

Factors Affecting to the Implementation of Green Supply Chain Management Practices among Manufacturing Companies in the Central Province of Sri Lanka

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ABSTRACT

The business world is currently abhorrent to the idea of going green, and the majority of organizations plan a strong emphasis on improving operational performance while also being aware of the impact on the environment. As one of the most important business advancements in the manufacturing industry, green supply chain management has emerged recently. However, the implementation of green supply chain management practices in manufacturing companies is a difficult process that is affected by different factors. Therefore, this research aims to study the factors affecting the implementation of green supply chain management practices. By adopting a deductive approach and quantitative survey method and using a self-administered questionnaire data were collected, the sample was 181 functional, staff, executive, and top-level managers of 12 manufacturing companies located in the central province, of Sri Lanka. Both simple random and convenient sampling techniques were used in this study. The questionnaire was distributed as a google form and hard copy and only 175 responses were accepted. Version 21.0 of the Statistical Package for Social Sciences software was used to analyze the data. The results of correlation and regression analysis highlighted, there was a positive statistically significant relationship and impact between independent and dependent variables except top management commitment and customer pressure. Further the study identified supplier performance as the greatest explanatory factor of the implementation of green supply chain management practices.

Key words: Green supply chain, Environment, Influential factors, Operational Performances, Supplier performances

INTRODUCTION

In the current global business setting supply chain management (SCM) plays a significant role in organizational management. It has become a broad and profound branch of management. It is a blend of different areas such as manufacturing, operational management, total quality management, marketing, etc. (Patel and Deshpande, 2015). SCM is now more important than ever for any company's success and customer satisfaction (Yu *et al.*, 2021). It can improve customer service, save operating expenses and strengthen a company's financial position. SCM is used in marketing, planning, manufacturing, buying, and distribution both inside and outside of the organization (Patel and Deshpande, 2015).

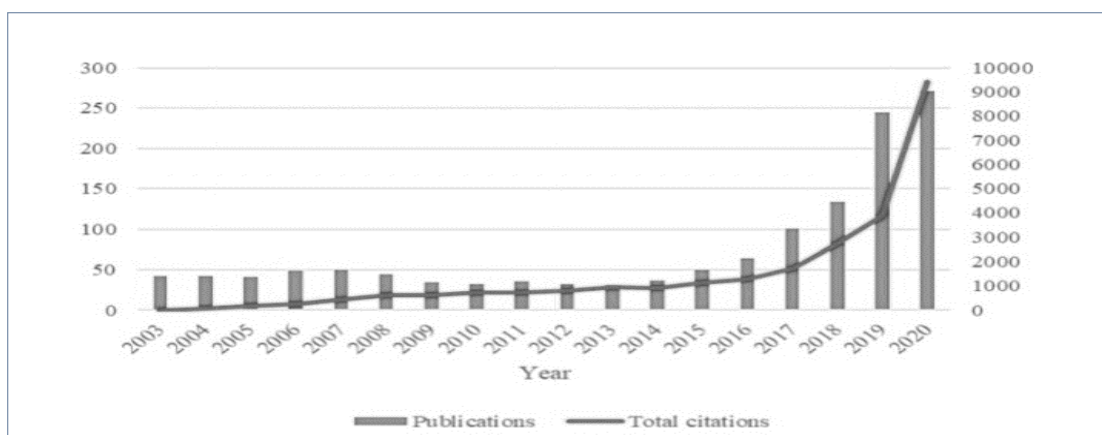
A green supply chain (GSC), which is used as a sustainability outcome generator other than the traditional supply chain, is one of the best versions of SCM. When managers consider sustainability in terms of the design and operation of the supply chain, it can be named a green supply chain (Hendiani *et al.*, 2022). Green supply chain management (GSCM) is a method that emphasizes environmental performance and the reduction of waste production. The concept of GSCM is very much crucial because it provides the necessary

push to achieve competitive advantages by integrating innovative and different strategies within a business organization (Aalirezai *et al.*, 2018). A business entity can grab a lot of benefits through the implementation of GSCM. On the other hand, when going to implementation, there may be various effects due to competition, political instability, uncertainty in the economy, and other reasons. For that several options are presented, that firms to ensure become properly sustained, maintained, and managed, like how to implement technology, who are the partners, the way of organizing, and when setting up the system. These facts are important to implement a GSC and maintain its effectiveness, there may be various challenges in going to adopt it because it depends on several factors and elements (Kant and Malviya, 2015). Internal (organizational) and external (customers, society, competitors, suppliers, and regulations) are the most important drivers of the success of GSC and its implementation (Walker *et al.*, 2008).

In the manufacturing sector, the GSCP has become a popular trend. With that advancement in SCM, the traditional approach to GSCM has become more adaptable. Manufacturing companies around the world, are paying much more attention to the implementation of GSCM. According to Surangi *et al.* (2021) with the improvement of GSCM, various determinants (e. g. green procurement, green manufacturing, green distribution, reverse logistic) are explained, which has been causing many changes, especially in organizational performance. Saada (2021) Identified rather than the traditional supply chain, GSCM is the most preferred method for managing organizational practices with environmental concerns.

