://doi.org/10.1108/BPMJ-09-2018-0241>
- Azevedo, S. G., Carvalho, H., & Cruz Machado, V. (2011). The influence of green practices on supply chain performance: A case study approach. *Transportation Research Part E: Logistics and Transportation Review*, 47(6), 850–871. <https://doi.org/10.1016/j.tre.2011.05.017>
- Beamon, B. M. (1999). Designing the green supply chain. *Logistics Information Management*, 12(4), 332–342. <https://doi.org/10.1108/09576059910284159>
- Brah, S. A., Li Wong, J., & Madhu Rao, B. (2000). TQM and business performance in the service sector: a Singapore study. *International Journal of Operations & Production Management*, 20(11), 1293–1312. <https://doi.org/10.1108/01443570010348262>
- Carter, C. R., & Liane Easton, P. (2011). Sustainable supply chain management: evolution and future directions. *International Journal of Physical Distribution & Logistics Management*, 41(1), 46–62. <https://doi.org/10.1108/09600031111101420>
- Carvalho, H., Duarte, S., & Machado, V. C. (2011). Lean, agile, resilient and green: Divergencies and synergies. *International Journal of Lean Six Sigma*, 2(2), 151–179. <https://doi.org/10.1108/20401461111135037>
- Charpail, M. (2017). *Environmental Impacts of the Fashion Industry — SustainYourStyle*. <https://www.sustainyourstyle.org/old-environmental-impacts>
- Chase, R. B., & Robert, F. J. (2018). *Operations and Supply Chains management*.
- Cramer, W., Guiot, J., Fader, M., Garrabou, J., Gattuso, J.-P., Iglesias, A., Lange, M. A., Lionello, P., Llasat, M. C., Paz, S., Peñuelas, J., Snoussi, M., Toreti, A., Tsimplis, M. N., & Xoplaki, E. (2018). Climate change and interconnected risks to sustainable development in the Mediterranean. *Nature Climate Change*, 8(11), 972–980. <https://doi.org/10.1038/s41558-018-0299-2>
- De Giovanni, P., & Esposito Vinzi, V. (2012). Covariance versus component-based estimations of performance in green supply chain management. *International Journal of Production Economics*, 135(2), 907–916. <https://doi.org/10.1016/j.ijpe.2011.11.001>
- Dharmasiri, L. M. (2019). Waste Management in Sri Lanka: Challenges and Opportunities. *Sri Lanka Journal of Advanced Social Studies*, 9(1), 72. <https://doi.org/10.4038/sljass.v9i1.7149>
- Diabat, A., & Govindan, K. (2011). An analysis of the drivers affecting the implementation of green supply chain management. *Resources, Conservation and Recycling*, 55(6), 659–667. <https://doi.org/10.1016/j.resconrec.2010.12.002>
- Dong, Z., Tan, Y., Wang, L., Zheng, J., & Hu, S. (2021). Green supply chain management and clean technology innovation: An empirical analysis of multinational enterprises in China. *Journal of Cleaner Production*, 310(May), 127377. <https://doi.org/10.1016/j.jclepro.2021.127377>
- EDB. (2021a). *Organic Products Manufacturers, Suppliers and Exporters in Sri Lanka - EDB*. <https://www.srilankabusiness.com/exporters-directory/organic-products-exporters-in-sri-lanka/>
- EDB. (2021b). *Sri Lankan Apparel Industry and Environmental Sustainability - EDB Sri Lanka*. <https://www.srilankabusiness.com/blog/environmentally-sustainable-apparel-manufacturing.html>
- Export Development of Board. (2020). *Industry Capability Report Spice & Concentrates*. January, 4.
- Flynn, B. B., Sakakibara, S., & Schroeder, R. G. (1995). Relationship Between Jit and Tqm: Practices and Performance. *Academy of Management Journal*, 38(5), 1325–1360. <https://doi.org/10.2307/256860>

- Foschi, E., Zanni, S., & Bonoli, A. (2020). Combining eco-design and LCA as decision-making process to prevent plastics in packaging application. *Sustainability (Switzerland)*, 12(22), 1–13. <https://doi.org/10.3390/su12229738>
- Garver, M. S., & Mentzer, J. T. (1999). Logistics research methods: employing structural equation modeling to test for construct validity. *Journal of Business Logistics*, 20(1), 33.
