Analysis of Factors Influencing the Implementation of Green Supply Chain Management Practices: A Case Study on A Leading Supermarket in Sri Lanka

G.H.D.D Dharmarathna

179206A

Master of Business Administration in Supply Chain Management

Department of Transport & Logistic Management

University of Moratuwa

Sri Lanka

April 2019

DECLARATION

I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or other institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text. Also I hereby grant to the University of Moratuwa the non-exclusive right to reproduce and distribute my dissertation in whole or in part in print, electronic or other medium. I retain the right to use this content in whole or part in future works. (such as articles or books).

....   …………………………

G.H.D.D Dharmarathna   Date

179206A

The above candidate has carried out research for the Masters Dissertation under my supervision.

....   …………………………

Dr.Ranil Sugathadasa   Date

Senior Lecturer,

Department of Transport & Logistic Management,

University of Moratuwa

ACKNOWLEDGEMENT

ABSTRACT

Green supply chain management (GSCM) has emerged as a one of the key approaches for every enterprise seeking to become environmentally sustainable in the entire world. At present Sri Lanka many industries have taken their initiatives to implement and adopt GSCM in to the business. Out of them super market industry is one of the major industries to be focused on. Currently there are three large scale super market chains in Sri Lanka and few more medium scale super market chains as well. "Greening" the business is the key factor of sustainable development and it will also add many other benefits to the business. Implementing GSCM is not a single task that only the subjected company can deal with. It is linked with each and every stage of the supply chain life cycle from row materials to the end of life of product. GSCM is a process to be implemented with a proper and monitored plan and there are many factors to be considered. Adoption of GSCM in super markets is a challenging process which should be implemented along with many other parties such as suppliers and customers. This research is focused on implementing GSCM in one of the leading supermarket chains in Sri Lanka and the factors influencing the implementation of GSCM is discussed. Also the relevant recommendations are proposed to lead for a successful implementation.

TABLE OF CONTENTS

Table f Figures

List of Tables

LIST OF APPENDICES

ABBRIVIATIONS

CP -Customer Perception

EP -Employee Perception

FC -Facilitating Conditions

GSCM -Green Supply Chain Management

MC -Market Competition

TMS -Top Management Support

CHAPTER 1. INTRODUCTION

Environmental business practices and green production practices have become a very popular theme in the entire world. During the last three decades the theme of environment preservation has become a main topic on many political, social and economic debates. Green supply chain management (GCSM) one such popular topic which has emerged as a vital organizational philosophy to reduce environmental risks. As Gilbert (2001) states, "greening the supply chain is the process of incorporating environmental criteria or concerns into organizational purchasing decisions and long-term relationships with suppliers". This concept is still new to Sri Lanka and some of other Asian countries. But it should be promoted in Sri Lanka and also make companies believe it to be a worth full and genuine strategy of the organization as a responsible corporate citizen. Most of the countries, which are developing and developed, tend to promote GSC practices as a solution for environmental problems rise in their countries. This research makes effort to promote the GSCM concept in Sri Lanka which is based on a leading locally renowned supermarket in Sri Lanka.

1.1 Research Problem

Facing the emerging environmental problems and severe business competition, super market chains in Sri Lanka have recognized the importance of implementing "Green" concept in their business and to provide a "Green" service to their customers. At present the number of consumers getting the service of super markets is increasing rapidly and in parallel the effect on environment from this business is also increasing. GSCM is the best solution to minimise the environmental damage causing from the business. When implementing GSCM in companies there are many facts to be considered and this research is intended to identify the factors to be considered when implementing GSCM. Also, the government of any country implement many rules and regulations over every business segment to minimise the environment pollution in the country and as an industry super markets also have to adhere them. In order to comply

with them companies have to change the business model and motion and for that it is very important to identify the market specific supply chain practices and the factors influencing when introducing them.

1.2 Research Objectives

The research was carried out based on the objectives listed below,

- To identify market specific green supply chain strategies for super markets.
- To identify the internal factors influencing the implementation of GSCM
- To identify the external factors influencing the implementation of GSCM
- To identify the blocking issues of implementing GSCM

1.3 Research Methodology

Research methodology is one of the processes in a research life cycle which gather and analyze data and information for the purpose of making decisions (research methodology. Business Dictionary.com). Methodology includes the methods and principals used in the research. It describes the available research methods and the selected research methods for the study with the selection criteria. Furthermore, the methodology describes the sources of data collection methods and analytical techniques which are used to analyze the collected data.

1.3.1 Research Design

"A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure" (Batcha, 2017). It reflects the conceptual structure on which the research is based and also it constitutes the blueprint for the collection, measurement and analysis of data. The research design includes an outline of research hypothesis and its operational implications to the final analysis of data.

In this research a combination of two research designs are used. The selected two are descriptive and correlational. The descriptive design describes characteristics associated with the population while correlational design assesses associations

among different variables. The choice of design was to quantify the effects of the characteristics of the population as most of the information was not available. The correlational design will describe the associations among different variables identified in the conceptual framework in order to determine which were the most important factors affecting the implementation of GSCM. In this research to analyze the factors influencing the implementation of GSM researcher must study the environment and it is directly facilitated by the descriptive design. According to the background analysis majority of the variables are non-quantified and to analyze such data set from a representative sample the descriptive design can be used. Also, this design provides the opportunity to integrate the qualitative and quantitative methods of data collection.

1.3.2 Research Categories

According to the existing literature there are two main researches such as qualitative and quantitative. The research category should be decided based on the research questions and its objectives and aims.

1.3.2.1 Quantitative Research

Quantitative research is an approach used for testing objective theories by analyzing the relationships among variables and it is based on collecting numeric data and analyzing them using counting and statistical methods. It is used to quantify opinions, behaviors, attitudes, and other defined variables and to find out results from a larger sample of population.

1.3.2.2 Qualitative Research

Qualitative research is a type of an exploratory research mostly used to understand the reasons, motivations and opinions of the subjected research scope. It also provides insights into the problem and facilitate to develop ideas or hypotheses.

By considering the advantages and disadvantages of both the concepts the researcher decided to use a mixed method of both in this research. Following a mixed method can help to get in-depth knowledge of the subjected research area and allow

generalizing of research results. At the analysis the quantitative data was analyzed first and the qualitative data was used to prove and investigate the quantitative result findings. According to the research scope the proposed theoretical framework is analyzed on quantitative methods and the "factors" or the reasons are analyzed based on qualitative methods.

1.4 Structure of the Thesis

Chapter 2 is dedicated to review the existing literature pertaining to GSCM adoption in super markets and other related industries. Also, it describes the existing practices of GSCM in the world as well as and in Sri Lanka.

Chapter 3 describes the theoretical framework used in this research and the hypotheses developed based on it. This chapter will resent the methodology and the theoretical framework used for this research.

Chapter 4 describes the procedure and results of the measurement scale analysis. The outcomes of descriptive data analysis and hypotheses testing are presented and all identified relationships in the theoretical framework is analyzed.

Chapter 5 describes the findings of the research and the areas discussed under research objectives. Based on the results relevant recommendations are provided in order to enhance the implementation of GSCM practices in the company

1.5 Limitations of the Study

This reserch is based only upon the perspective of internal employees and there is a room to expand the research by combining external stake holders with the subject. Also, GSCM is a vast subject scope and it is applicable to each and every industry in the world. In this study the scope is limited only to super market industry and also due to time and resource constraints the desired population is limited to only one super market chain in Sri Lanka.

CHAPTER 2. LITERATURE REVIEW

2.1 Introduction

At present environmental pollution is a critical problem that the entire mankind suffers from. Environmental pollution can be further described as air pollution land pollution and sound pollution. Global warming is another main problem that has to be addressed by entire population of the world. Supply chain management is a vast subject area which is highly coupled with day to day life of people. As an industry supply chain management has a great responsibility of minimizing environmental pollution and addresses this global hazard.

At past the main focus of supply chain management had been on cost and efficiency, with the most emerging topics of waste and environmental consequences the topic of GSM now incorporates the entire supply chain "with a full range of expertise in prevention and mitigation of environmental issues, as well as reducing the liability of the manufacturing firm". (M. Nelson, Marsillac & Rao, 2012).

2.2 What Is GSCM?

Green supply chain management (GSCM) is an emerging subject area which is attached with traditional supply chain management practices and has been evolved since 1990 creating a competitive market for "green" adoption. GSCM leads businesses to become more environmentally sensible and to behave in an "ethically and socially" responsible way in their entire supply chains. (Chin, Tat & Sulaiman, 2015) GSCM has drawn the attention of academics and practitioners to reduce the waste in production and delivery and ensuring the quality of the product during the entire life cycle of the product and preserve natural resources. GSCM also leads to prevent environmental pollution in the subjected industry.

GSCM is defined by many researches in many aspects. Basically, it sounds as incorporating "green" concept into SCM practices. Along with GSCM remanufacturing and Eco-efficiency processes are now considered as important assets

for a company to achieve best practices of SCM. "Green supply chain management can be defined as the integration of environmental thinking into supply-chain management, including the process of product design, material sourcing and selection, manufacturing processes, delivery of the final product as well as end-of-life management of the product after its useful life". (Chin, Tat & Sulaiman, 2015).

As Srivastava explains (2007) GSCM can be defined as "integrating the strategies of environment protecting in to supply chain. It includes the designing of products, the material purchasing and selection, the process of production and manufacturing, the delivery of the products and manager of product waste". (Srivastava, 2007).

As Ninlawan explains "Supply chain management (SCM) process is to perform cooperation and coordination among a complex network of interrelated activities involved from the production to distribution a finished product to the customer" (Ninlawan et al., 2010). According to Fortes SCM is a process in where the raw materials of a product are transformed into final outcome and delivered to the consumer at the end. (Fortes, 2009, p: 51).

Entire product life cycle is influencing the supply chain's environmental considerations. A supply chain network is a process which consists of many parties such as manufacturer, distributor, retailer, wholesaler, supplier, customer, and etc. who are direct or indirect the company, in producing and delivery products or services to end-users. As Chopra and Meindl describe "a typical supply chain processes includes the following five stages such as component/raw material suppliers, manufacturers, wholesalers/distributors, retailers and customers." These five stages are interconnected through flows of products, money & information. According to Chandra & Kumar managing a supply chain network is not an easy task and challenging since it involves various sub-systems, relationships, operations and activities. (Chandra & Kumar, 2000).

GSCM does not only pay attention on protecting the environment during the life cycle of supply chains but it also pays attention on adopting the supply chain to environment. The complete concept of "green supply chain" (GSC) has been

proposed by the Manufacturing Research Consortium (MRC) of Michigan State University in the U.S. in 1996, with the intention of comprehensively examine the environmental impacts and resources optimization of manufacturing supply chains. It describes how the climate changes should be taken in to consideration with in supply chains and also it further proposes the responsibilities of private and public sector when adopting to climate changes. According to their findings "supply chains should build climate resilience in partnership with communities in ways that are mutually supportive and also governments need to consider how best to promote, catalyze and channel private sector innovation and expertise to support green economy solutions to long-term climate resilience in the communities most vulnerable to climate impacts. (Adapting for a Green Economy: Companies, Communities and Climate Change, 2011)."

According to Srivastava (2007), "Green Supply Chain Management is growing in importance and driven by increasing environmental degradation, diminishing natural resources, and rising pollution levels. As such, Green Supply Chain Management is based on various environmental criteria interlinking with supply chain stages that both stem from and interact with all suppliers along the chain." (Srivastava, 2007).

2.3 Current level of Adoption of GSCM in the World

GSCM has become one of the latest trends in supply chain management evolution. Also due to the market competition and competitive reassure it has become of the most immerging topic for every industry throughout the entire world. (M. Nelson, Marsillac & Rao, 2012).

According to the Ten Principles introduced by the United Nations "Global Compact businesses should support a precautionary approach to environmental challenges; undertake initiatives to promote greater environmental responsibility; and encourage the development and diffusion of environmentally friendly technologies." ("The Ten Principles | UN Global Compact", 2019).

2.4 Super Market Industry in Sri Lanka

The concept of supermarkets was initiated in Sri Lanka with the initiative of Cargill's and Millers, which was during the colonial period of Sri Lanka. Supermarkets were initially started in the 1980's but during the past few years the super market industry of Sri Lanka has undergone and explosive growth. At present, the supermarket industry is at its industry's growing life cycle stage. (Wanninayake & Randiwela, 2007).

There are several chains of supermarkets operating in Sri Lanka and most of them are owned by the private sector. They are expanding with the direction of entering to the rural markets. During the past three years super markets are being expanded all over the areas outside the city limits. This was expanded along with the factors like the emergence of a new social circle of rich people in outside of urban. areas and the newly acquainted life styles of people requiring them such developed services. Due to the massive demand, super markets are expanding their network covering the entire country. (Wanninayake & Randiwela, 2007). Also, with free economical concepts the life style of Sri Lankans is following the western culture and the traditional grocery concept is changing to "mega stores". Super markets offer a wide range of products under one roof and they are using many promotional campaigns which attract consumers more into mega stores.

Customers belong to the upper and upper middle-class income earnings are more likely to shop at super markets. Also, they demand high quality products at reasonable prices and out of the majority shop at super markets are "brand" conscious and that has made the consumer to always visit super markets. Also customers are willing to have comfortable shopping experience rather getting tired on shopping.

There are many supermarket chains and some of them are Cargill's Ceylon Plc., Keels, Arpico, Laughs, Sun up and etc.

2.5 Current level of Adoption of GSCM in Sri Lanka

According to the research findings of literature based on the manufacturing industry of Sri Lanka it states that at present most of the manufacturing companies pay their attention on almost all processes and practices of GSCM and also most of the companies have commenced implementation. Furthermore, it describes that the time taken for the adoption is comparatively high in Sri Lanka than in Chinese and Japanese contexts. But the current level of adoption is satisfactory when comparing with the same contexts and the researcher further explains that the current adoption level creates good market for Sri Lankan manufacturing industry since global attention is higher on eco-friendly concepts than Sri Lanka. (Jayarathna,2017).

2.6 Factors influencing on GSCM

According to Hwa and Nunesetal, "there are three elements which may influence green supply chain: environment, strategies and logistics. Moreover, green productivity needs to build a triple focus system which includes environment, quality and profitability in order to implement sustainability strategy". (Hwa, 2001; Nunesetal, 2004).

According to a study carried out in Taiwan it has identified some barriers implementing green concepts to their supply chain due to following reasons.
"Most companies, especially the small- and medium-sized companies (SMEs) hesitate to implement environmental principle related strategies because they cannot adequately determine the economic risks."
"The high-level managers in many SMEs are just beginning to emphasize the environmental issues; however, they are short of human resources and budgets to address environmental concerns."
"the absence of an approach and methodology for incorporating environmental issues into this decision."
For most of the companies there is no updated method of analyzing and evaluation of suppliers. (Lu, Wu, & Kuo,2007).

According to a research carried out based factors affecting GSCM in food and beverage sector in New Zealand by Dr. Howard Frederick it describes the absence following factors influencing the implementation of GSCM. They can be stated as , "Explicit environmental strategy and planning tied to clear objectives consistent with vision and mission, people management and company culture characterized by employee awareness, knowledge, skills, and expertise brought about through organizational learning complemented by an adequate rewards system and strong collaboration and trustful communication with members of the supply chain toward the goal of integrating suppliers into the production process and rationalizing the supply chain." (Frederick, Howard & Elting, 2013).

Environmental strategy of any institution should be well planned and a company should have a clearly defined environmental objectives and goals. Also, the company vision and mission should be revisited and modified in a way it can achieve the goals of environmental preservation. (Frederick, Howard & Elting, 2013).

Furthermore, the researcher describes the implementation of GSCM is influenced by several other concerns such as the attitude of public related to environmental concerns, motivation of the internal staff, reasons of marketing GSCM in the company, the amount of cost saving gains to the company and the new trends and patterns of sales exploitations. (Frederick, Howard & Elting, 2013).

Top management commitment is a key fact that many researchers points out. According to the examples presented the flat management structure has facilitated the implementation of GSCM other than the traditional structures of managing. The quick decision making and flexibility of top management are the key facts to consider. Also, according to many researchers, the absence of systematic approach and the inconsistency of processes handled by the internal staff bring down the efficiency of achieving the goal. A company should value GSCM and the top management should pay their direct attention on it. In some examples voluntary staff is the only driving force of this and it is just another consideration to the top management. Marketing considers GSCM as only another necessity to develop an environmentally-friendly brand image. The presence of such situations led down the continuation of

implementation the process of implementing GSCM. This observation is supported by the literature and states that top management support directly become a healthy factor of implementing GSCM. (Lee and Rhee, 2007), (Jesús, Beatriz & Mónica, 2008), (Daily and Huang, 2001), (Miller, 1997). (Frederick, Howard & Elting, 2013). Also, a research carried out based on the factors influencing the implementation of GSCM in Vietnam agricultural industry it has identified that the commitment of the management has a significant positive impact. (Pham & Khuyen. 2017).