The basic reasons for the GSC have become the growing trend toward flexible management solutions in the business sector, with evolution and changes in social mentality and the emergence of new ideas. As consequence “antecedent to the mandate given to the managers by the shareholders is the mandate given to the entrepreneur by the society” (Miller and Breton Miller, 2006). This primary factor driving the rapid rise of the GSC. To engage a more environmentally friendly version, this trend of the supply chain has begun to appear in many research headlines and papers. According to Bhoal and Narwal (2013) with economic growth, the energy usage level and material consumption have increased which has caused resource deflation and environmental issues. Managers and non-managerial employees in a variety of sectors, including manufacturing, healthcare, construction, etc. might benefit from these changes because nowadays they are more concerned about material wastage and energy wastage.

Figure 1. 1 Global GSCM publications and total citation trends 2003-2020



Source: Zhang & Zhao, 2022

GSCM was valued all around the world. And several publications related to this field increased year by year. Zhang and Zhao (2022) Explained that “The average annual number of articles published increased by 14.28% similarly, the time trend of total citation is also increasing year by year and the annual average citation per year is 1473” This statement shorted out that more researches and scholars are playing their concern on this field. At present, it states its growing stage and there is greater potential in this field (Zhang

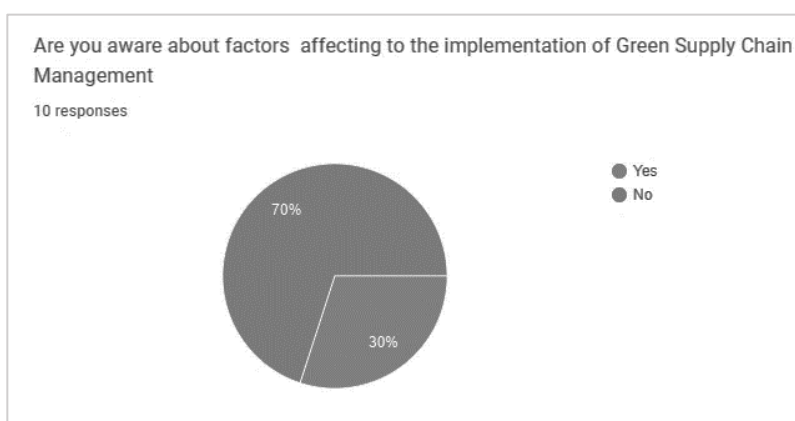
and Zhao, 2022). According to ecovadis academy, over 600 multinational companies work with them, to find enterprise solutions for sustainable supply chains. Because for a smart business, environmental, social, and ethical performance must be. The supply chain put the biggest impact on this. So GSCM is a comprehensive method, that optimizes firm operation with minimum cost. Because of that it gradually become environmentally proactive in past 20 years. Based on that promoting recycling, reuse, and resource reduction more and more (Paulraj, 2011).

When considering about recent world experienced massive disruption, during and post COVID 19 pandemic scholars put much attention on the supply chain (Choi, 2021; Govindan *et al.*, 2020; Lopes de Sousa Jabbour *et al.*, 2020), and also practitioners. A lot of manufacturing companies faced supply chain disruptions during that period. According to world economic insights, Inc., when recovering from these challenges companies are more concerned about sustainable, resilient supply chain practices. Because it improves economic and environmental performance “sustainability, it’s a journey, sustainability certification becomes the vehicle that accompanies whole supply chains via that journey.”

However, the implementation of GSCM depends upon various factors. If the implementer is not aware of those things it is regarded as a critical issue, because it is important to know about critical factors that impact the success of a GSC. Apeji and Sunmola (2022) Said that it needs to be aware of the factors affecting on supply chain and needs to enhance the skill of clearly seeing an end-to-end in supply chains based on the affecting factors. To keep the GSC as successful as possible, managers need to maintain these factors properly. Manufacturing companies as the major sector who are consumed, a lot of materials and comes up with a lot of waste, should be taken seriously these factors (Bhool and Narwal, 2013). Because their flowing of supply chain sustainability impacts not only within their premises but also impacts the general public. So it is practically impossible to develop a GSCM system is creating without taking into account these affecting factors. So companies need to make it to meet their sustainable goals.

In Sri Lanka, GSCM seems to be a novel concept to the majority of companies together with academic and supply chain professionals. While few companies have adopted concern about all aspects of GSCM majority of companies are focused on a few practices (Manage and Dissanayake, 2021). So when considering the Sri Lankan current context, with the current fuel crisis, transportation problems, and economic and political decline, the manufacturing companies that contribute much more to the economy, have a huge probability to adopt greening their supply chain. So there was a need for a study to explain the factors that affect them when doing such an implementation. On the other hand, the amount of research done in this field in Sri Lanka is very low and most of them are aimed at the western province. Therefore, there is a need to conduct a study on this field in other provinces while filling the research gap. The researcher was going to find out what are the factors that affect the implementation of green supply chain management for manufacturing companies in the central province and the research will be important for manufacturing companies who are already attached to GSC and who hope to be a part of it.

Figure 1. 2 Evidence from pilot study



Source: Responses of pilot study

The results of this pilot study, which was conducted in July/August 2022, using randomly selected 10 manufacturing companies located in the central province, further prove that the time has come to get into deep consideration factors affecting the GSCMP implementation, which can be more helpful to continue the supply chain practices under this economic crisis. When shifting from a traditional supply chain to a GSC, it needs to study the factors affecting the implementation and success of GSCM. It is very helpful to supply chain managers and others to continue their duties under innovative supply chains. The majority of studies found that awareness of those factors affects the intention to implement green supply chain practices positively (Jum et al., 2021). As a result, it is important to know what are the factors affecting to implementation of GSCMP.

