

## EXTENDED ABSTRACT

# ADOPTION OF GREEN SUPPLY CHAIN MANAGEMENT (GSCM) PRACTICES AMONG SMALL MEDIUM ENTERPRISES (SMES) IN WESTERN PROVINCE IN SRI LANKA

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### Abstract

Purpose of this study is to look into the level of Green Supply Chain Management (GSCM) practices adoption among Small and Medium Enterprises (SMEs) in western province in Sri Lanka. To achieve study objective, a quantitative approach was used, and data were collected through a structured questionnaire and were analyzed using factor analysis method. Theoretical scope of the study identified green purchasing (GP), eco-design (ED), reverse logistics (RL), green manufacturing (GM), and internal environmental management practices (IEMPs) as major dimensions of GSCM practices. The empirical scope is limited to manufacturing companies in Western Province in Sri Lanka. Study discovered that adoption of GSCM Practices isn't in a satisfied level among Sri Lankan SMEs. Further, it was revealed that RL and IEMPs recorded a somewhat higher satisfactory level than that of ED, GM and GP practices. Results will assist SMEs in establishing GSCM practices, as well as government and other policy making authorities in developing GSCM policies.

**Keywords:** Green supply chain management (GSCM) practices, small and medium enterprises (SMEs)

## 1. Introduction

Small and medium enterprises (SMEs) play a significant role in the most of economies, particularly in developing countries. SMEs accounts for the majority of businesses globally and are critical contributors to employment creation and global economic development. They account for over 90% of companies and more than 50% of global employment. In emerging economies, formal SMEs can account for up to 40% of national income (GDP). When informal SMEs are included, these figures skyrocket (The World Bank, 2021). Accordingly, in almost all economies in the world, SMEs play a vital role by contributing significantly to GDP by participating in the mainstream economy and by providing employment as a source of income for a significant portion of the population. On the other hand, SMEs act as a kindergarten for the large enterprises of the future, as the majority of large enterprises now emerged as SMEs at this time. Conversely, SMEs account for a large proportion of environmental pollution in the world, however, the way they manage environmental matters and their impact on the environment is not well understood (de Oliveira and Jabbour, 2015). Some SMEs fail to incorporate environmental practices into their business operations, whilst others have

taken initiatives to boost their environmental performance, refocusing their entrepreneurial energy. The truth is that the great majority of businesses are unaware of how much harm they are creating. The reason for this is that they are too focused on meeting the needs of their customers.

However, at present, there is an increasing attention about the concept of GSCM Practices among the scholars than ever before. This is mainly because to prevent the environmental degradation. In accordance with this, the majority of developed and developing nations have undertaken a variety of efforts and methods to decrease the environmental effect in the process of delivering products to customers. As a result, the majority of organizations recognize green activities as a concern for environmental sustainability. According to Seman and Aslinda (2012), GSCM has gradually gained acceptance and implementation among forward-thinking businesses as an emerging environmental strategy in supply chain management. Nevertheless, the majority of GSCM studies were limited to large enterprises and less attention was paid to SMEs (Gandhi and Vasudevan, 2019) and also the reasons and the degree of adoption on green practices (Sheila. & Sridharan, 2016).

Previous studies have particularly highlighted a variety of reasons as to why SMEs should adopt green practices or green manufacturing. Some scholars stand on a positive view when justifying the SMEs' need of 'going green', arguing that "consumer demand for environment friendly goods and services as well as the escalating costs of waste disposal have triggered environment-related business opportunities for the SMEs" (Yacob, Wong, & Khor, 2019).

Despite the relevance of GSCM, Lakshmimeera and Palanisamy (2013) shown that adopting GSCM practices is difficult due to the inter organizational aspect. Many academics show that the complexity of adopting green supply chain methods originates from the diversity of inter organizational systems, which includes many stakeholders with competing interests (Jonathan et al., 2007). However, when it comes to empirical studies on the factors that impact the adoption of GSCM efforts, the researchers discovered that various outcomes were obtained for the same factors (Khidir and Zailani, 2009). Given that, despite the fact that a significant number of studies on the adoption of GSCM techniques have been done, it remains researchable owing to conflicting findings (Bowen et al., 2001; Khidir and Zailani, 2009). Further, many studies in this field have been conducted on developed countries rather than underdeveloped countries. Similarly, the researchers recognized a gap in the existing piece of literature regarding the same phenomena in the Sri Lankan setting. As a result, this study aims to test the level of adoption of GSCM practices in SMEs in the Sri Lankan setting.