People management is another key fact is being discussed related to the subject. The extend of awareness related to GSCM is very important and every employee should be skilled to manage the practices of GSCM. Implementing of GSCM should be incorporated in the company vision and mission and this could be used to drive the staff. Absence of proper driving forces and lack of knowledge of staff may "not just lead to lose the direction but also to inadequate exploitation of competences of staff members". (Jesús, Beatriz & Mónica, 2008). The staff participation on the process can be facilitated trough using methods like competitions, and feedback and by giving them the feeling of that they are part of the process of really introducing a difference to the company. The staff should be trained not only to practice the "Green" at the company but they should be trained in a way to include those practices into their behavior and practice them at home and also during their day to day activities other than in the office environment. From this the mindset can be changes and it can get the real commitment of staff and can create a self-driving force among themselves. (Govindarajulu and Daily, 2004). (Pham & Khuyen. 2017).

Supply chain relationships and collaborations of supply chain is another key fact described in literature. There should be policy stating the relationships with the stakeholders of the company supply chain and necessary compliances should be included with in the policy to make the supply chain "Green". Operations such as packaging and storage should be coupled with green practices. (Frederick, Howard & Elting, 2013).

According to the literature business networking can be stated as another key fact to be considered when implementing GSCM. Practitioners of GSCM believe that

talking and sharing knowledge with other companies even from different industries helps to face the challenges of implementing and maintaining GSCM in institutions. (Frederick, Howard & Elting, 2013).

GSCM is not a task which can be implemented individually as a nation it should be facilitated. Infrastructure of the country should facilitate the industries to go "Green". Other supported industries such as waste management and recycling should be implemented and developed as industries to facilitate the individuals. (Frederick, Howard & Elting, 2013).

The use of new technology is another key fact that influence the implementation of GSCM. According to a research based on agricultural industry it has revealed that the usage of science and technology can result a higher performance of implementing GCSM. (Pham & Khuyen. 2017). The fact is supported by Kamolkittiwong & Phruksaphanrat (2015)'s in their research based on factors influencing the implementation of GSCM in Electronic Industry. Technology can reduce the cost of production and improve the product quality of the brand. Also, IT can bring down the environmental impact to a minimum level and restrict the effect of hazardous substances and polluted waste which directly affect human health.

Consumer awareness is another fact that has been discussed in GSCM implementation. Consumers with high awareness of the topic will efficiently participate the process and by themselves they will promote the culture. (Pham & Khuyen. 2017).

Knowledge and experience of the participants has a direct impact on the success of the entire GSCM process. (Holt,2009). The policy makers and practitioners are facing lots of troubles due the absence of comprehensive understanding and this will lead the addressing of wrong issues and sometimes discouraging of healthy factors. (Wibowo, Handayani & Mustikasari, 2018)

2.7 Processes of Green GSCM in Super Market Industry

As explained in the definition of GSCM there are underline sub processes.

2.7.1 Green Design

Green design is used widely in the literature to describe the designing of products along with environmental preservation considerations. "It is the systematic process of addressing the design issues associated with environmental safety and health over the full product life cycle during new production and process development" (Fiksel 1996). "Its scope encompasses many disciplines, including environmental risk management, product safety, occupational health and safety, pollution prevention, resource conservation and waste management." (Fiksel 1996). Green operations should be incorporated to each and every aspect related to product manufacturing, usage, handling, logistics and also for waste management once the design is finalized.

2.7.2 Green Manufacturing

As Lund explains "Green manufacturing aims to reduce the ecological burden by using appropriate material and technologies, while remanufacturing refers to an industrial process in which worn-out products are restored to like-new condition" (Lund 1984).

2.7.3 Green Procurement

In production sites the amount of purchasing row martials represent big numbers and it will directly affect the quality of the product. Green procurement means that the martials that are being purchased and the suppliers of the business have to follow environmental healthy processes and products. That will lead the producer to deliver environmentally friendly products. (Ninlawan et al., 2010). Green purchasing involves the tasks of reduction, recycling and reuse of materials during the processes of purchasing.

There are many reasons for which industries adopt environmentally friendly purchasing practices and Huang (2001) describes them as follows, (Huang, 2001)

"Responding to customer interest in environmentally friendly products and practices,

• Distinguishing a company and its products from competitors,

• Pursuing cost savings. The general green purchasing principles consist of three primary principles (APO, 2001):

• The first principle is to ask buyers to consider the environmental impact of a product at all stages of its life cycle.

• The second principle recommends that buyers assess the overall environmental quality of manufacturers in terms of their environmental policies, management systems and overall performance.

• The third principle encourages buyers to collect as much environmental information as possible when purchasing products." (Huang, 2001).

2.7.4 Green Distribution

The main activity in the supply chain is the production planning and distribution (Lee and Kim, 2000). Green distribution describes the practices and methods used to distribute the product in an environmentally friendly manner by reducing the wastage during distribution. Packaging and transport methods used should not add any harm to its environmental values.

2.7.5 Green Marketing

It is not only manufacturers and suppliers are responsible to develop and supply products in an environmentally friendly manner into the market. "Companies also badly need ecologically minded consumers or buyers who place a priority on

purchasing green products. In other words, green companies need green markets"
(Koshibu, 2001).

As an industry currently super markets are trying to adopt green supply chain
practices under the above discussed processes though it has not been widely
discussed in Sri Lanka.

CHAPTER 3. RESEARCH METHODOLOGY

3.1 Introduction

This chapter explains research framework and principles followed inside the study, and the reasons based on developing the specific framework.

3.2 Theoretical Framework

According to the described literature main factors affecting the implementation of GSCM were list down for further analysis within the subjected scope of the research. The following theoretical framework is used. (Figure 3.1)

Figure 3.1 Theoretical Framework
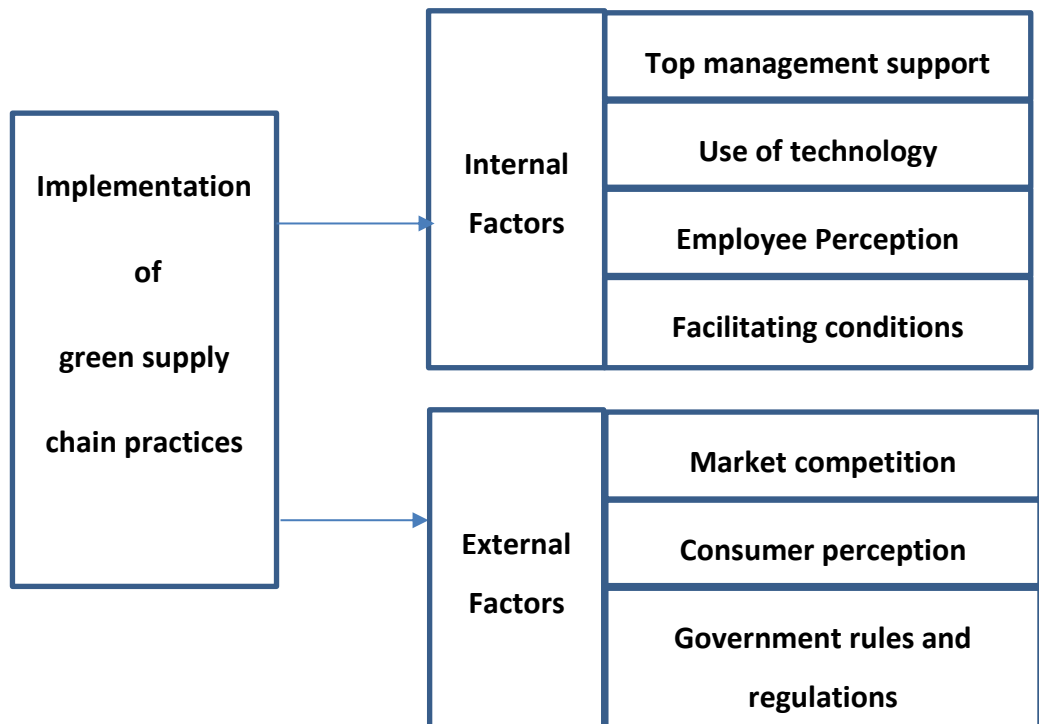
The proposed independent variables are listed below.

Top management support – The level of the support provided by the top management and the level of need of the top management of implementing GSCM

Use of technology – The level of usage of technological advances with related to the implementation of GSCM

Employee Perception – The view of employees with related to the implementation of GSCM and also the way how employees participate the implementation process.

Facilitating conditions - The level of impact from other facilitating conditions for employees to implement GSCM and to drive the process.

Market competition - The impact of marketing and implementation of GSCM by other competitors in the industry and the amount of pressure the has to be faced since competitors.

Consumer perception – The view of consumers with related to the implementation of GSCM and up to what extend they have adopted green purchasing and how they value the concept of GSCM.

Government rules and regulations – The level of Impact of rules and regulations introduced by the government and other professional bodies and the level of impact from developed polices inside the country as well as in the world with related to GSCM

3.3 Hypothesis

The direct relationships are the key construct hypothesis in the research model. According to the figure 3.1 there are seven main hypotheses which address the relationships of independent variables. All the following hypotheses are developed based on the perception of employees working in outlets of the selected sample.

H1. Market competition will have a positive impact on implementing GSC practices in super markets.

H2. Employee perception on customer acceptance of GSCM will have a positive impact on implementing the same.

H3. Government rules and regulations will have a positive impact on implementing GSC practices in super markets.

H4. Top management support will have a positive impact on implementing GSC practices in super markets.

H5. Employee Perception on the subject will have a positive impact on implementing GSC practices in super markets.

H6. Facilitating conditions will have a positive impact on implementing GSC practices in super markets.

H7. Usage of new technology will have a positive impact on implementing green supply chain practices in super markets.

3.4 Sampling Techniques and Procedures

Random sampling method is used to figure out the research sample. This research collects data from employees who belongs to the operational staff and who belongs to the executive staff of the company.

Due to the time and resource constraints the sample is restricted to the western province. There are 946 operational staff and 310 executive officers working in the outlets and head office located in western province.

According to the Krejcie and Morgan Table (KENPRO, 2012) the sample size can be calculated as274 of operational staff and 175 of executive staff.

CHAPTER 4. ANALYSIS

4.1 Introduction

This chapter presents the analysis and results of quantitative and qualitative data collected via the distributed questionnaire. The analysis consists of three main areas such as descriptive data analysis, hypothesis testing and qualitative data analysis and statistical methods used during the analysis along with calculated results are described.

4.2 Overview of Data Collection

A questionnaire survey was conducted among the participants of the selected sample and the sample consisted two categories the operational staff and the executive staff. This questionnaire was followed with an information sheet and a consent from for participants along with contact details of the researcher. It was distributed among employees to provide answers. As explained in chapter 3 the questionnaire was mapped according to the theoretical framework discussed. All constructs were measured using a likert-scale with four elements. The responses for the questions were arranged as follows 1-Strongly Agree ,2-Agree,3-Disagree ,4- Strongly Disagree.

4.3 Data Screening and Management

Survey results depend on the effort and the attention of the participants when completing the questionnaire and there is no way to guarantee that all respondents complete the survey thoughtfully and effort fully even if all the relevant instructions were provided. Identifying the responses which fail to increase the rigor of analysis is very important. The concept of data screening is the way to remove unreliable responses. Data screening is defined as a fundamental task in data analyzing. Before the analysis process a pre-data, analysis should be conducted using the row data collected. (DeSimone, Harms & DeSimone, 2014). There are some major reasons to implement data screening as a mandatory process in data analysis. They are to

investigate the accuracy of collected data, to identify and fix the outliers, treat missing values and to figure out response set issues.

4.4 Missing Data Management

Within social researches missing data can be a main problem that should overcome. Therefore, before the analysis starts the method of missing data handling should be defined. There are several ways of treating missing data such as removing the case and replace with mean. In this survey any responses with missing values were ignored and discarded. According to statistical theories missing values will cause problems when analyzing the data using techniques like Structural Equation Modeling and Goodness-of-fit-index. As mentioned, 449 questionnaires were distributed and there were 14 cases where the questionnaire had been filled by inappropriate respondents and such cases were removed from the data set. Also, there were some scenarios where the respondents have missed a page or have ignored most of the questions in questionnaire and those cases were also removed. As such data was examined and missing data was removed.

4.4.1 Outliers Screening

"An outlier is an observation that lies an abnormal distance from other values in a random sample from a population". ("AP Statistics Flashcards | Quizlet", 2018) Outliers can be present due to incorrect data entry, failure to indicate coding for missing values, case does not present from the intended sample and the sample distribution may deviate from normality. There are two types of outliers, they are univariate outliers which describes the outliers associated with single variable and multivariate outliers which describes outlier values appear as a combination of values from number of variables. In a study based on factor analysis outlier screening based on these two methods is mandatory. In this study to check outliers residual analysis was used (Tabachnik & Fidell,2007). In order to check univariate outliers the mean composite for each variable was created and standardized. A Tabachnick explains standardized values which exceed the absolute value of 3.29 are considered as outliers

(Tabachnik & Fidell,2007). With the results generated with related to this study it was revealed that there are no outliers present in the data set. Multivariate outliers were tested using Cook's distance value. Using SPSS the values were generated and values with the distance value above 0.0069 were considered as outliers. By analyzing the data set it was revealed that there are no cases subjected to multivariate outliers.

4.4.2 Investigate Univariate Normality

Normality refers to the shape of the data distribution. Checking the normal distribution of the variables is important to proceed the analysis. Normal distribution of the data can be checked either graphically or statistically. In this study the Pearson's skewness parameter is used to validate the statistical normality and visual check of histogram is used to check the graphical normality. From the results of visual assessment of the generated histograms using SPSS demonstrated that the shape of all variables are reasonably usual and acceptable. Additionally, all the values calculated for variables with related to skewness are within the acceptable range of (-2.25 to +2.58).

4.5 Descriptive Statistics

Descriptive data analysis describes the background information of developed research model. Several factors such as gender, age and experience of employees are measured using few questions in the questionnaire.

4.5.1 Demographic Factor Analysis

The following section provides a general overview of age, gender, education level and experience level distribution of employees in the desired sample.

4.5.1.1 Experience analysis of executive staff

Experience of executive staff can add a big value for the process of implementing GSCM in outlets. According to the selected sample there is a mixed distribution from 0 to 25 years. The majority represents the group of 11-15 years in

the company. There is mostly similar observation in categories of 0-5 and 16-20 years. From the entire sample of executive staff, the majority of 59.65% have more than 10 years of experience in the company and that can be considered as an asset for the implementation process of GSCM. (Figure 4.1)

Figure 4.1 Experience distribution of executive staff
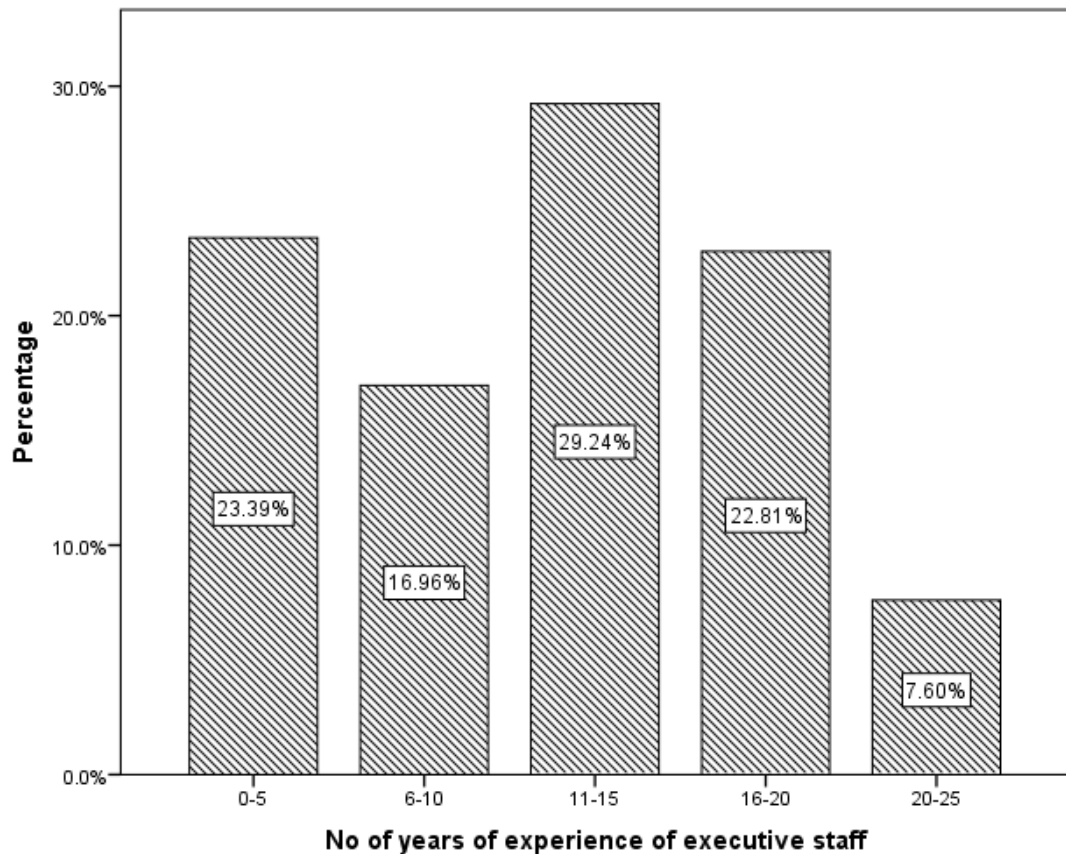
(Compiled by researcher using survey data)