LITERATURE REVIEW

Green Supply Chain Management

The green supply chain was introduced by Michigan university in 1996. Their purpose was to introduce a theoretical manufacturing supply chain. It consists of green design, clean production, and recycling, to reduce the environmental impacts, and resource and energy consumption. According to the literature, the idea was recognized and spread by the manufacturing ecosystem. Not only that, it has become one of the best consumer preferences worldwide.

However, green supply chain management received considerable attention at the beginning of the 21st century and it has become an essential component among organization managers, researchers, policymakers, etc. With that organizations, governments, and other international bodies have become more concerned about environmental problems. Thus, corporate bodies struggling to become more sustainable through green supply chain management practices (Banik *et al.*, 2022). Green supply chain management is a field that explores enormous new pathways for potential researchers and it has become a new evolving in today's setting (Zhang and Zhao, 2022). Zhalechian *et al.* (2016) Identified that green supply chain management is considered in terms of environmental problems in supply chain management practices (including, product design, manufacturing activities, sourcing of raw materials, and product delivery to the final consumer). It is an integration of environmental concerning product development, sourcing and manufacturing processes with supply chain management. Tseng *et al.* (2019) Find out that green supply chain management is an eliminator of negative impacts of supply chain management, as well as it is a helper in enhancing organizational performances and capturing new markets at national and international levels (Saade *et al.*, 2019). It reduces environmental risk while improving organizations' ecological performances (Abid *et al.*, 2021). And it aids to achieve better environmental and economic performance under proactive environmental strategies (Laguir *et al.*, 2020). Ultimately, instead of alleviating the detrimental effect of a business's supply chain operations, GSC implies value creation through the functioning of the entire supply chain (Abdul *et al.*, 2021).

As per the Sri Lankan manufacturing sector, Sri Lanka currently has several manufacturing companies including micro, small, medium, and large-scale businesses. Even though the area of green supply chain management has advanced significantly in the recent few years (Zhang and Zhao, 2022), most Sri Lankan manufacturing companies still basically use traditional supply chains in their day-to-day logistics and other supply chain-related activities. Recently all the manufacturing firms in Sri Lanka adversely disrupted because of the alarming COVID-19 outbreak and also the effect of the recent economic crisis. According to Sugathadasa *et al.* (2020) the manufacturing sector in Sri Lanka facing new disruptions in terms of implementing green supply chain management amidst those outbreaks. It has emerged as a model for

achieving its profit margins and objectives while reducing environmental risk. According to previous literature, in the Sri Lankan context, there can be seen less involvement in green supply chain management practices (Manage and Dissanayake, 2021). However, according to past findings, the majority of manufacturing sector companies have already begun green supply chain management to achieve ISO 14000 certification. But most of them are not aware of proper implementation. During the implementation, they encountered several challenges. On the other hand, all the manufacturing firms including large-scale firms equally influenced supply chain activities, with the import ban on some materials, several operational activities have been put on hold indefinitely. Most companies tried to keep their supply chain with the aid of green approaches, during the past period (Sugathadasa *et al.*, 2020).

The Implementation of Green Supply Chain Management

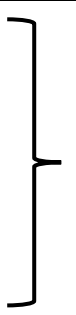
The implementation of green supply chain management creates many positive aspects in the industry framework, which can be listed as growth in improvement, the lowest waste generation, cost reduction leading to improved output, etc. The purpose of green sourcing in the supply chain also contributes to enhancing the recognized competence of companies and their allies. Moreover, an ecological enforcement process of green supply chain management in any company closes a basic function in the acquisition and preservation of positive elements (Zhu and Sarkis, 2005). As such several studies have revealed in their studies that performing green supply chain management is highly essential and the final result deals with the ecological component of the industry. Initiating and implementing sustainability in the supply chain can be defined as a green supply chain. The supply chain plays a key role in addressing a variety of environmental and social impacts and challenges inspired by earning and some other industries sustainable supply chain plays a prominent role and therefore, the beginning and execution of sustainability in supply chain management remains growing (Ahi and Searcy, 2013, 2014; Taylor *et al.*, 2011). Sustainability in the supply chain addresses many issues related to ecological, social, and broader economic components (Linton *et al.*, 2007).

Based on the understanding of the scope of the GSCMP it is a collection of inter-organizational activities that have been stimulated to cooperate in environmental problem-solving, inspection, and risk reduction. Additionally, it encompasses both internal and external operations (Linton *et al.*, 2007). It should be mentioned that literature regarding GSCP is lacking. Nevertheless, there are some practices have been found through past studies. In line of the aforementioned definitions and best practices, it should be highlighted that GSCMP started with suppliers and ends with final users. However, to do this study mainly focuses on green procurement, green production, green warehousing, and green delivery.

Factors Affecting the Implementation of Green Supply Chain Management Practices

Several factors can be identified that affect the implementation of green supply chain management practices. These factors may be internal or external. However, those factors are important in planning and executing. Implementation of green supply chain management is hard to achieve without knowing the critical factors affecting it (Banik *et al.*, 2022). Lin *et al.* (2020) Identified the impact of technology innovation and organizational and environmental factors on the application of green supply chain management when the results show the relative advantage, perceived cost, top management support, complexity, compatibility, company size, customer pressure, legal pressure, and human resources have been related to the application of green supply chain management. According to Udbhav and Rishabh (2017), the largest category found is government, market factor, supplier and customer factor, internal drivers, and finally environment. Asif *et al.* (2020) Find out that government regulations, customer demand, and supplier performance as priority drivers for the adoption of green supply chain management. Following are the factors that the researcher identified from the literature and factors that were considered in this study (Asif *et al.*, 2020; Govindan *et al.*, 2020; Hendiani *et al.*, 2022; Mathivathanan *et al.*, 2017; Muduli *et al.*, 2013).