- Green, K. W., & Inman, R. A. (2005). Using a just-in-time selling strategy to strengthen supply chain linkages. *International Journal of Production Research*, 43(16), 3437–3453. <https://doi.org/10.1080/00207540500118035>
- Green, Kenneth W., Inman, R. A., Birou, L. M., & Whitten, D. (2014). Total JIT (T-JIT) and its impact on supply chain competency and organizational performance. *International Journal of Production Economics*, 147(PART A), 125–135. <https://doi.org/10.1016/j.ijpe.2013.08.026>
- Green, Kenneth W., Inman, R. A., Sower, V. E., & Zelbst, P. J. (2019a). Comprehensive supply chain management model. *Supply Chain Management*, 24(5), 590–603. <https://doi.org/10.1108/SCM-12-2018-0441>
- Green, Kenneth W., Inman, R. A., Sower, V. E., & Zelbst, P. J. (2019b). Impact of JIT, TQM and green supply chain practices on environmental sustainability. *Journal of Manufacturing Technology Management*, 30(1), 26–47. <https://doi.org/10.1108/JMTM-01-2018-0015>
- Green, Kenneth W., Whitten, D., & Inman, R. A. (2008). The impact of logistics performance on organizational performance in a supply chain context. *Supply Chain Management*, 13(4), 317–327. <https://doi.org/10.1108/13598540810882206>
- Green, Kenneth W., Zelbst, P. J., Meacham, J., & Bhadauria, V. S. (2012). Green supply chain management practices: Impact on performance. *Supply Chain Management*, 17(3), 290–305. <https://doi.org/10.1108/13598541211227126>
- Hassan, M. ul, Mukhtar, A., Qureshi, S. U., & Sharif, S. (2012). Impact of TQM Practices on Firm ' s Performance of Pakistan ' s Manufacturing Organizations. *International Journal of Academic Research in Business and Social Sciences*, 2(10), 232–259. <http://search.proquest.com/openview/788f078378e766a49bd9736e7f9d4c13/1?pq-origsite=gscholar&cbl=696344>
- Ho, J. C., Shalishali, M. K., Tseng, T. L., & Ang, D. (2009). Opportunities in Green Supply Chain Management. *The Coastal Business Journal*, 8(1), 18–31.
- Hugo, G. (2008). DEVELOPMENT AND by. *Environment*, August.
- International Trade Administration (ATA). (2021). *Sri Lanka - Country Commercial Guide*. <https://www.trade.gov/country-commercial-guides/sri-lanka-textiles>
- Jasti, N. V. K., & Kodali, R. (2015). Lean production: literature review and trends. *International Journal of Production Research*, 53(3), 867–885. <https://doi.org/10.1080/00207543.2014.937508>
- Jayarathna, C. P. (2016). The level of green supply chain practices adoption in Sri Lankan manufacturing companies. *International Journal of Supply Chain Management*, 5(4), 12–17.
- Jermstittiparsert, K., Namdej, P., & Sriyakul, T. (2019). Impact of quality management techniques and system effectiveness on the green supply chain management practices. *International Journal of Supply Chain Management*, 8(3), 120–130.
- Klassen, R. D., & McLaughlin, C. P. (1996). The impact of environmental management on firm performance. *Management Science*, 42(8), 1199–1214. <https://doi.org/10.1287/mnsc.42.8.1199>
- Kopicki, R; Berg, M J; Legg, L. (1993). *Reuse and recycling - reverse logistics opportunities*. <https://www.osti.gov/biblio/133268>



- Kweku, D., Bismark, O., Maxwell, A., Desmond, K., Danso, K., Oti-Mensah, E., Quachie, A., & Adormaa, B. (2018). Greenhouse Effect: Greenhouse Gases and Their Impact on Global Warming. *Journal of Scientific Research and Reports*, 17(6), 1–9. <https://doi.org/10.9734/jsrr/2017/39630>
- Lakmali, G. A. D. T., & Jayaratne, P. (2018). Economic Impacts of Applying Green Supply Chain Management Practices in Organizations in Sri Lanka. *2018 IEEE International Conference on Service Operations and Logistics, and Informatics (SOLI)*, 202–207. <https://doi.org/10.1109/SOLI.2018.8476803>
- Laosirihongthong, T., Adebajo, D., & Choon Tan, K. (2013). Green supply chain management practices and performance. *Industrial Management & Data Systems*, 113(8), 1088–1109. <https://doi.org/10.1108/IMDS-04-2013-0164>
- Lummus, R. R., Krumwiede, D. W., & Vokurka, R. J. (2001). The relationship of logistics to supply chain management: developing a common industry definition. *Industrial Management & Data Systems*, 101(8), 426–432. <https://doi.org/10.1108/02635570110406730>
- Lundgren, K., Kuklane, K., Gao, C., & Holmér, I. (2013). Effects of heat stress on working populations when facing climate change. *Industrial Health*, 51(1), 3–15. <https://doi.org/10.2486/indhealth.2012-0089>
- Mahadevan, B. (2015). *Operations Management: Theory and Practice*.