4.5.1.2 Gender analysis of operation staff

Gender distribution among the operational staff is highly unbalanced. The majority represents the females which is 70.34% from the entire sample. This appear as a delaying factor since currently it is one of the main problems in outlets when performing heavy tasks related to daily operations as well. (Figure 4.2)

Figure 4.2 Gender distribution of operational staff
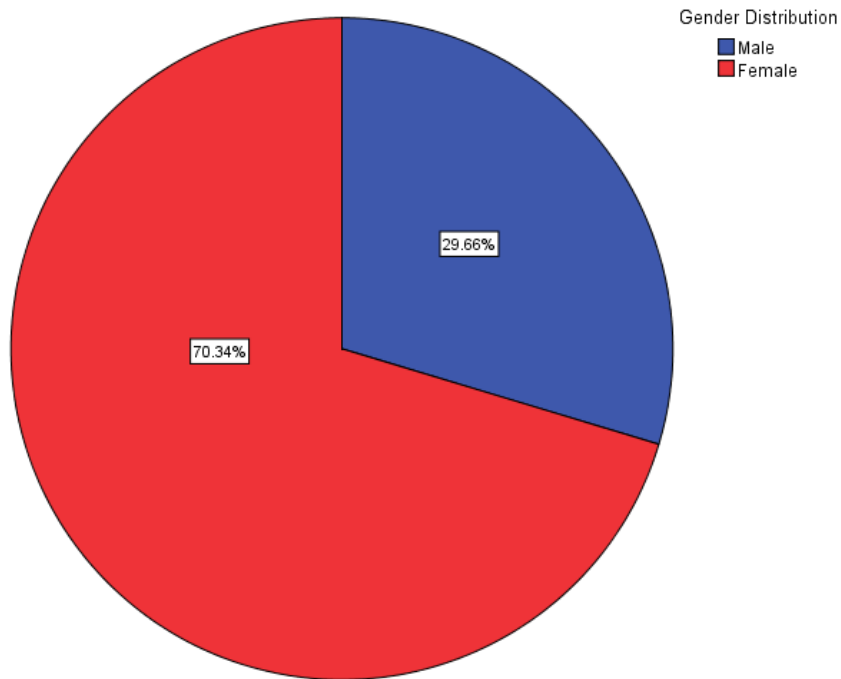
(Compiled by researcher using survey data)

4.5.1.3 Education Level Analysis

The education level of the operational staff distributes among three categories. The majority has educated up to advanced level and they represent 70.72% from the entire sample. The second highest raise their highest qualification as ordinary level and there are 4.56% of operational staff who has followed a diploma course after the AL examination. (Figure 4.3)

Figure 4.3 Education level distribution of operational staff
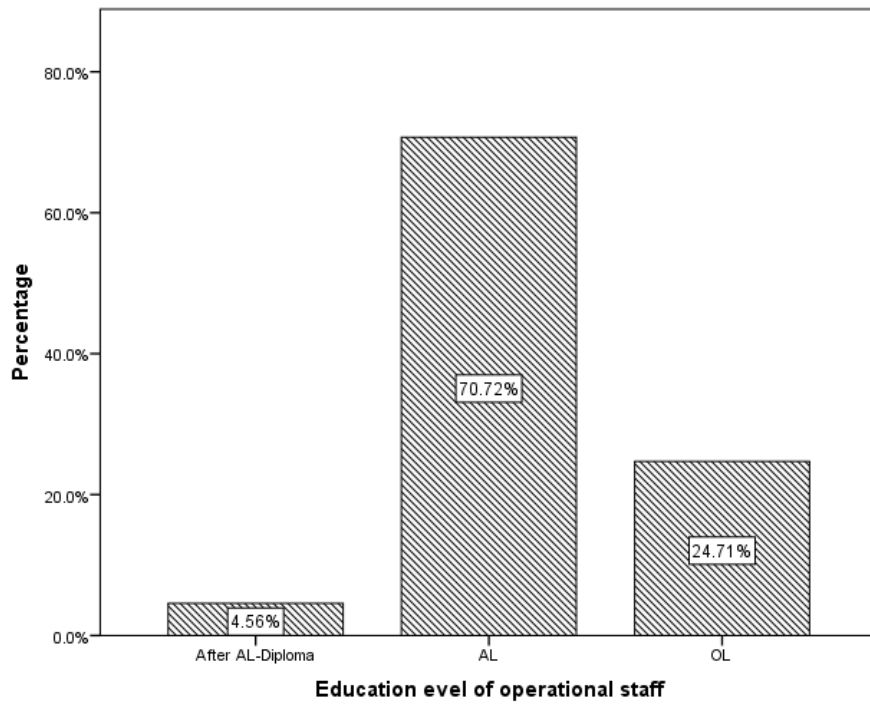
(Compiled by researcher using survey data)

4.5.1.4 Age distribution of operational staff

As figure 4.4 describes the age distribution of operational staff lies from 15 to 35 years. The majority represents 54.37% from the entire sample which falls on 21-25 years of range. It is clearly explained that 93.16% of operational staff is below 30 years of age.

Figure 4.4 Age distribution of operational staff
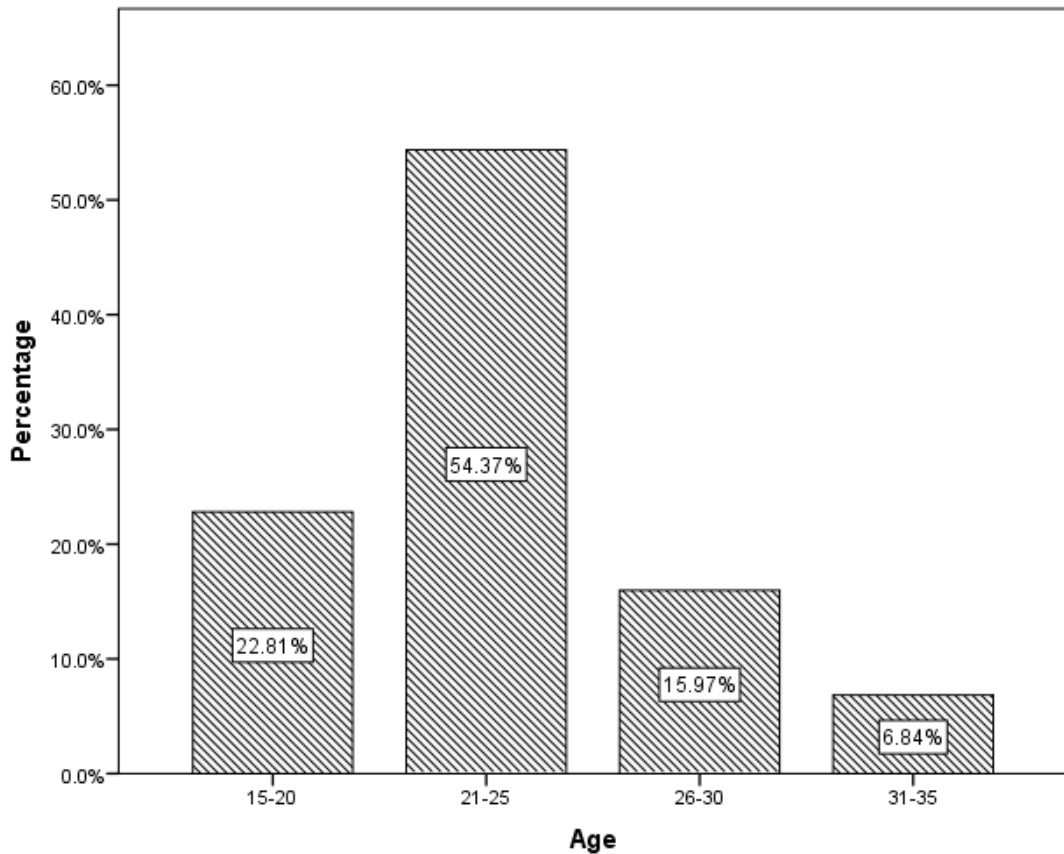
(Compiled by researcher using survey data)

4.5.2 Job Category Analysis

There are two major categories of employees in the supermarket chain such as operational staff and executive staff.

The job category distribution of operational staff can be described as follows (Figure 4.5). Out of the sample maximum of operational staff belong to the category of Cashiers which represents 40.91%. The second largest category of operational staff is attached to grocery section which represent 25.00% from the entire sample. The minimum percentage of operational staff is allocated to butchery which is 4.55% from the same. Similarly, 25% of operational staff is allocated to grocery while 15.91% is attached to fresh food section. Form this analysis it can conclude that customers meet

45.46% of operational staff before they move the cashier and there are 54.54% of operational staff who meet the customer at cashiers.

Figure 4.5 Job Category Distributing of operational staff
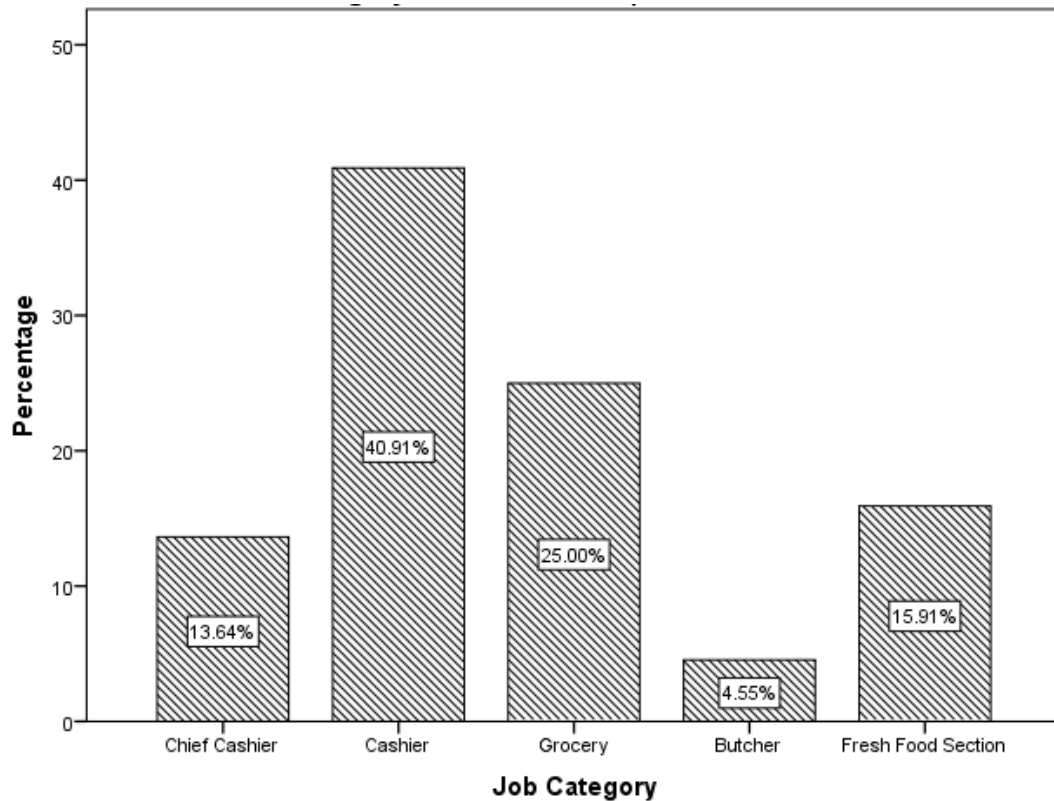
(Compiled by researcher using survey data)

4.5.3 Awareness on GSCM

The awareness of GSCM was tested among the operational staff and the main intention of the researcher was to test whether the staff is aware about the concept or have ever heard about such concept. Out of the responses received it was identified that majority of the operational staff is not aware of this concept which represents 64.38% from the entire sample. Only 35.62% is aware about the subject as a concept. (Figure 4.6)

Figure 4.6 Awareness of GSCM
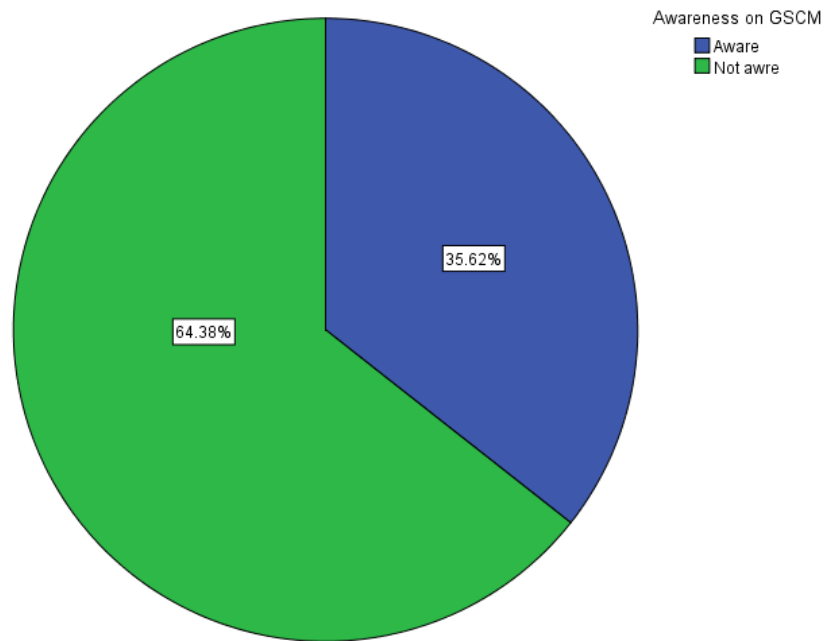
(Compiled by researcher using survey data)

Then the operational staff were asked whether they have received any training on GSCM and the majority which is 66.16% from operational staff has replied as they have not received any training.

4.5.4 Attitude on creating an environmentally friendly environment at outlets

Both the operational staff and the executive staff were asked whether they believe that an environmentally friendly environment can be created at the outlet. From the two staff categories over 93% believe that environmentally friendly outlets can be created which consists of 93.18% of operational staff and 97.37% of executive staff. Out of the unfavorable responses operational staff represents 6.82% and executive staff represents 2.63% of staff members. When comparing both staff categories the unfavorable rate is higher in operational staff which represents the majority from the entire sample than the same in executive staff. The following two figures (Figure 4.7 and Figure 4.8) represents the graphical presentation of mentioned data.