Table 2. 1 Formulation of the independent variable

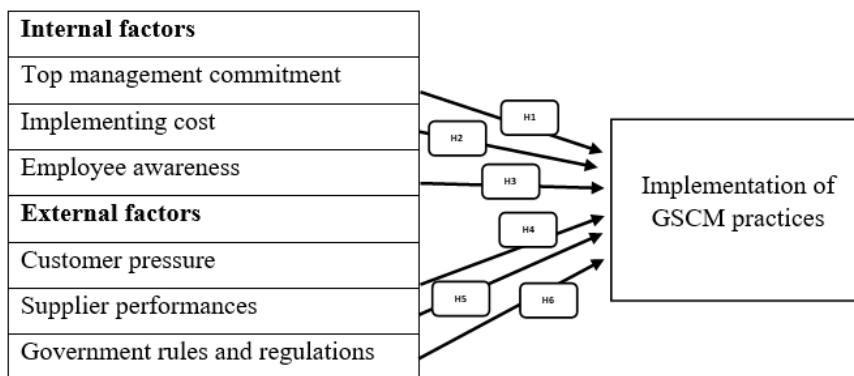
Lack of knowledge, High-cost, Lack of, information technology, Lack of government support, Lack of learning capacity, Supplier factor, Internal factor, Customer factor, Environmental factor, Market factor, etc.		Internal factors: top management commitment, implementing cost, employee awareness external factors: customer pressure, supplier performances, government rules, and regulations
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Source: Developed by the researcher

METHODOLOGY

Conceptual framework

Figure 3. 1 Conceptual framework



Source: Developed by the researcher

Research design

As the purpose of this research is to explore new knowledge, this is a basic type of research. Based on the problem statement of the research, the study will involve a deductive approach, because this study spreader from general to specific which will arrive at a rational conclusion by a logical generalization. In addition, the researcher employed a quantitative research approach, using a questionnaire as one of the tools of research, used to collect data from selected manufacturing companies. Accordingly, the researcher conducted this study by using managers who are above the functional level in manufacturing companies, in the central province of Sri Lanka. The total population was 340 managers and out of 181 were selected (As per the Morgan table) as a sample for this study. The study setting of the research was non-contrived and the researcher used a cross-sectional study to conduct this research, which means data was gathered at once. The data was gathered through a structured questionnaire and analyzed by using SPSS 21.0 software and running inferential and descriptive analysis. (ANOVA test, correlation analysis, and regression analysis)

Population and Sample

Population: The term “population” refers to the entire group of people, occasions, or interesting things that the researcher wishes to study (Sekaran and Bougie, 2016). The population of this study was the total number of managers of manufacturing companies in the central province of Sri Lanka. They have an

understanding of regarding supply chain practices of particular organizations and also central province is ranked among the first few provinces in the industrial distribution chart, according to the statistics. And all the research done in this field is implemented based on western province. That is why managers of manufacturing companies in the central province of Sri Lanka were taken as a sample of the present study.

Sample: The sample was 181 workers from 12 manufacturing companies in the central province of Sri Lanka. Because it is very difficult and impractical to collect data from all the elements in the population. If the researcher collected data from the entire population, it will bring some knowledge that is not up to date and may arise issues on the validity of the research. Also, when considering the implementation of research, some budget and time limitations may occur. Therefore, the researcher collected data from a specific sample instead of going for data collected from the whole population. Convenient sampling used to select the required number of manufacturing companies from each category and to select managerial level employees from those companies have been simple random sampling technique, because the entire population focused in the study can be categorized into mutually exclusive groups that are meaningful, appropriate and relevant in this study (Sekaran and Bougie, 2016).

In the present study can be identified the sample size of 181 managers out of 340 employees at a 95% confidence level according to the Morgan table.

Data Collection

There are two main sources for collecting data for research, namely primary and secondary sources when continuing this research, the researcher has used both primary and secondary data.

Data analysis

To achieve the purpose of this study the researcher used both descriptive method and inferential methods. Descriptive statistics are related to mean, median, and mode (central tendency) and variance, standard, and deviations (dispersion). On the other hand, inferential statistics related to multiple linear regression, correlation coefficient and ANOVA test were used to test the hypothesis. Those are relevant to this study because it uses quantitative data to describe the factors affecting the implementation of GSCM practices. And data were analyzed through SPSS 21.0 software.

RESULTS

Validity

Table 4. 1 Division of questions

Variable	Number of questions
Top management commitment	5
Implementation cost	3
Employee awareness	2
Customer pressure	3
Supplier performances	3
Government rules and regulations	4
Implementation of green supply chain management practices	11

Source: Developed by the researcher

Table 4. 2 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.804
Bartlett's Test of Sphericity	Approx. Chi-Square	2201.097
	Df	190
	Sig.	.000

Source: Output generated by SPSS 21.0

According to the above table, the KMO value is 0.804. It means that there are more than two variables because that value greater than 0.5. And also as per the extraction method: the principal component analysis's initial icon value is 1.000 and extraction values are greater than 0.5.