- Perera, P. S. T., & Perera, H. S. C. (2013). Developing a Performance Measurement System for Apparel Sector Lean Manufacturing Organizations in Sri Lanka. *Vision: The Journal of Business Perspective*, 17(4), 293–301. <https://doi.org/10.1177/0972262913505371>
- Perotti, S., Micheli, G. J. L., & Cagno, E. (2015). Motivations and barriers to the adoption of green supply Chain practices among 3PLs. *International Journal of Logistics Systems and Management*, 20(2), 179–198. <https://doi.org/10.1504/IJLSM.2015.067255>
- Purba Rao, D. H. (2005). Do green supply chains lead to competitiveness and economic performance? *International Journal of Operations & Production Management*, 25(9), 898–916.
- Sampson, S. E., & Spring, M. (2012). Customer Roles in Service Supply Chains and Opportunities for Innovation. *Journal of Supply Chain Management*, 48(4), 30–50. <https://doi.org/10.1111/j.1745-493X.2012.03282.x>
- Sanyé-Mengual, E., Pérez-López, P., González-García, S., Lozano, R. G., Feijoo, G., Moreira, M. T., Gabarrell, X., & Rieradevall, J. (2014). Eco-designing the use phase of products in sustainable manufacturing: The importance of maintenance and communication-to-user strategies sanyé-mengual et al. Eco-designing the use phase. *Journal of Industrial Ecology*, 18(4), 545–557. <https://doi.org/10.1111/jiec.12161>
- Sarkis, J. (2012). A boundaries and flows perspective of green supply chain management. *Supply Chain Management*, 17(2), 202–216. <https://doi.org/10.1108/13598541211212924>
- Shah, A. U., & Siddiqui, D. A. (2019). Customers' Driven Green Supply Management and Organization Performance. *Global Disclosure of Economics and Business*, 8(2), 67–82. <https://doi.org/10.18034/gdeb.v8i2.99>
- Somogyi, R. M., Nagy, Z., & Török, Á. (2009). *Greening Supply Chain Management*. 2(3), 367–374.
- Srivastava, S. K. (2007). Green supply-chain management: A state-of-the-art literature review. *International Journal of Management Reviews*, 9(1), 53–80. <https://doi.org/10.1111/j.1468-2370.2007.00202.x>
- Susanty, A., Sari, D. P., Rinawati, D. I., & Setiawan, L. (2018). Impact of internal driver on implementation of GSCM practice. *Proceedings of the International Conference on Industrial Engineering and Operations Management, 2018-March(Cc)*, 149–156.
- Tseng, M.-L., Islam, M. S., Karia, N., Fauzi, F. A., & Afrin, S. (2019). A literature review on green supply chain management: Trends and future challenges. *Resources, Conservation and Recycling*, 141, 145–162. <https://doi.org/https://doi.org/10.1016/j.resconrec.2018.10.009>

- Vachon, S., & Klassen, R. D. (2006). Extending green practices across the supply chain: The impact of upstream and downstream integration. *International Journal of Operations and Production Management*, 26(7), 795–821. <https://doi.org/10.1108/01443570610672248>
- Van Hoek, R. I. (1999). From reversed logistics to green supply chains. *Supply Chain Management*, 4(3), 129–134. <https://doi.org/10.1108/13598549910279576>
- Zelbst, P. J., Green, K. W., Abshire, R. D., & Sower, V. E. (2010). Relationships among market orientation, JIT, TQM, and agility. *Industrial Management & Data Systems*, 110(5), 637–658. <https://doi.org/10.1108/02635571011044704>
- Zhu, Q., & Sarkis, J. (2004). Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises. *Journal of Operations Management*, 22(3), 265–289. <https://doi.org/10.1016/j.jom.2004.01.005>
- Zhu, Q., Sarkis, J., & Lai, K. (2013). Institutional-based antecedents and performance outcomes of internal and external green supply chain management practices. *Journal of Purchasing and Supply Management*, 19(2), 106–117. <https://doi.org/https://doi.org/10.1016/j.pursup.2012.12.001>
- Zhu, Q., Sarkis, J., & Lai, K. H. (2012). Examining the effects of green supply chain management practices and their mediations on performance improvements. *International Journal of Production Research*, 50(5), 1377–1394. <https://doi.org/10.1080/00207543.2011.571937>
- Zhu, Q., Sarkis, J., & Lai, K. hung. (2007). Green supply chain management: pressures, practices and performance within the Chinese automobile industry. *Journal of Cleaner Production*, 15(11–12), 1041–1052. <https://doi.org/10.1016/j.jclepro.2006.05.021>
- Zhu, Q., Sarkis, J., & Lai, K. hung. (2008). Green supply chain management implications for “closing the loop.” *Transportation Research Part E: Logistics and Transportation Review*, 44(1), 1–18. <https://doi.org/10.1016/j.tre.2006.06.003>