Figure 4.7 Motivation to create green environment -operational staff

Operational Staff

Can create
Can not create

6.82%

93.18%
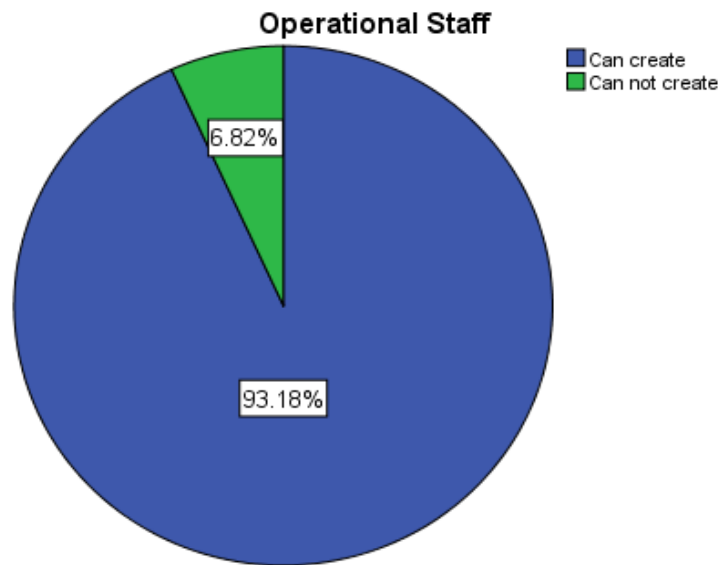
(Compiled by researcher using survey data)

Figure 4.8 Motivation to create green environment -executive staff

Executive Staff

Can create
Can not create

2.63%

97.37%
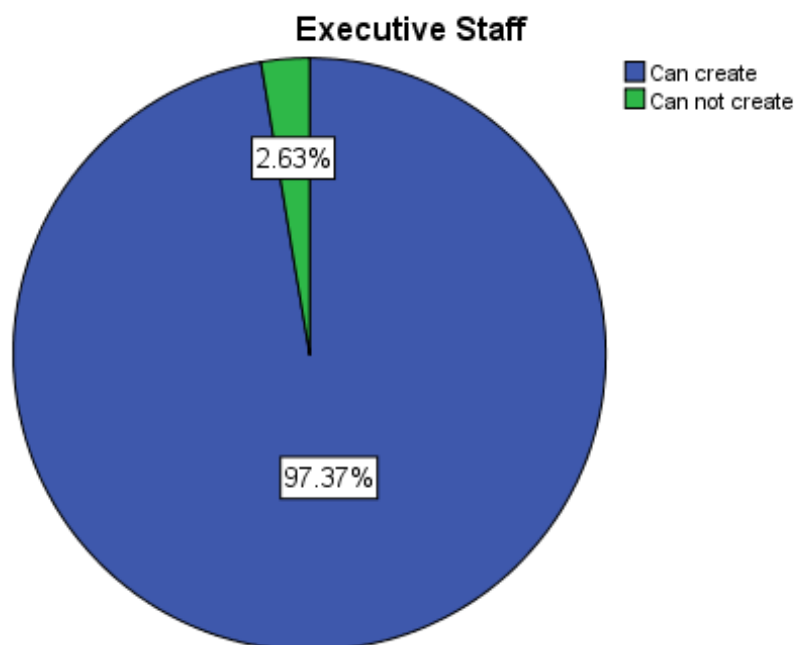
(Compiled by researcher using survey data)

4.5.5 Availability of company rules and regulations to protect the environment

The awareness on the available company rules and regulations among the staff was checked. From the entire sample 75.68% are aware of the company rules and regulations which consists of 48.68% of executive staff and 26.32% of operational staff. Out of the entire sample 9.21% believe that there are no company specific rules and regulations to protect the environment which consists of 2.63% of executive staff and 3.95% of operational staff. There 6.58% of executive staff who are not aware whether there are company specific rules and regulations to protect the environment and this same category includes 11.84% of operational staff. When considering the entire sample 24.32% are not aware of the fact. (Figure 4.9)

Figure 4.9 Awareness on company rules and regulations
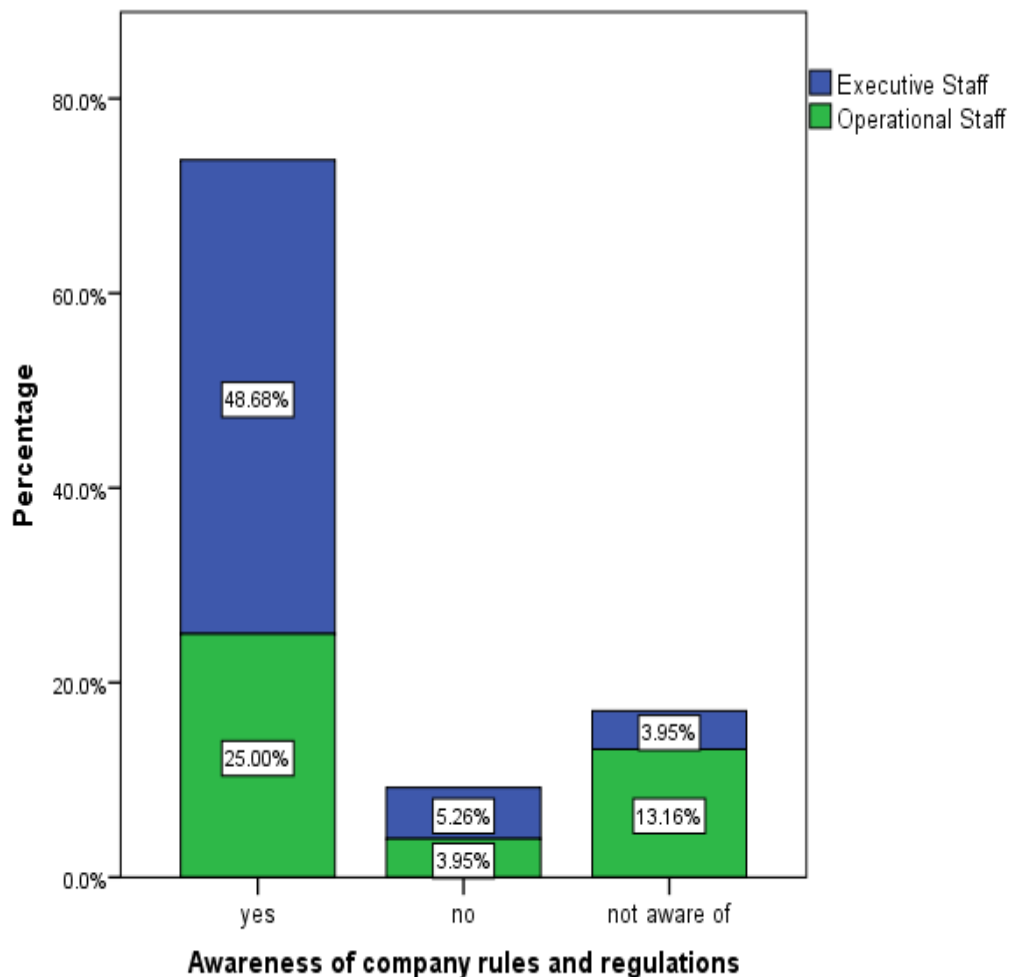
(Compiled by researcher using survey data)

4.5.6 Actions followed with related to GSCM

Availability of key GSCM practices which are being currently used at outlets were examined from the responses received by the staff.

4.5.6.1 Electricity management

Electricity management is considered as one of the key factors of GSCM. As per the collected data all outlets are taking necessary actions to reduce the unnecessary usage of electricity. Out of the sample 61.36% of respondents strongly agree the fact and 38.64% agree the fact. (Figure 4.10)

Figure 4.10 Reduction of unnecessary usages of electricity
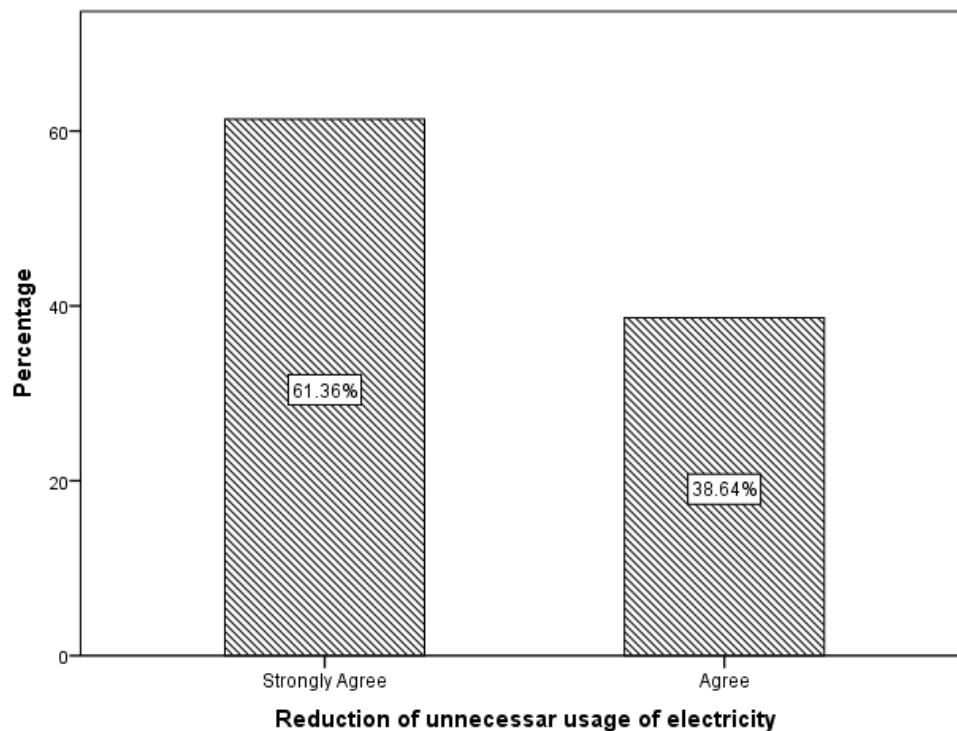
(Compiled by researcher using survey data)

4.5.6.2 Water management

Water management is another key consideration in GSCM. Out of the responses received almost all outlets consider about water management and statistics reveals that

59.09% strongly agree that they are taking necessary actions to preserve water and 40.91% agree the same. (Figure 4.11)

Figure 4.11 Availability of water management practices
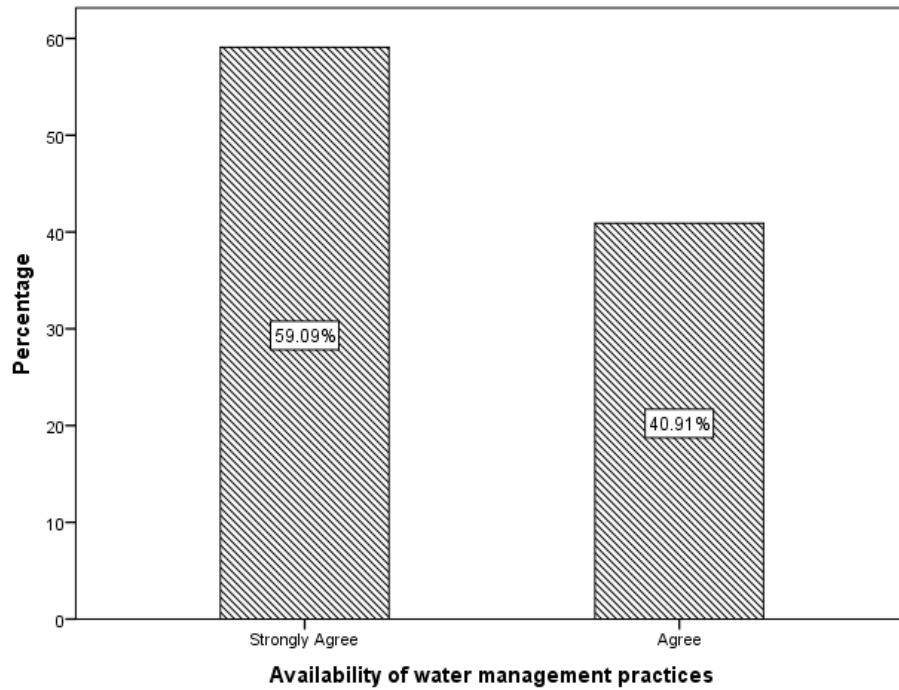
(Compiled by researcher using survey data)

4.5.6.3 Minimum usage of polythene

Polythene usage is considered as a key fact to be managed in GSCM process. From the analyzed data it was identified that 43.18% strongly agree that they all take necessary actions to minimize the polythene usage and 50% agree the same while 6.82% disagree the fact. (Figure 4.12)

Figure 4.12 Minimum usage of polythene
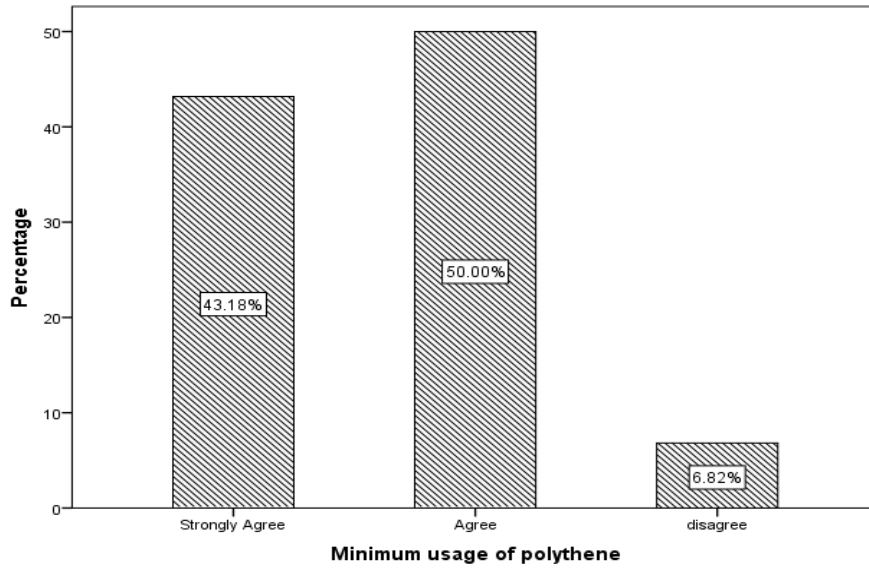
(Compiled by researcher using survey data)

4.5.6.4 Minimum usage of plastic

Figure 4.13 Minimum usage of plastic
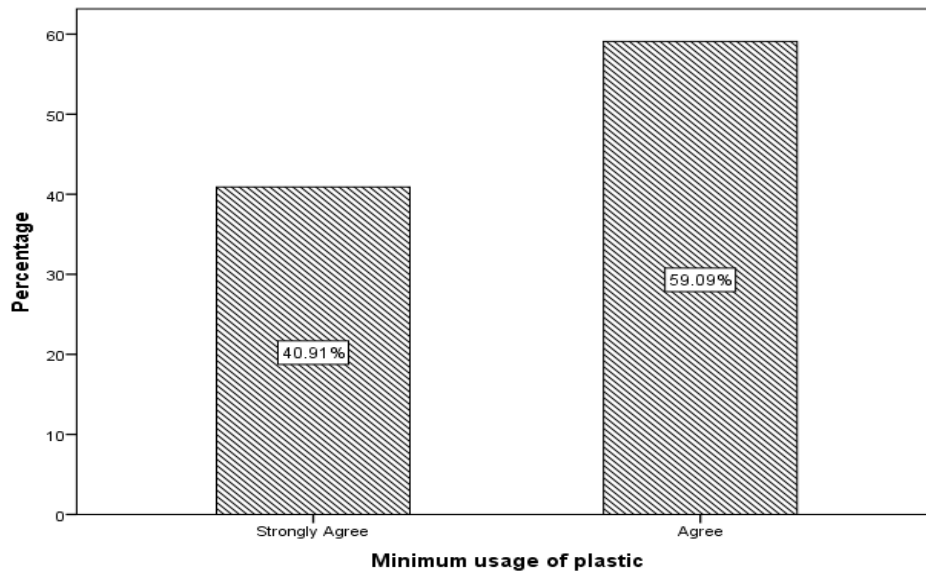
(Compiled by researcher using survey data)

Plastic usage should be minimized in all outlets as key consideration. From the responses received it was calculated that 40.91% strongly agree the fact and 59.09% agree the fact. (Figure 4.13)

4.5.6.5 Minimizing the food wastages

Food items are the main product range of the subjected sample. Waste of food is a very critical consideration of the GSCM process as well as in company goals. From the data collated it was identified that 40.91% strongly agree that they have minimized the wastage of food items in the outlet. There are 47.73% who agree the same while 11.36% disagree the same. (Figure 4.14)

Figure 4.14 Food wastage management
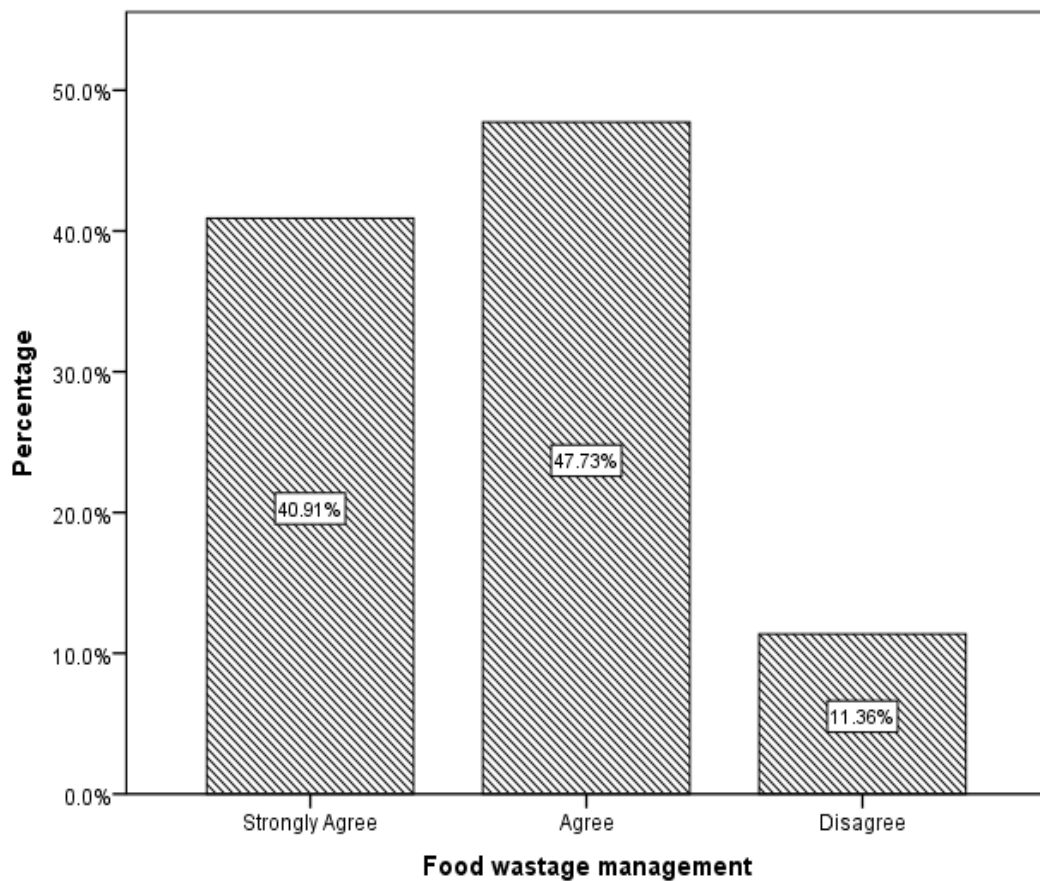
(Compiled by researcher using survey data)