Reliability

To evaluate the internal consistency in this study, internal reliability was taken into account. When reliability measurement consistently yields similar results, it is means that highly reliable. A single variable is evaluated in the study utilizing several indicators, including the relationship between every sign of the same variable should be checked by the researcher. The reliability was evaluated using Cronbach's Alpha. In this case, a reliability test was run to evaluate the consistency of each variable separately. When considering the value of alpha, internal dependability is checked, and if it is greater than 0.7, it denotes an appropriate level of internal consistency.

Table 4. 3 Reliability test

Variable	Number of items	Cronbach's Alpha
Top management commitment	5	0.815
Implementation cost	3	0.773
Employee awareness	2	0.747
Customer pressure	3	0.877
Supplier performances	3	0.853
Government rules and regulations	4	0.674
Implementation of green supply chain management practices	11	0.847

Source: Output generated by SPSS 21.0

This study's internal consistency reliability, which determined that all of the questionnaire's questions can be accepted in terms of all the variables, was satisfactory, therefore it can be inferred that. The conception and operationalization of variables in this study were based on past literature. It guaranteed the accuracy of the instruments' contents and indirectly guaranteed the variables' dependability and internal compatibility.

The Rate of Respondents

The researcher has disseminated the surveys in the form of a hard copy of the questionnaire to the selected manufacturing companies in the Central Province, Sri Lanka, and also shared as a google form to one

company. Just 175 of the 182 forms in both methods were submitted were filled out correctly. Hence, 96% of respondents have responded. The researcher was able to gather more than 100 responses so it can be concluded questionnaire was normally distributed.

Demographic Profile of the Respondents

This is the first section of the questionnaire used for this study. It concerned the respondent's racial and ethnic compositions. The demographic data used in this study were gender, level of education, age, worker's present position, and working experience.

According to the analysis 50.3% were male respondents and the rest 49.7% are female respondents. And the majority of respondents are gradulators (49.1%) and the lowest responses come from O/L (3.4%). According to the age category majority of respondents were under the 26-35-years age category and the lowest represents from 46-55-years age category and no one from above 55 years. As per the position majority respondents are executive-level employees (41.1%) and the lowest number of responses come from other employees (2.9%). And highest number of employees have 6-10 years of experience (37.7%) and the lowest number of respondents have above 15 years of experience (6.9%).

Descriptive Statistics

Table 4. 4 Descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Top management commitment	175	2.80	5.00	4.4651	.56455	.319
Implementing cost	175	1.33	5.00	3.8857	.82018	.673
Employee awareness	175	2.00	5.00	3.9457	.74175	.550
Customer pressure	175	2.00	5.00	3.9695	.77085	.594
Supplier performances	175	2.00	5.00	3.7829	.75292	.567
Government rules and regulations	175	3.00	5.00	4.2243	.54343	.295
Implementation of GSCMP	175	2.18	5.00	3.7325	.59067	.349

Source: Output generated by SPSS 21.0

According to the table, descriptive analysis is used to identify the basic nature of the research study variables through descriptive statistical tools like minimum, maximum, mean, standard deviation, and variance. As per the table number of observations for each variable is 175. Implementation cost is the variable with the minimum value, it denotes 1.33 where the maximum value of all variables represents the value of 5.00 equally. The central tendency of all variables has been provided by the mean value. The highest mean value standard for (4.46) top management commitment with a 0.56 standard deviation and green supply chain management practices has the lowest mean value (3.73) with a 0.59 standard deviation.

Inferential Statistics for Hypothesis Testing

Correlation Analysis

Here is the purpose of testing the hypothesis, the relationship between dependent and independent variables were examined.

Table 4. 5 Correlation analysis

		IGSCMPF	MCF	ICF	EAF	CPF	SPF	GRRF
IGSCMPF	Pearson Correlation	1						
	Sig. (2-tailed)							
	N	175						
MCF	Pearson Correlation	.221**	1					
	Sig. (2-tailed)	.003						
	N	175	175					
ICF	Pearson Correlation	.488**	.430**	1				
	Sig. (2-tailed)	.000	.000					
	N	175	175	175				
EAF	Pearson Correlation	.531**	.298**	.528**	1			
	Sig. (2-tailed)	.000	.000	.000				
	N	175	175	175	175			
CPF	Pearson Correlation	.444**	.273**	.473**	.634**	1		
	Sig. (2-tailed)	.000	.000	.000	.000			
	N	175	175	175	175	175		
SPF	Pearson Correlation	.591**	.245**	.386**	.570**	.542**	1	
	Sig. (2-tailed)	.000	.001	.000	.000	.000		
	N	175	175	175	175	175	175	
GRRF	Pearson Correlation	.428**	.246**	.291**	.319**	.180*	.381**	1
	Sig. (2-tailed)	.000	.001	.000	.000	.017	.000	
	N	175	175	175	175	175	175	175
**. Correlation is significant at the 0.01 level (2-tailed).								
*. Correlation is significant at the 0.05 level (2-tailed).								

Source: Output generated by SPSS 21.0

Top management commitment

Table 4. 6 Correlation for management commitment

Pearson Correlation	Sig. Value
0.221	0..003

Source: Output generated by SPSS 21.0

According to the table correlation coefficient between the implementation of green supply chain management practices and top management, commitment is 0.221. Accordingly, there is a weak positive correlation between the implementation of green supply chain management practices and top management commitment. The respective level of significance of the aforesaid correlation coefficient is 0.003. Therefore, the study accepted the hypothesis on H_1 . There is a significant impact of top management commitment to the implementation of green supply chain management practices among manufacturing companies in the central province of Sri Lanka.