## 2. Literature Review

Various studies in the GSCM literature utilized various techniques to assess the degree of GSCM practices. (Al-Aomar & Weriakat, 2012) stated that in order to embrace green practices, all steps and elements of the supply chain must be analyzed for their environmental effect. According to (Al-Aomar & Weriakat, 2012), supply chain elements such as purchasing, storage, distributing/transporting, manufacturing, and consuming are examined in order to assess the adoption of GSCM practices. Previous studies have identified essential techniques such as green design, green operation, reverse logistics, waste management, and green manufacturing (Srivastava, 2007).

Depending on their degree of development, different nations define SMEs differently. The researchers utilized the SME policy framework definition of SMEs based on the number of workers and yearly turnover for the study.

### 2.1 Dimensions of GSCM Practices

**Green Purchasing (GP):** GP includes choosing suppliers and other raw materials that are environmentally friendly (Sheth & Sharma, 1997).

**Eco-Design (ED):** ED is concerned with the creation of products that minimize material and energy consumption, allow the reuse, recycling, and recovery of component materials and parts, and

eliminate or reduce the usage of hazardous products throughout the production process (Zhu et al., 2008). Internal Environment Management Practices (IEMPs): IEMP refers to how organizations address and mitigate the adverse impact of its operations on the environment (Rao, 2008). Furthermore, Zhu et al., (2008) argued that management support includes ideas related to GSCM practices at the executive level, collaborating among the different functions of the company, and companies learning have a positive association with the implementation of GSCM practices.

Reverse Logistics (RL): The flow of products or goods back from the consumer to an earlier level of the supply chain is referred to as RL (Seroka-Stolka, 2014). This foundation was formed with the intention of recycling, reusing, remanufacturing, repairing, refurbishing, or ensuring safe disposal (Younis, Sundarakani & Vel 2016). Green Manufacturing (GM): Main aim of GM is to eliminate environmental consequences by utilizing appropriate materials and technology, whereas green manufacturing attempts to repair worn-out items to like-new condition (Lind, 1984). The GM approach not only benefits the environment (Deif, 2011), but it also has an influence on shareholders, consumers, and the company's reputation in a competitive market (Zhu & Sarkis, 2004).

## 2.2 Level of Adoption of GSCM Practices among SMEs

Large organizations' operational environment ability differs from the SMEs and this is true in adopting green context (Gandhi et al., 2018). According to Mitra and Datta (2014) large firms are more likely to adopt GSCM practices because of the sufficient funds and resources and the pressure that they face from the government to adopt such practices in their process in comparison to SMEs. The SMEs ability is hindered by various factors such as, limited resources and funds, lack of skills and technology, lack of organizational structure, lack of systems etc. (Gandhi et al., 2018). According to the study done by Aryawansha et al. (2019) found that GSCM practices in the Sri Lankan manufacturing industry was in a moderate level. This moderate level of adopting GSCM practices could be due to several reasons. Diab et al. (2015) point out that the government, the main controlling body of a country should play a major role in encouraging firms towards better environmental practices. Further, it is said that the government needs to impose green investment and other green-related laws, which is not often the case in Sri Lanka as yet.

## 3. Methodology

Current study considers all the SMEs in Western province of Sri Lanka registered under Ceylon Chamber of Commerce (CCC SME Directory, 2018) as population. Accordingly, 134 SMEs were considered as the target population. Consensus study was used covering a variety of sectors including manufacturing, footwear & Textile, Construction & Engineering, Power & Energy, Trading, Beverages & Food, Chemical & Pharmaceutical as well as Packaging. The unit of analysis was the owners of the SMEs and cross-sectional analysis was utilized.

Data for the research were collected through a survey questionnaire which consisted of two main parts i.e. part one about demographic information, part two including questions relating to GSCM practices. Accordingly, 5 questions from GP, 6 questions from GD, 4 questions from RL, 3 questions from GM and 7 questions from IEM were tested. The response scale was a 5 point Likert scale. Internal consistency of all the instruments recorded high and well above the standard (Cronbach Alpha coefficients > 0.7). Out of the distributed questionnaires (134), 108 questionnaires were returned for an overall response rate of 80.6%, and it is considered as appropriate for further analysis. Data were analysed by descriptive statistics and factor analysis.