4.5.6.6 Waste Management practices

Waste management is a key fact discussed in GSCM and also it is a main problem that the current Sri Lanka faces. From the gathered data 52.27% strongly agree that outlets have proper processes to manage waste.31.82% agree the same while 15.91% disagree the fact. (Figure 4.15)

Figure 4.15 Waste management
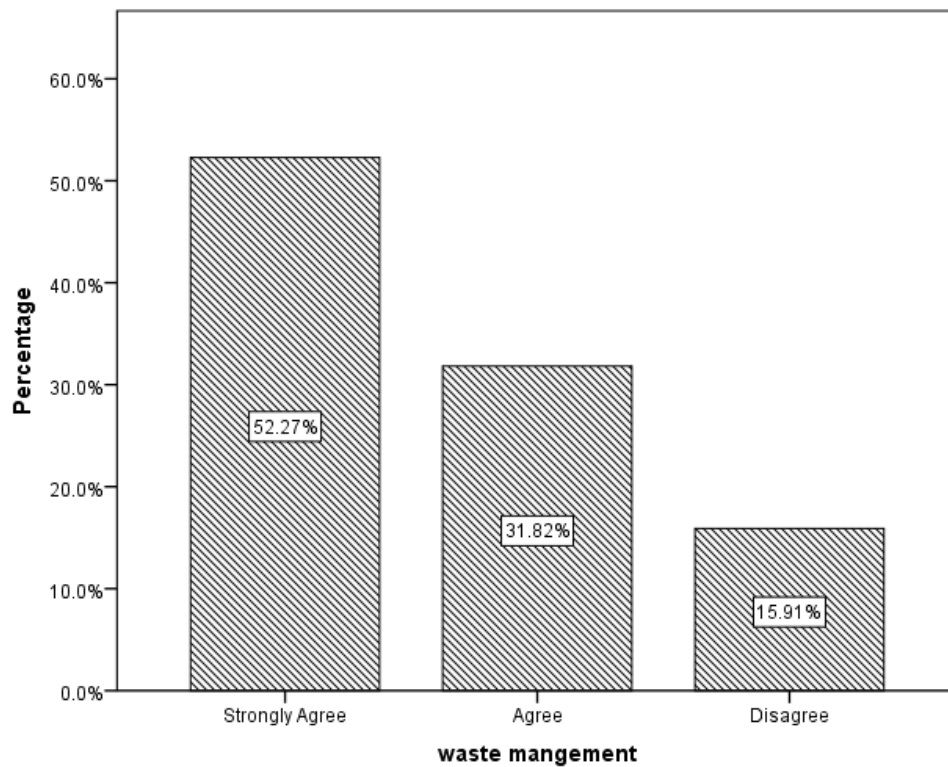
(Compiled by researcher using survey data)

4.5.7 Customer Perception

Customer perception is another key fact described in the theorical framework and based of the responses of operational staff with related to customer experiences were statistically analyzed.

4.5.7.1 Encourage customers to use reusable customer bags

Reusable bags are introduced to customers and sometimes the company has provided offers and special discounts to customers for these bags. But still there is a less adoption of bringing back the bag for next visits. This can be promoted with the help of sales persons. From the responses received it was identified that 15.91% strongly agree that they encourage customers to use reusable customer bags and 52.27% agree the same. (Figure 4.16). The negative responses represent 31.82% from the entire sample with disagree responses.

Figure 4.16 Encourage customers to use reusable bags
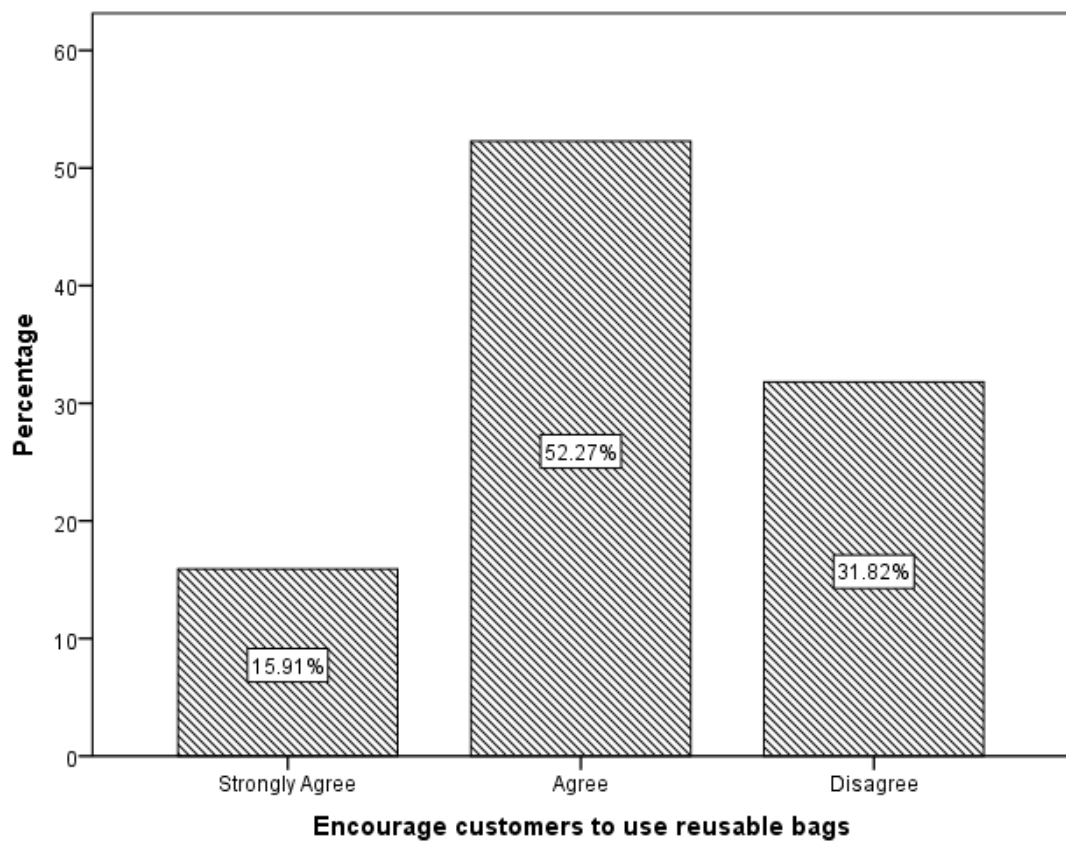
(Compiled by researcher using survey data)

4.5.7.2 Encourage customers to reduce the number of shopping bags use

Sales persons can influence the customers to reduce the polyethene usage. For example, they can suggest customers to have same kind of vegetables in the same bag without using one for each. There are such many scenarios where sales persons can involve in. From the gathered data it is identified that 27.27% strongly agree the fact that they encourage customers to reduce the number of shopping bags use. Providing positive response 56.82% agree the same. There are 15.91% respondents who disagree the fact. (Figure 4.17)

Figure 4.17 Encourage customers to reduce the use of shopping bags
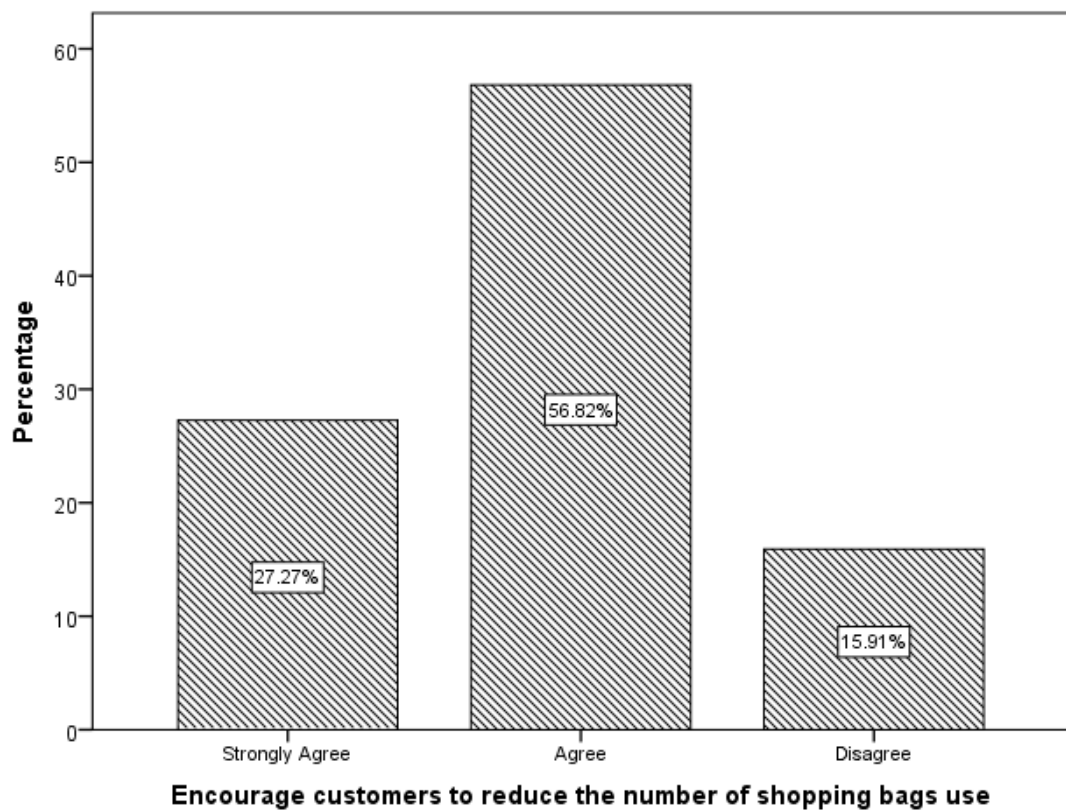
(Compiled by researcher using survey data)

4.5.7.3 Customers are willing to reduce the number of shopping bags used.

Customers themselves should have a driving force to "go green". The very basic step is for this inside the outlet is the number of shopping bags used. The observation of sales persons with related to customer behavior was examined. Out of the responses received 22.73% strongly agree that customers are willing to reduce the number of shopping bags used. Representing the positive responses another 65.91% agree the same. The negative sample represent 11.36% from the entire sample with disagree responses. (Figure 4.18)

Figure 4.18 Willingness of customers to reduce the use of shopping bags
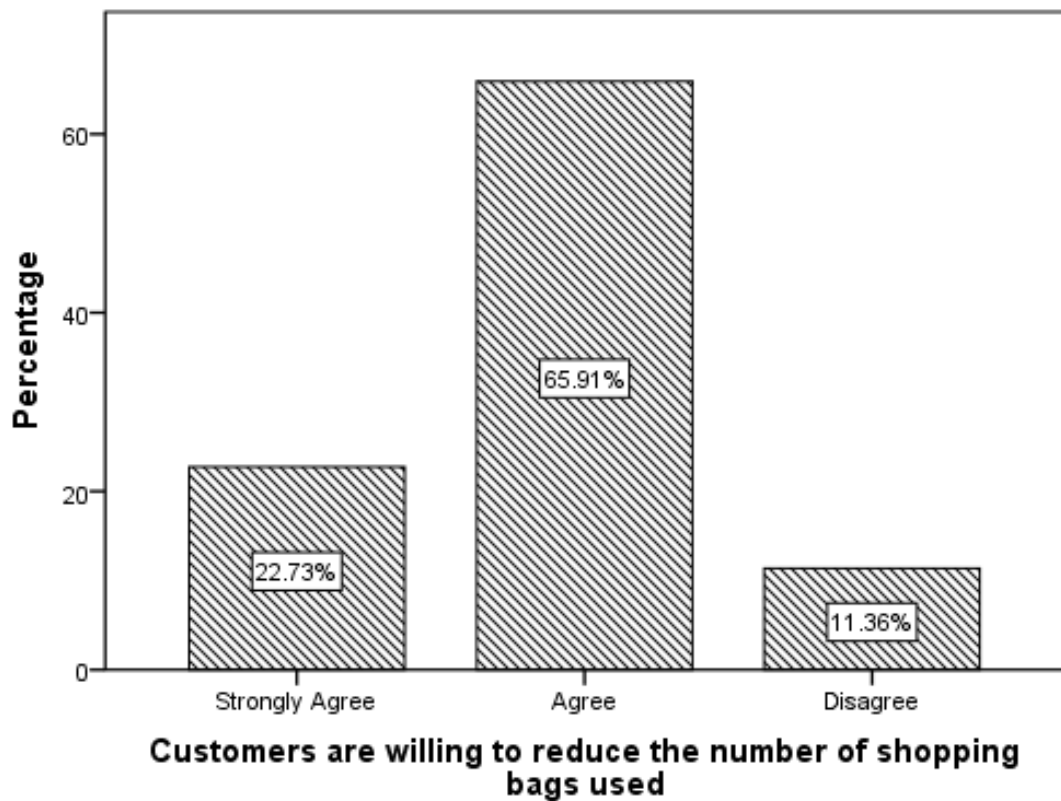
(Compiled by researcher using survey data)

4.5.7.4 Customers are willing to use reusable bags and packaging

Reusable bags and packaging are currently introduced by the company and getting customers used to use them is very important. With the observation of sales persons, it is identified that 20.45% of them strongly agree that customers are willing to use reusable bags and packaging. Another 61.36% agree the same representing a sum of 81.81% from the entire sample. The negative respondents represent 18.18% from the entire observations of sales people. (Figure 4.19)

Figure 4.19 Willingness of customers to use reusable bags
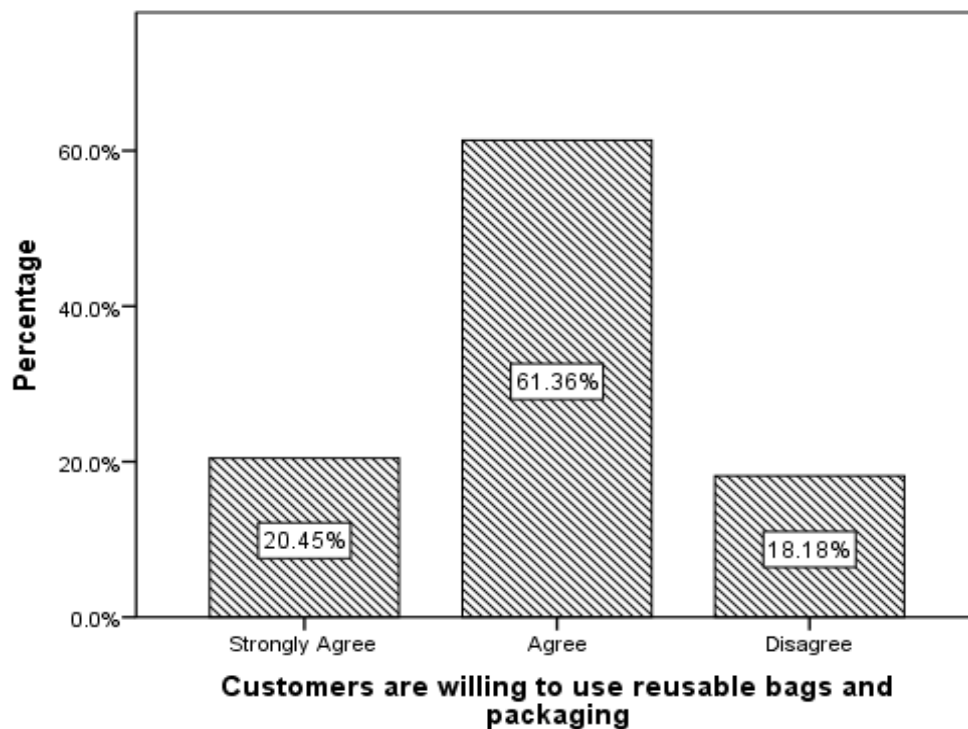
(Compiled by researcher using survey data)