Implementing cost

Table 4. 7 Correlation for implementing cost

Pearson Correlation	Sig. Value
0.488	0.000

Source: Output generated by SPSS 21.0

As shown above in the table correlation coefficient between the implementation of green supply chain management practices and implementing cost is 0.488. Therefore, there is a moderate positive correlation between those two variables in considered manufacturing companies. Accordingly, the respective level of significance is 0.000 ($p < 0.05$). Therefore, the study can accept hypothesis two: H_2 . There is a significant impact of implementing costs on the implementation of green supply chain management practices among manufacturing companies in the central province of Sri Lanka.

Employee awareness

Table 4. 8 Correlation for employee awareness

Pearson Correlation	Sig. Value
0.531	0.000

Source: Output generated by SPSS 21.0

According to the results, the correlation coefficient between the implementation of green supply chain management practices and employee awareness is 0.531 (Strong positive) which is significant at 0.000. That study accepted hypothesis three: H_3 . There is a significant impact of employee awareness on the implementation of green supply chain management practices among manufacturing companies in the central province of Sri Lanka.

Customer pressure

Table 4. 9 Correlation for customer pressure

Pearson Correlation	Sig. Value
0.444	0.000

Source: Output generated by SPSS 21.0

As well as correlation coefficient for the relationship between the implementation of green supply chain management practices and customer pressure is 0.444. Accordingly, there is a moderate positive correlation at a significant level of 0.000. Therefore, the study accepted hypothesis four: H_4 . There is a significant

impact of customer pressure on the implementation of green supply chain management practices among manufacturing companies in the central province of Sri Lanka.

Supplier performances

Table 4. 10 Correlation for supplier performances

Pearson Correlation	Sig. Value
0.591	0.000

Source: Output generated by SPSS 21.0

With the results, the correlation coefficient between the implementation of green supply chain management practices and supplier performances is 0.591. Accordingly, there is a strong positive correlation between those two variables and significance at 0.000. With that, the study accepted hypothesis five: H_5 . There is a significant impact of supplier performances on the implementation of green supply chain management practices among manufacturing companies in the central province of Sri Lanka.

Government rules and regulations

XII Table 4. 11 Correlation for government rules and regulations

Pearson Correlation	Sig. Value
0.428	0.000

Source: Output generated by SPSS 21.0

The correlation coefficient for the relationship between the implementation of green supply chain management practices and government rules & regulations is 0.428 (Moderate positive correlation) as a sign at 0.000 ($p < 0.05$).

All in all, it can be concluded that there is a statistically significant correlation between the dependent variable and all six independent variables. Therefore, the study not accepted the null hypothesis: H_0 . There is no significant impact between external, and internal factors and the implementation of green supply chain management practices among manufacturing companies in the central province of Sri Lanka.

Furthermore, according to the data asset, there are no multi-collinearity problem-independent variables selected in the study.

Regression Analysis

Regression analysis was utilized to recognize the impact of independent variables on the dependent variable of this study. As per the previous section correlation is significant it is necessary to run a regression analysis.

XIII Table 4. 12 Model summary

Model	R	R Square	Adjusted R Square	Std. The error in the Estimate	Durbin-Watson
1	.691 a	.478	.459	.43438	1.729
a. Predictors: (Constant), GRRF, CPF, MCF, ICF, SPF, EAF					
b. Dependent Variable: IGSCMPF					

Source: Output generated by SPSS 21.0

According to the table R square value is 0.478. It means that 47.8% of the variation in the implementation of green supply chain management practices can be explained by selected six independent variables (Top management commitment, implementation cost, employee awareness, customer pressure, supplier performances, government rules, and regulations). As this is a social science study, this can be considered a good percentage as it is greater than 25%.

Table 4. 13 ANOVA table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	29.007	6	4.835	25.623	.000 ^b
	Residual	31.699	168	.189		
	Total	60.706	174			
a. Dependent Variable: IGSCMPF						
b. Predictors: (Constant), GRRF, CPF, MCF, ICF, SPF, EAF						

Source: Output generated by SPSS 21.0

According to the ANOVA table significance level of the regression line is less than 0.05, which means that the regression line is strong enough to explain the impact of independent variables on the dependent variable.

Table 4. 14 Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.906	.339		2.669	.008		
	MCF	-.067	.065	-.064	-1.025	.307	.793	1.261
	ICF	.168	.051	.233	3.258	.001	.609	1.641
	EAF	.117	.065	.147	1.809	.072	.472	2.119
	CPF	.031	.059	.041	.525	.600	.520	1.923
	SPF	.265	.058	.338	4.585	.000	.573	1.746
	GRRF	.210	.068	.193	3.102	.002	.799	1.252

Source: Output generated by SPSS 21.0

According to the table, the VIF value is less than 10 and also a tolerance value greater than .1. Accordingly, there is no multi-collinearity problem.

As per the regression table regression coefficient of management, commitment is -0.067 and the respective significance value is 0.307. Accordingly, hypothesis one: H₁. There is a significant impact of top management commitment to the implementation of green supply chain management practices among manufacturing companies in the central province of Sri Lanka that cannot be accepted.

Accordingly, top management commitment has not had a statistically significant impact on the implementation of green supply chain management practices among manufacturing companies in the Central province of Sri Lanka.

As well as the regression coefficient of implementing cost is 0.168 and the respective significance value is 0.002. Accordingly, hypothesis two: H_2 . There is a significant impact of implementing costs on the implementation of green supply chain management practices among manufacturing companies in the central province of Sri Lanka that can be accepted.