## 4. Results

The researchers used the factor analysis approach to extract factors from principal component analysis with varimax rotation. To assess the data's suitability for factor analysis, Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sample adequacy were used. The KMO test results

revealed that the comparison value is 0.728, which is significantly higher than the recommended minimum standard of 0.5 for conducting factor analysis.

Based on the results of the preceding tests, it is clear that all factors are appropriate for factor analysis. As a consequence, the researchers used a principal component analysis using the 25 items to extract factors with eigenvalues of discontinuity greater than 1 (Tabachnick and Fidell, 1989), and factor loading greater than 0.5 was used to select components. As a result, 22 items scored higher than 0.5.

**Table 1.** Factor loadings, means and standard deviation of each item.

Items	Factors					M	SD
	1	2	3	4	5		
<b>GP</b>						<b>3.27</b>	<b>.633</b>
GP1			.747			3.18	.984
GP2			.693			3.36	.826
GP3.			.728			3.51	.815
GP4			.738			3.24	.852
GP5			.570			3.06	.874
<b>ED</b>						<b>3.29</b>	<b>.634</b>
ED1		.761				3.27	.781
ED2		.762				3.32	.915
ED3		.617				3.14	1.009
ED4						3.40	.917
ED5		.780				3.23	.849
ED6						3.38	.894
<b>RL</b>						<b>3.21</b>	<b>.714</b>
RL1				.763		3.24	.885
RL2				.763		3.28	.895
RL3				.796		3.31	.928
RL4				.737		3.19	.981
<b>GM</b>						<b>3.34</b>	<b>.743</b>
GM1					.730	3.36	1.018
GM2					.784	3.31	.944
GM3					.811	3.34	.799
<b>IEMP</b>						<b>3.35</b>	<b>.61</b>
IEMP1.	.746					3.23	.804
IEMP2.	.667					3.32	.830
IEMP3	.761					3.29	.918
EEMP4	.615					3.24	.830
ENMP5	.663					3.8	.952
ENMP6						3.34	.775
IEMP7	.764					3.41	.876

Source ; Survey results (2020)

Table 1 presented the details of the means, standard deviations, and percentages of the 25 items of adopting GSCM practices in the SMEs. It can be seen that a total of 05 factors were identified and the grand mean values for 5 dimensions emphasized that GSCM Practices adopted by SMEs are not in a satisfactory level only in average stage (all are 4).

The first factor (F1), labeled “**IEMP**”, included 06 items out of 07items. The second factor (F2), which was labeled “**ED**”, was composed of four items. Besides, the third factor (F3) which was

associated with 05 items was labeled as “GP” and fourth factor (F4) which was associated with 04 items was labeled as “RL”. Remaining factor, with 03 items were labeled as “GM”.

The results indicated that the top GSCM practices adopted by SMEs is implementation of Suppliers’ ISO 14000 Certification (M=.811). Other leading GSCM practices referred to “Focus on ISO 14001 certification.” (M=3.48). However, recycling the used packages (M =3.19) providing design specification to suppliers that include environmental requirements for purchased items (M=3.18), Design of products to avoid or reduce the use of hazardous products (M =3.14) and Requesting suppliers to use environmental packaging (M=3.06) were also in average satisfactory level in the SMEs. In addition, the measuring tool explained 56% of the total variance.

## 5. Conclusions

It was revealed that the practices of GSCM such as GP, ED, RL, IEM and GM in SMEs in Sri Lanka is not at a satisfactory level, and needs further attempts to enhance the environmental consideration practices. Considering all the scores, RL and IEMPs recorded a somewhat higher satisfactory level than the other practices of ED, GM and GP practices. According to the study, the explanation for this type of interaction is a lack of environmental norms and regulations in Sri Lanka. As a result, the researcher proposes that environmental policies, rules, and regulations be strengthened even more. Another reason for the moderate satisfactory adaptation of GSCM practices is the high investment costs that may incur at the initial stages. Moreover, as (Mohanty and Prakash, 2014) suggest, GSCM adaptation requires top management commitment. Strong support from senior management is crucial to ensure that they support the efforts to implement the environment that is desirable rather than undermine it (Dilshani and Herat, 2017). Finally, based on the findings of the results and the conclusions reached, the researchers emphasized some recommendations of how the government can either enforce or encourage firms to improve their GSCM practices with less spending budget and more use of other stakeholders in the chain. Supplier auditing is another way to measure the firm’s perspective on the environment, purchasing products with eco-label is a sort of label that indicates that a product is not damaging to the environment.

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