4.5.7.5 Customers are willing to spend on environmentally healthy products

Figure 4.20 Willingness of customers to send on environmentally healthy products
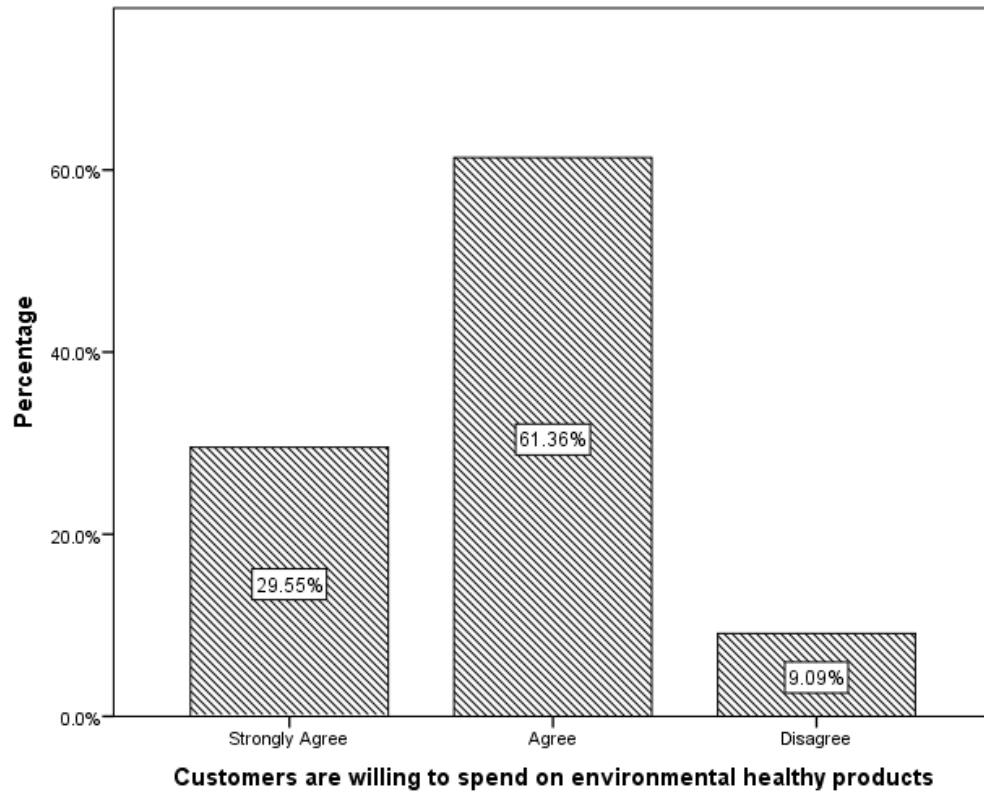
(Compiled by researcher using survey data)

The usage of environmentally healthy products is another key fact in GSCM. Customers' desire on moving to environmentally healthy products is measured through the observation of sales personals. From the received responses there are 29.55% of strongly agree responses along with 61.36% of agree responses. The negative responses consist of 9.09% of disagree responses. (Figure 4.20)

4.5.8 Employee attitude on GSCM implementation

Figure 4.21 Reasons for implementing GSCM

Reason for Implementing GSCM

- ■ company regulation
- ■ forced by the government
- ■ meet the market cometition
- ■ social responsibility

20.00%

53.33%

10.00%

16.67%
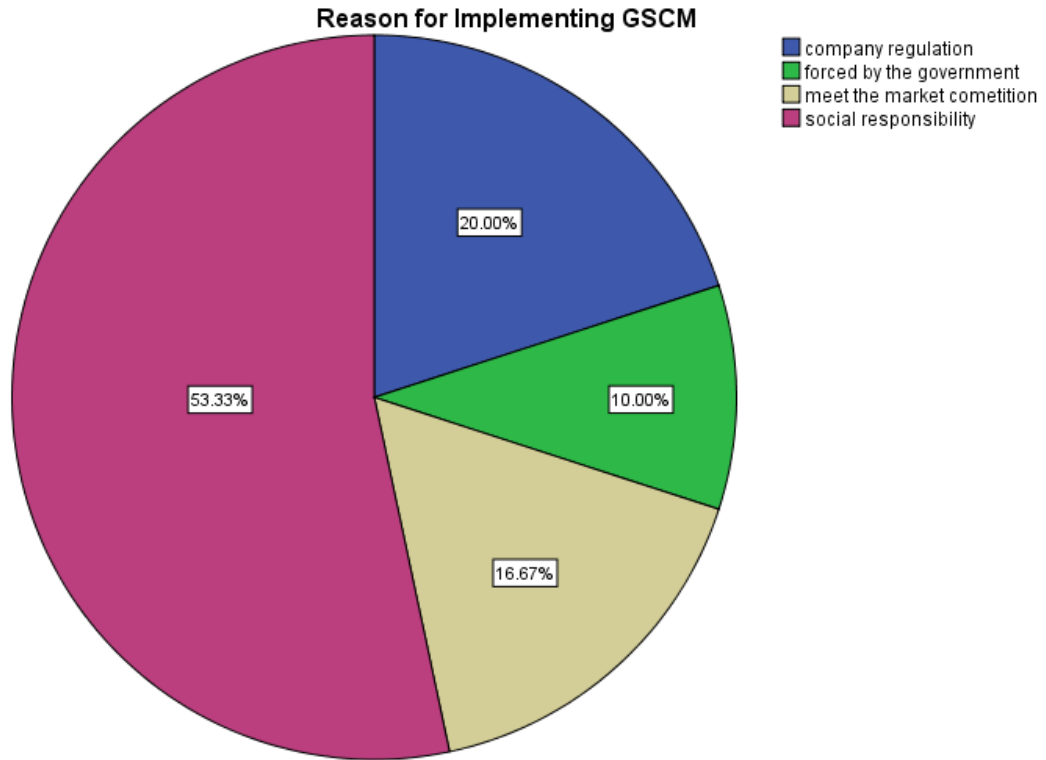
(Compiled by researcher using survey data)

Employee attitude on GSCM is measured form the responses of executive staff. As the main concern to evaluate their perception they were asked the reason why they think that GSCM should be implemented. (Figure 4.21) From the received responses it was identified that the majority of the sample representing 53.33% think that they should implement GSCM since it is a social responsibility of them. Another 20.00% has given the reason as it is a company regulation, they should follow the process. Out of the responses 16.67% reason out the cause as they should implement GSCM to meet the market competition. The remaining 10.00% thinks the reason as since it is forced by the government, they should implement GSCM.

4.5.9 Budget reservations on GSCM

Budget is a key factor for implementing GSCM since it adds some additional costs during the implementation stage. Out of the received responses 53.33% believes that the budget allocations are not sufficient for the implementation of GSCM at outlets and 46.67% believes that budget allocations are sufficient for GSCM implementation. (Figure 4.22)

Figure 4.22 Budget allocations on GSCM
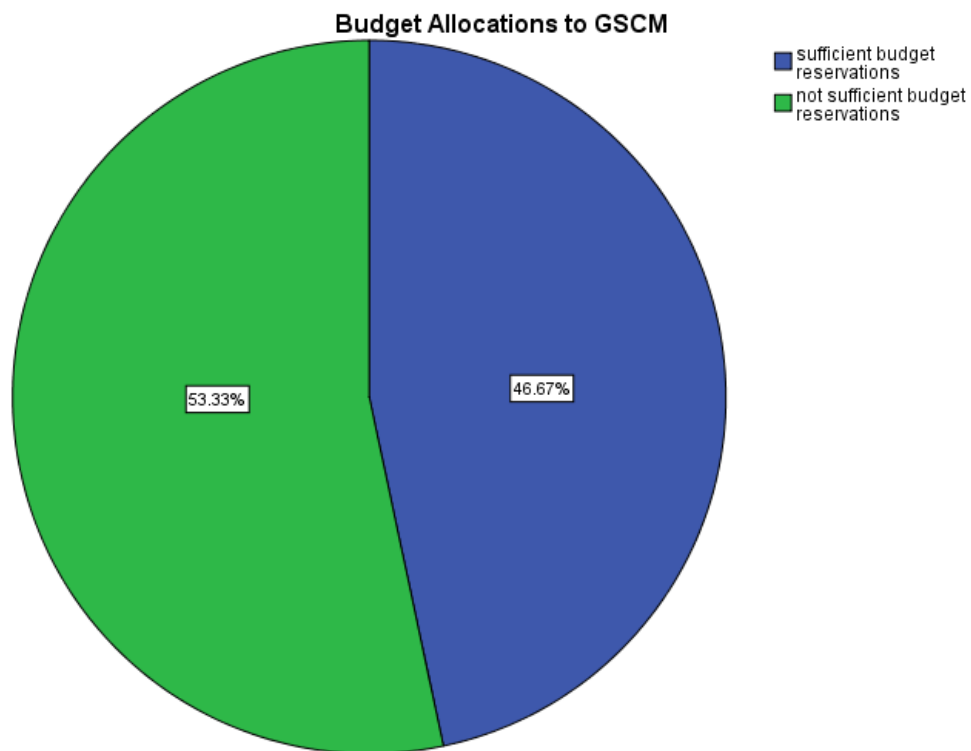
(Compiled by researcher using survey data)

4.5.10 Awareness on government rules and regulations

Government rules and regulations is a key fact in implementation of GSCM. The awareness on them is very important when managing an outlet. From the received

responses it was calculated that 83.33% are aware of government rules and 16.67% are not aware of them. (Figure 4.23)

Figure 4.23 Awareness on government rules and regulations
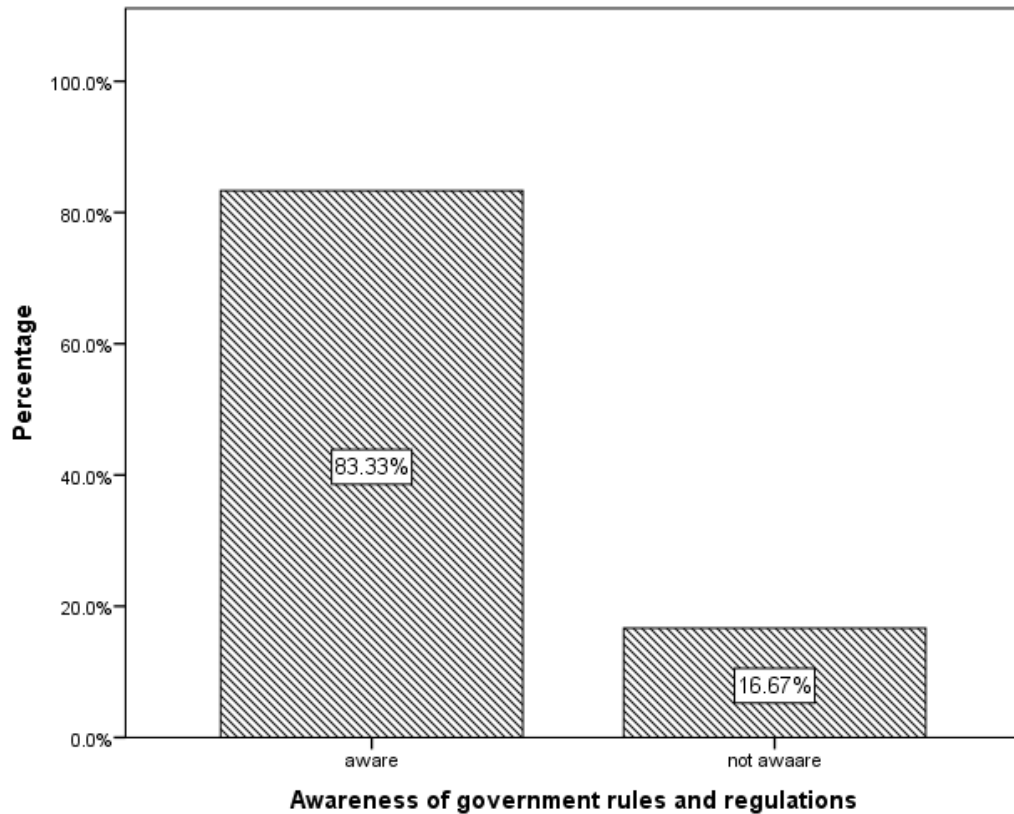
(Compiled by researcher using survey data)

4.5.11 Adhering to government compliances

Each and every citizen and cooperate should adhere the government compliances and they is well established set of rules to evaluate them. With related to supermarket industry there are many government officials involved to monitor the condition of them such as public health inspectors and police officers. From the received responses 86.67% has stated that they meet the compliances and 13.33% has stated as they are not. (Figure 4.24)

Figure 4.24 Meet government regulations
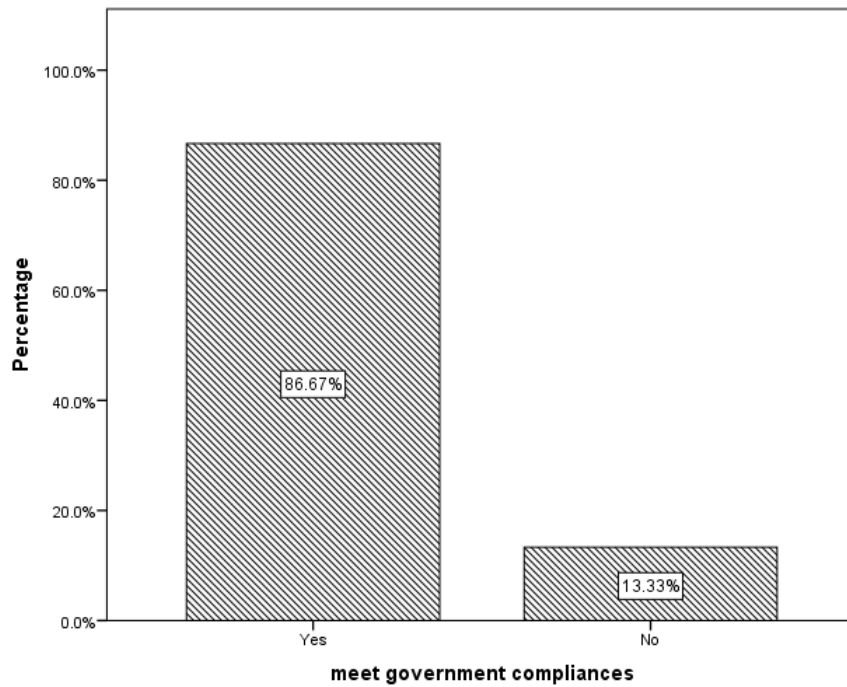
(Compiled by researcher using survey data)

4.5.12 Technology usage of GSCM

Technology is another key factor influencing the implementation of GSCM and the view of executive staff on new technology usage is evaluated. Out of the responses received 96.67% responded as new technologies can improve the implementation of GSCM while 3.33% have provided negative responses. (Figure 4.25)

Figure 4.25 View on new technology usage

New technologies will improve the implementation of GSCM

■ Yes
■ No

3.33%

96.67%
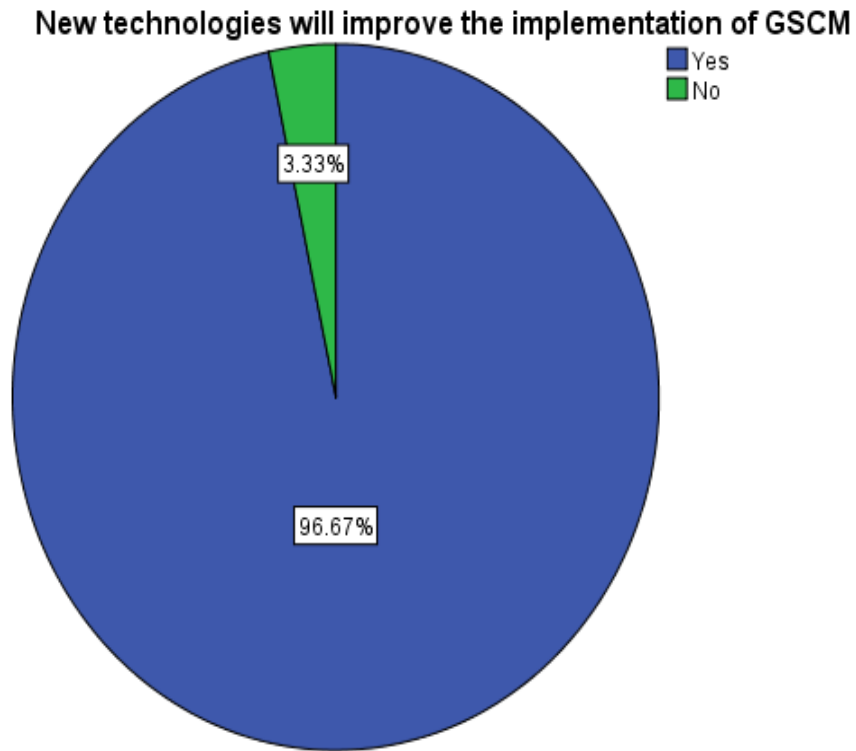
(Compiled by researcher using survey data)

4.5.13 Availability of new technologies

The available technologies in outlets is another fact that was evaluated. Out of the responses received 43.33% think that the available technologies are sufficient for the implementation of GSCM and 56.67% think that the available technologies are not sufficient. (Figure 4.26)