With that top implementing cost has a statistically significant impact on the implementation of green supply chain management practices among manufacturing companies in the Central province of Sri Lanka.

The regression coefficient of employee awareness is 0.117 and the respective significance value is 0.072. Accordingly, hypothesis three: H_3 . There is a significant impact of employee awareness on the implementation of green supply chain management practices among manufacturing companies in the central province of Sri Lanka that cannot be accepted.

Accordingly, employee awareness has not had a statistically significant impact on the implementation of green supply chain management practices among manufacturing companies in the Central province of Sri Lanka.

As per the table regression coefficient of the employee, awareness is 0.031 and the respective significance value is 0.600. Accordingly, hypothesis four: H_4 . There is a significant impact of customer pressure on the implementation of green supply chain management practices among manufacturing companies in the central province of Sri Lanka cannot be accepted.

Accordingly, customer pressure has not had a statistically significant impact on the implementation of green supply chain management practices among manufacturing companies in the Central province of Sri Lanka.

As shown in the table regression coefficient of supplier performances is 0.256 and the respective significance value is 0.000. Accordingly, hypothesis five: H_5 . There is a significant impact of supplier performances on the implementation of green supply chain management practices among manufacturing companies in the central province of Sri Lanka that can be accepted.

Accordingly, suppliers' performances have a statistically significant impact on the implementation of green supply chain management practices among manufacturing companies in the Central province of Sri Lanka.

As well as regression coefficient of government rules and regulations is 0.210 and the respective significance value is 0.002. Accordingly, hypothesis six: H_6 . There is a significant impact of the government rules and regulations on the implementation of green supply chain management practices among manufacturing companies in the central province of Sri Lanka.

All in all, it can be concluded that government rules and regulations have a statistically significant impact on the implementation of green supply chain management practices among manufacturing companies in the Central province of Sri Lanka can be accepted.

DISCUSSION ON RESEARCH FINDINGS & IMPLICATIONS

The conducted research study measured the overall impact of internal and external factors influencing the implementation of green supply chain management practices among manufacturing companies in the central province of Sri Lanka.

For this research top management commitment, implementing cost, and employee awareness are considered as internal factors and external factors are customer pressure, supplier performances, and government rules and regulations that are considered to measure the impact on the implementation of green supply chain management practices. The conceptual framework of the study has been developed based on previous literature.

Adhering to the primary objective of the study it was found that selected six external and internal factors made a significant impact on the implementation of green supply chain management practices. Although as mentioned in the literature review number of past researchers suggested that the aforesaid six factors are drivers for green supply chain management implementation. The results of this study also discovered there is a significant relationship between selected internal, and external factors and the implementation of green supply chain management practices.

As per the findings of this study, when manufacturing companies give considerable attention to factors affecting to green supply chain management and implement green supply chain management practices more effectively and efficiently the company supply chain will become sustainable. On the other hand, when managers give more attention to implementing cost, employee awareness, supplier performances, and government rules and regulations, green supply chain management practices are positively impacted by them.

According to the study, adopting green supply chain management methods can help the firm in a variety of ways. The thing is that these benefits are important not only to the organization but to society at large. In light of the research's findings, numerous recommendations can be made. The study advised the central province's manufacturing firms to have a conversation about how to include green supply chain management techniques in their regular business operations. It is essential for a better, more sustainable future. As a result, the researcher has offered several recommendations for manufacturing firms in the central province to improve their environmental performance.

As per the current research supplier performance has a crucial role in the implementation of GSCMP within manufacturing companies. So companies need to provide an important consideration on their suppliers, by establishing a proper supplier selecting process and, through developing environmentally based supplier selecting criteria companies can ensure continuous green supply chain implications from their suppliers' side as a most important tier in companies' supply chain.

Nowadays, the corporate world is evolving, from a financial viewpoint to a sustainable perspective. The obligation of companies to go green has since increased. Companies should establish a goal and mission for their green initiatives. As well, to encourage their employees to go green, companies should consider different reward and penalty systems. GSC strategies are always being matched up with business sustainability objectives by relevant companies. Therefore, it is crucial to establish a green theme in business with the objective of ongoing development and environmentally based practices.

Companies need to make sure top management is committed to implementing GSCMP. But they are over inspection is not much suitable for such practices, if they can overlook all the process it is better. And they should encourage all the stakeholders to practice green implications and they can implement different programs for communicating green practices to the general public depending on the size of the company. They also can enhance their staff members' knowledge of environmental issues by providing workshops for employees.

Currently, the pace of technological development is accelerating organizational performance. Therefore, to achieve goals like energy saving, it is important for each manager and employee should make an effort to stay connected with current technological developments.

The researcher highlighted the following recommendations for the government:

Accordingly, manufacturing companies in the central province of Sri Lanka are in need of a considerable development in their sustainability, so the government of the country must encourage public awareness and demand for green products. Funding from the government for the implementation of novel practices and spreading knowledge regarding new concepts is necessary. The success stories come from developed countries relevant to these practices, which need to be promoted vigorously. Moreover, the researcher suggests strengthening the policies, rules, and regulations relating to green practices further.

Ultimately, the study provides valuable insights into the unique factors within the central province of Sri Lanka that impact the implementation of GSCMP. This regional specificity contributes to a more nuanced understanding of sustainable supply chain practices. Also these insights can guide strategic decision making and operational adjustments. The study adds empirical evidence to the existing literature, grounding theories in the real world context of Sri Lankan manufacturing companies. This empirical foundation strengthens the validity and applicability of the findings.