Figure 4.26 Satisfied with the available technologies

Satisfied with the available technologies

43.33%

56.67%

No
Yes
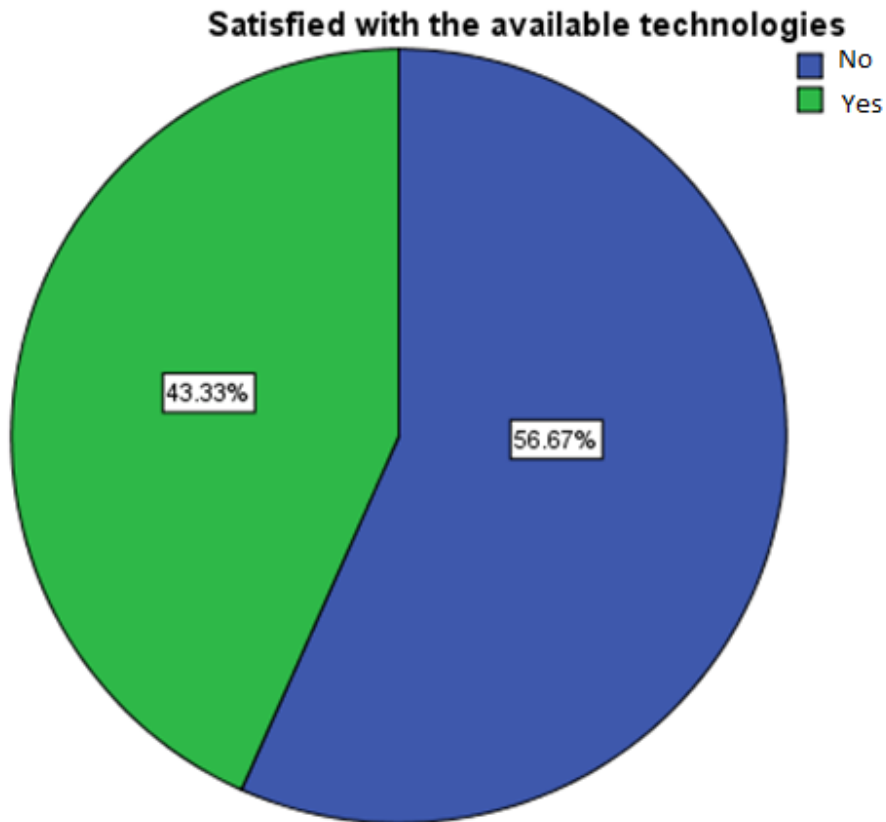
(Compiled by researcher using survey data)

4.5.14 Currently Focused Key Ares of GSCM

There are six major areas that are evaluated with the selected outlets such as explained in table 4.5.1. According to the implemented percentages the highest implementation is for waste management which represents 85.38% from the total responses received from the executive staff. Electricity management, reduction of polyethene usage and promotion of reusable packaging has rated above 50%. Outlets should more focus on water management and ecofriendly marketing campaigns.

Table 4.5.1 Currently focused key areas of GSCM

Factor	Implementation percentage
Electricity management	50.29 %
Water management	35.67 %
Waste Management	85.38 %
Eco friendly marketing campaigns	30.41 %
Reduction of polythene usage	54.39 %
Promotion of reusable packaging	60.23 %

4.5.15 Management Support

Management support is a key fact to be considered when implementing GSCM. The following factors were analyzed with the responses received from the executive staff.

4.5.15.1 Get staff involved in new implementations

The staff were asked whether they are getting chances to implement new practices of GSCM at their outlets. From the responses received 13.33% strongly agreed that they get the chance to introduce new things with related to GSCM in their outlets and 40% agree the same. But from the sample 46.67% represents the disagreeing executives. (Figure 4.27)

Figure 4.27 Opportunities to implement new ideas
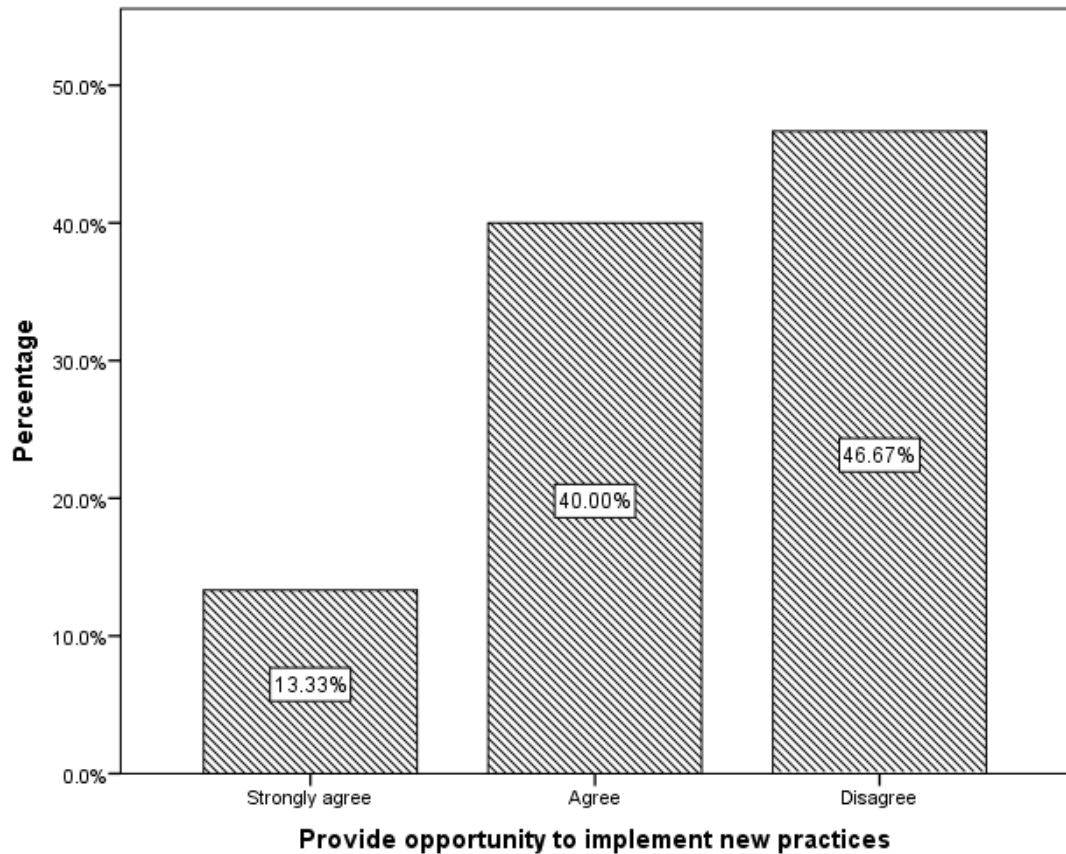
(Compiled by researcher using survey data)

4.5.15.2 Ability of discussing problems with the management

As the second point executives were asked whether they are getting enough room to discuss with the top management about the implementation of GSCM. From the responses received 20% strongly agree that they are getting chances to discuss the issues with the top management and 33.33% agreed the same while 46.67% represent disagreeing community. (Figure 4.28)

Figure 4.28 Possibility of discussing problems with the management

Possibility of discussing problems with the management
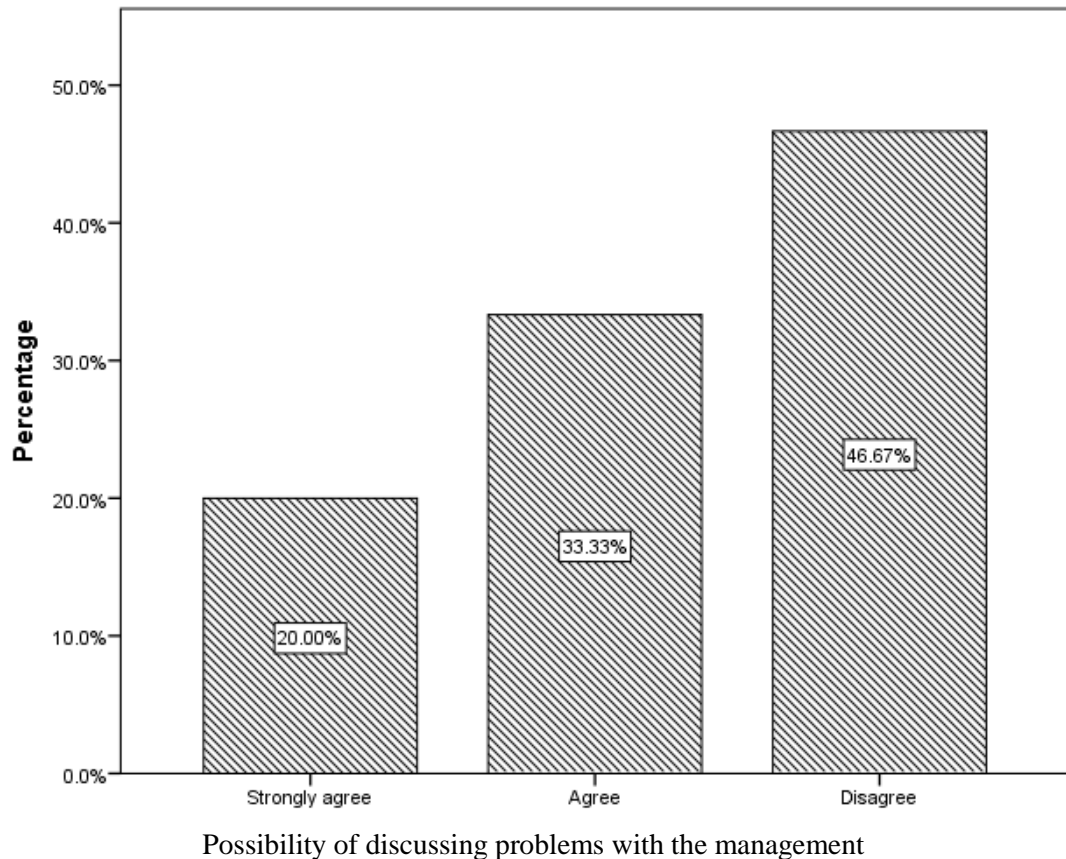
(Compiled by researcher using survey data)

4.5.15.3 Authority to make influences on suppliers about GSCM

Suppliers are one of the main stakeholders of the process of GSCM. Suppliers make agreements directly with the head office but the presence of food items really happens at the outlet with the executives and the sales staff. It will be the duty of them to check whether the suppliers work according to the company polices. Executive staff were asked whether they have any authority to make influences on suppliers with related to governing the GSCM at the outlet. Out of the responses received 13.33% strongly agree that they can make influences on suppliers along with 20% of respondents who agree the same. But the majority represent the answer that they cannot make influences on suppliers with the combination of 63.33% disagree responses and 3.33% of strongly disagree responses. (Figure 4.29)

Figure 4.29 Authority to make influences on suppliers
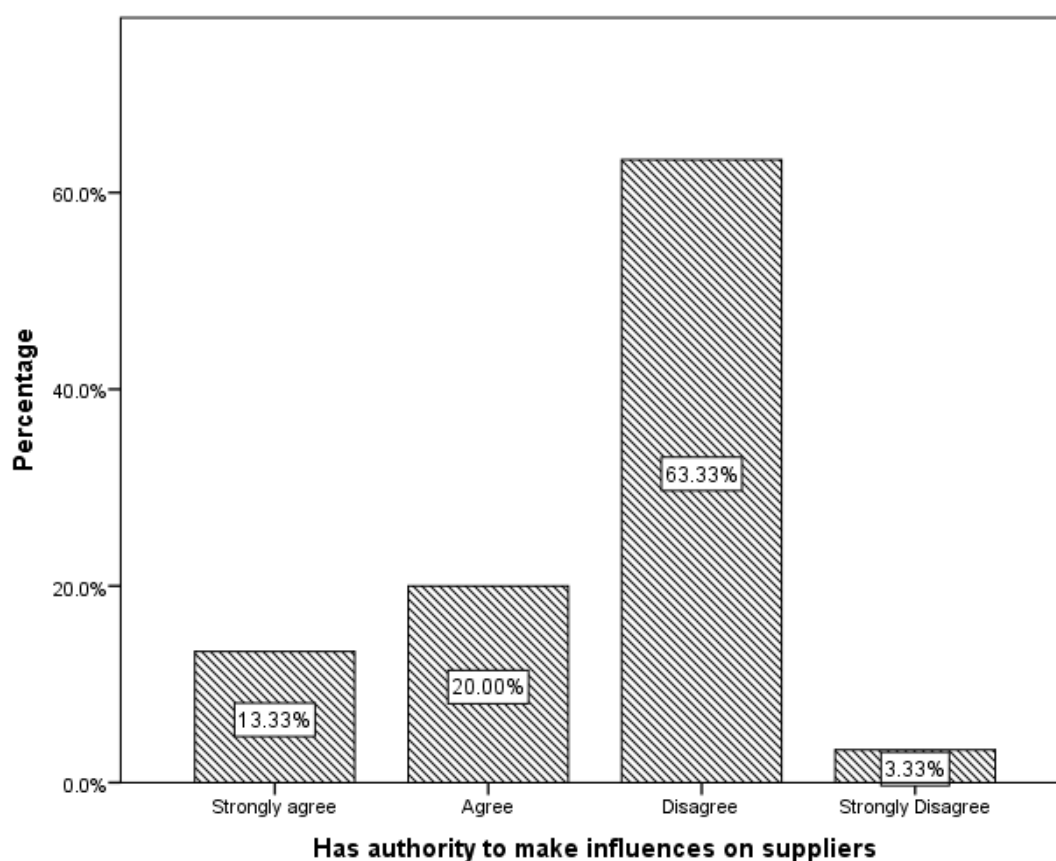
(Compiled by researcher using survey data)

4.5.16 Facilitating Conditions

Facilitating conditions is a key fact which should be considered when analyzing the factors influencing the implementation of GSCM. To follow the implementation there should be a favorable environment in the company.

4.5.16.1 Receive well explained guidelines to implement GSCM at the outlet

All operating instructions to outlets are received through the head office. The clarity of them is very important for the executives to when implementing them. Out of the received responses from the executive staff it was identified that 13.33% strongly agree that they are received with clear guidelines to implement GSCM at

outlets. 60% of respondents agree the same while there are 26.67% disagreeing respondents. (Figure 4.30)

Figure 4.30 Availability of proper guidelines
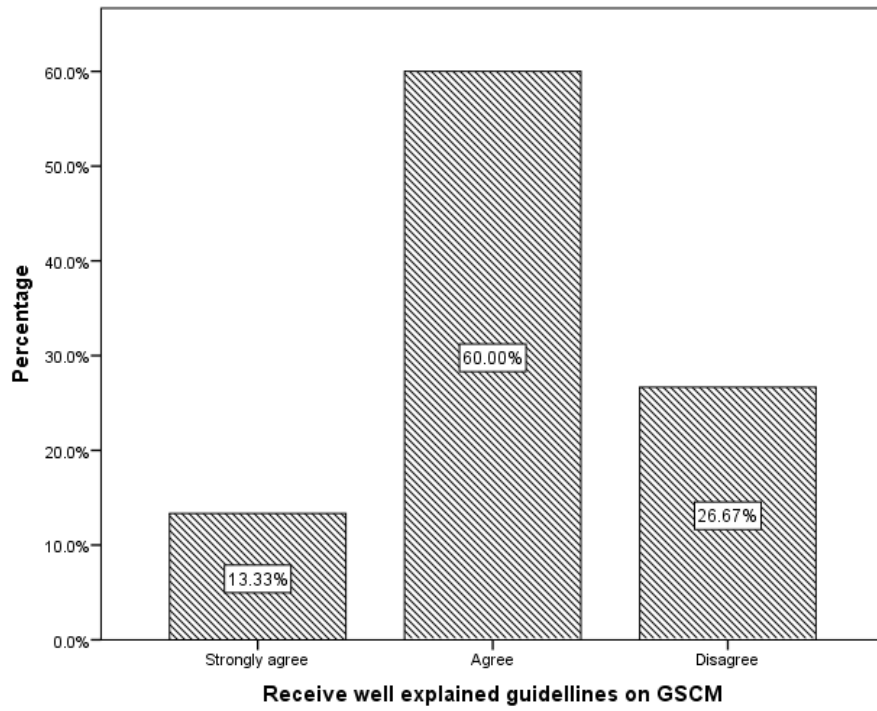
(Compiled by researcher using survey data

4.5.16.2 Have got enough training on GSCM

Figure 4.31 Receive training on GSCM
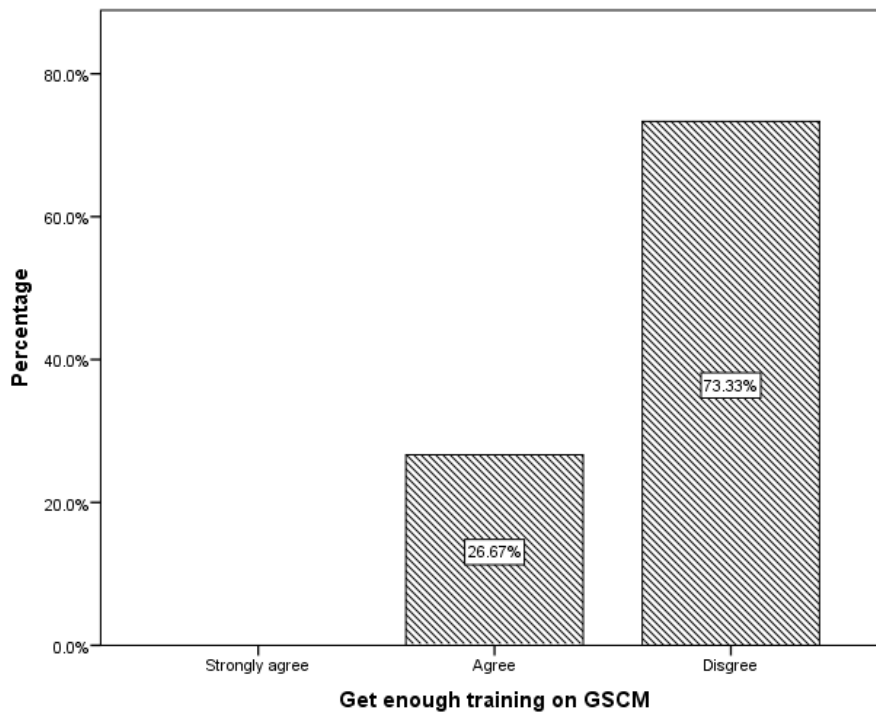
(Compiled by researcher using survey data)

Training the staff is another key fact that the management should concern when implementing GSCM. From the received responses it was identified that only 26.67% agree with the receiving trainings with related to GSCM and the majority of 73.33% disagree the fact and they think that the receiving of training is not sufficient when implementing GSCM. (Figure 4.31)

4.5.17 Market Behavior

The market behavior is another key fact to be considered when implementing GSCM. Competitive market with high level of GSCM will always be a driving force for a better implementation of GSCM in the company.