CONCLUSION

The major objective of this study was to examine the factors affecting to manufacturing enterprises in Sri Lanka's central province as they adopted GSCMP. In this study, the effects of each component on the adoption of GSCMP were assessed to achieve that goal. The variable that had the greatest influence on the adoption of such a practice were also identified. The adoption of GSCM practices and implementation costs, employee awareness, customer pressure, supplier performances, as well as governmental rules and regulations, are found to be significantly and strong positively correlated. It was discovered that using green supply chain management techniques.

Additionally, this study sought to pinpoint supplier performance as the most crucial factor in the adoption of GSCMP (supplier is one of the most influential and most important tiers in a company's supply chain). There is a significant and positive association between supplier performance and the adoption of GSCMP as a dependent variable (.591). This value exceeds the values of other variables. Regression analysis also reveals that it has a significance value of .000, which is lower than that of other components. After examining the results of the two tests indicated above, the researcher has concluded that supplier performance is the most crucial factor for the adoption of GSCMP.

It is evident to conclude that demand for environmental materials for products from domestic and foreign suppliers and supplier performances regarding GSCMP significantly lead to GSCMP implementation for manufacturing companies located in the central province of Sri Lanka. With the fact that there is a significant relationship between all selected factors and the implementation of the GSCMP. But there is no significant impact on management commitment or customer pressure with the implementation of GSCMP. However, there is a significant impact on implement cost, supplier performance, employee awareness, and government rules and regulations with the implementation of the GSCMP. With that, the researcher concludes that manufacturing companies are not adopting GSCMP because of top-level management and customer pressure. Moreover, the significant impact between government rules and regulations and GSCMP implementation implies that regulatory requirements are a further requirement for adopting GSCMP. However, the researcher believes that the government needs to come up with enough rules and regulations for practices relating to the environment. And also, according to the previous discussion, employee awareness is also a determinant of the adoption of the GSCMP. It implies that they are more concerned about their employees because their ability relevant to resource integration and respond to immediate changes is necessary for such an implementation. The researcher further concludes that implementing costs are also a significant determinant for adopting GSCMP. Therefore, the analysis of the study's data produced

outcomes that added to the body of knowledge already in existence.

In reading the literature, the researcher discovered that there are numerous factors that influence the adoption of GSCMP, but the relationships and impacts vary depending on the study's context. At the same time, it can be highlighted that companies' decisions to adopt GSCMP are stimulated by both internal and external factors. As per the results of the study, it was concluded that selected factors both internally and externally stimulated organizations to adopt GSCMP. By considering these facts, organizational managers can find more effective ways to enhance the adoption of the GSCMP. By enhancing factors like employee capabilities towards green practices and creating a proper supplier selection process in order to adopt GSCMP, management and decision-makers can support more on organizational performances. Further, these practices can be used by managers as strategies for capturing new global markets. This study is like a road map for managers. Because results of the study help managerial peoples towards the lacking area to be more aware when implementing GSCMP.

According to the detailed analysis, the majority of Sri Lankan industrial enterprises in the central province have started the process of implementing the GSCMP. This shows that those businesses are more concerned about the effects of their operations on the environment. Furthermore, these insights can help managers and related companies improve their present GSCMP. Today's context foreign businesses are more focused on global sustainability actions than Sri Lanka due to the worldwide trend of being green, this is a favorable indicator for them. The researcher further believes that the study's findings will improve the adoption of GSCMP by manufacturers, suppliers, and the government.

LIMITATIONS

The study focuses on a limited sample of twelve manufacturing companies from central province of Sri Lanka. Data was collected through self-completed questionnaires and interviews with various level of personnel. Due to the small sample size and restricted factors considered, the study acknowledges limitations in its scope. The adoption of GSCMP is influenced by various factors, but the study only addresses a few, highlighting potential shortcoming in its approach. To Address this, future research could consider expanding the sample size to ensure greater representation and extending the study to other regions in Sri Lanka for a more comprehensive understanding of factors influencing the implementation of GSCMP. Additionally, applicability of the study's findings in diverse manufacturing contexts or industries would contribute to a broader understanding of GSCM challenges and opportunities. Ultimately, future research should aim to build upon the current study by exploring additional dimensions, conducting comparative analyses, and employing different methodologies. This iterative process will enrich the understanding of GSCM adoption in Sri Lanka and contribute valuable knowledge to the broader field of GSCM.

SUGGESTIONS FOR FUTURE RESEARCH

Due to the limitations of the current study, the researcher has offered several recommendations that might be useful for other studies. The researcher used a straightforward random sample approach to gather data from manufacturing firms in Sri Lanka's central area. Therefore, it is best to select the sample using specific logical methods. This survey only covered a small number of businesses in the central province. However, more researchers can expand the sample to include more Sri Lankan districts and manufacturing companies.

The work can be applied in a variety of ways in future research. For this study, only environmentally friendly supply chain management techniques were taken into account. However, there are several ways that businesses can implement green projects. It may be fruitful to consider how the idea of sustainability influences numerous facets of business and daily life, such as green production, green marketing, green accounting, green IT, etc.

The empirical findings of this study revealed several variables influencing the adoption of Green supply chain management practices. To keep away this study from becoming too complex, the researcher simply chose a few parameters. Future researchers may choose more variables for the investigations in the future.

This is a mini-map for managers to implement green supply chain management practices

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