### 4.5.17.1 Competitors level of promoting GSCM

Figure 4.32 Level of promoting GSCM by competitors
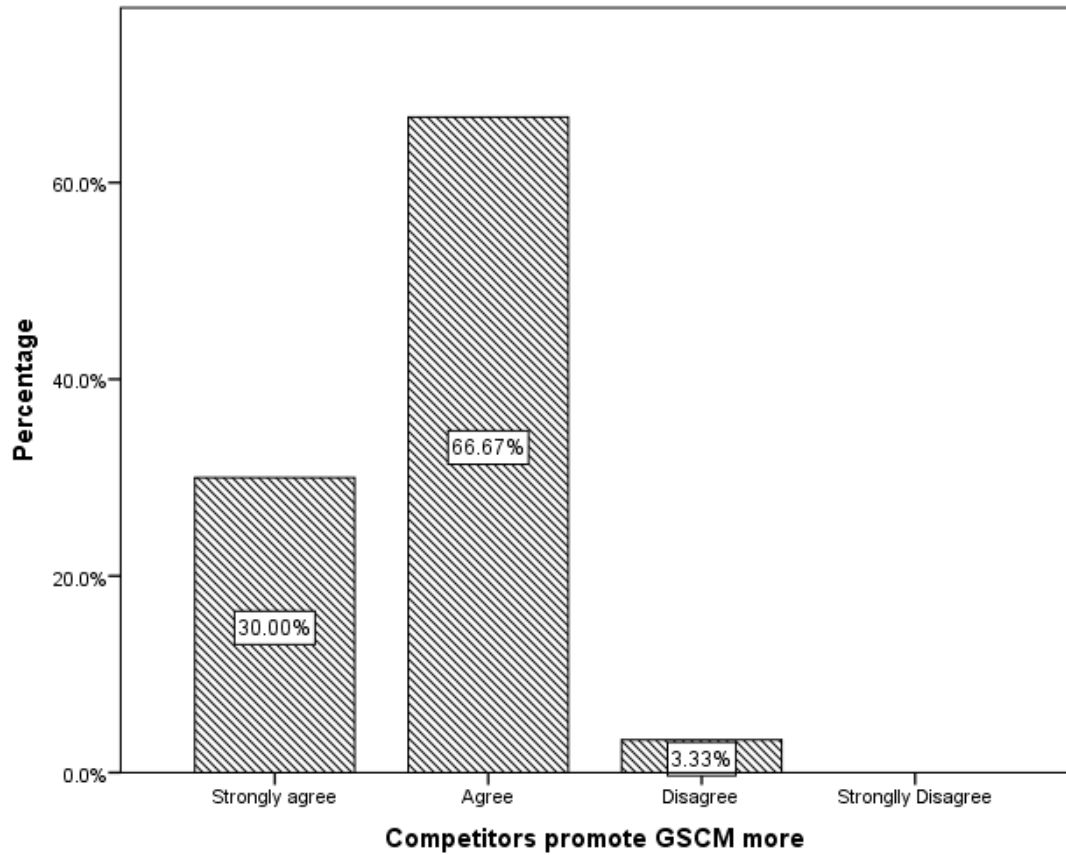
(Compiled by researcher using survey data)

Market competition key fact for all super market chains in Sri Lanka When discussing about GSCM analyzing the behavior of competitors is very important according to the view of executive staff it was identified that 30.00% strongly agree that the level of promoting GSCM by competitors is higher than their current level of prompting along with another 66.7% who agree the same fact. Collectively 96.67% of respondents think that the strength of the marketing campaigns on GSCM by competitors is higher than the current level of same in their company. (Figure 4.32)

4.5.17.2 Competitors receive additional benefits from GSCM

Then the executive staff were asked up to what extend they agree that the competitors are receiving additional benefits by implementing GSCM than they receive. From the received responses it was identified that 33.33% strongly agree the fact and 53.33% agree the same while 10% disagree the fact and 3.33% strongly disagree the fact. (Figure 4.33)

Figure 4.33 The level of additional benefits receiving by competitors
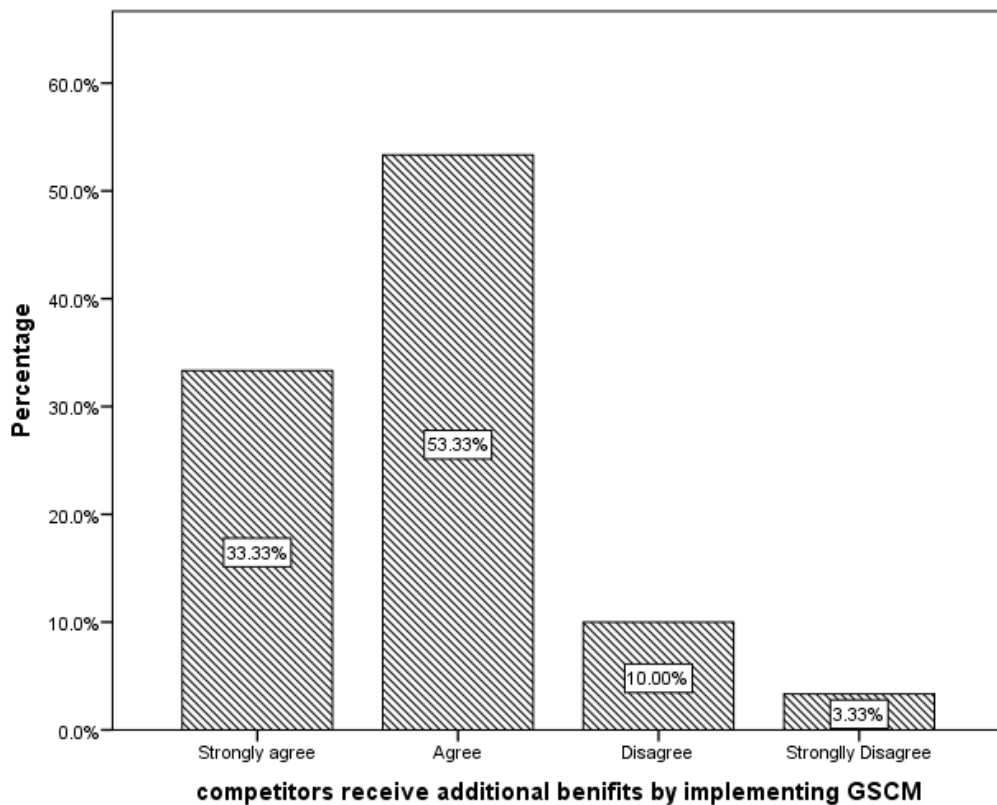
(Compiled by researcher using survey data)

4.5.17.3 Customer Attraction on GSCM

The executive staff were asked about the level of customer attraction on GSCM according to their point of view. From the received responses it was identified that 36.59% strongly agree that customers are more attractive on outlets which follows GSCM well. Along with them another 53.66% respondents agree the same. The

disagreeing community represent 7.32% of disagree responses and 2.44% of strongly disagree responses. (Figure 4.34)

Figure 4.34 The level of customer attraction on GSCM
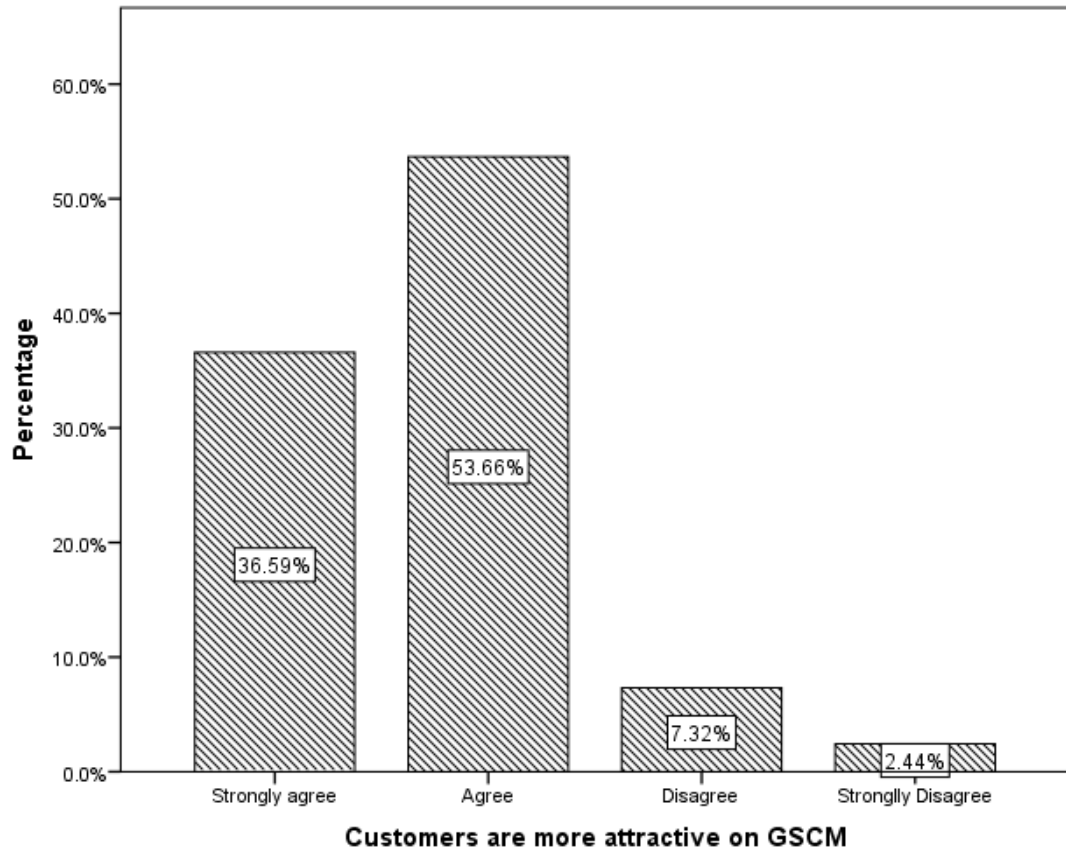
(Compiled by researcher using survey data)

4.6 Measurement Scale Analysis

Under measurement scale analysis the constructs which were proposed in the theoretical framework are being tested. Also, the reliability and validity of each of the measurement is analyzed.

4.6.1 Reliability

Reliability of a measurement refers to the degree to which the developed construct is free from random error. In this study there were seven independent variables and one dependent variable used to measure the constructs proposed for the theoretical framework as shown in Figure 3.1. The independent variables are market competition, top management support, customer perception, employee perception, facilitating conditions, government rules and regulations and technology usage. The dependent variable is the degree of implementation of green supply chain management.

4.6.1.1 Internal consistency

Internal consistency refers to the "degree to which respondents are consistent across the items within a single measurement of scale" (Kline,2007). In this study Cronbach's Alpha coefficient was calculated for each factor and based on the results internal consistency was measured. Based on the coefficient value a scale of measurement Hinton et al defined a "scale such as excellent (0.90 and above), high (0.0 to 0.90), high moderate (0.50 to 0.70) and low (0.50 and below)" (Hinton et al ,2004). Another definition of Hair et al describes that the "construct reliability should be 0.7 or higher to indicate adequate convergence or internal consistency". (Haiter al, 2006).

There are eight variables defined in this study such as market competition (MC), top management support (TMS), customer perception (CP), employee perception (EP), facilitating conditions (FC), government rules and regulations (GR), technology usage (TU) and the degree of implementation of green supply chain management (GSCM). Out of them factors were defied for TMS, CP, EP, FC, MC and other variables re directly measured. According to the presented alpha (α) value

in table 4.6.1 all constructs have high reliability of more than 0.70 alpha value. This can conclude that all constructs in the research are highly reliable.

Table 4.6.1 Reliability analysis results

Construct	No. of Items	Cronbach's Alpha (α)	Comments
Market Competition	3	0.733	High Reliability
Top Management support	3	0.854	High Reliability
Customer perception	3	0.770	High Reliability
Employee Perception	5	0.814	High Reliability
Facilitating Conditions	3	0.735	High Reliability

Reliability analysis results

Source: Calculations by the Author

4.6.1.2 Item Total Correlation

The correlation tests reflect the relationships between the variables of the developed research model. The identified relationships from these tests can be used to check the extend of proposed model captures important data from the research sample. (Koufteos, 1999). In this study the corrected item total correlation analyses were used for all constructs developed in the model. As described by Pallant (2005) and Hair et al. (2006) if a value of the correlation is less than 0.30 it indicates that the measurement of the variable differs from the construct as a whole. The analysis results for item total correlations for each construct are demonstrated in tables from Table 4.6.2 to table 4.6.14.

4.6.2 Validity

Construct Validity can be defined as "the degree to which a test measures what it claims, or purports, to be measuring." (Brown, 1996). Validity will provide an assurance to the researcher that the research instruments will truly measures what is intended to be measured. In this study validity of the scales were guaranteed by using exploratory factor analysis and by analyzing the correlation coefficient of all instrument scales. In addition, by using confirmatory factor analysis the convergent and discriminant validity were measured.

Factor analysis can be defined as a "collection of methods for explaining the correlations among variables in terms of more fundamental entities called factors". (Tinsley, 2006). There are two tests carried out in this study with related to factor analysis. The first one is the correlation coefficient matrix. According to Coakes all values present in correlation coefficient matrix are greater than 0.3 the subjected factors are suitable for factor analysis (Coakes,2005). In the same way Pallant explains that if values of the item-total correlation are less than 0.3 variable measurements differ from the construct. (Pallant,2005). The second theory that was being performed with related to factor analysis is the Kaiser-Meyer-Olkin (KMO) test. The test measures sampling adequacy for each variable in the proposed model and also for the complete model. If the output from KMO test is between 0.8 and 1 it indicates the sampling is adequate and also if KMO values less than 0.6 it indicates the sampling is not adequate and that remedial action should be taken. Some researchers present this value as 0.5 also (De Vaus ,2005). In some interpretations it indicates that KMO value above 0.6 to 0.7 is considered adequate for analyzing. (Niemeyer et al,2003). The statistical package SPSS is used to perform the factor analysis for all variables demonstrated in the model. Statistical results for the factor analysis of variables id described in the next sub section

4.6.3 Market Competition

Market competition variable is developed by using three factors as described in Table 4.6.2.

Table 4.6.2 Coding of market competition variable

	Variable Code	Questionnaire Statement
Market Competition	MC1	Competitors are promoting GSM more than in my company
	MC2	Customers are more attractive on GSM implementations
	MC3	Competitors receive additional benefits from GSM

Source: questionnaire Statement

By using SPSS the correlation coefficient matrix was generated. As shown in Table 4.6.3 the correlation coefficients between all three items are greater than 0.3 which concludes that these factors are suitable for factor analysis of market competition.

Table 4.6.3 Inter-Item Correlation Matrix for market competition

Inter-Item Correlation Matrix

	MC1	MC2	MC3
MC1	1.000	.387	.329
MC2	.387	1.000	.694
MC3	.329	.694	1.000

Source: Calculations by the Author

According to KMO test the measurement for market competition is 0.603 which is above 0.6 and it indicates the sampling is adequate and data is in order for analysis. (Table 4.6.4)

Table 4.6.4 KMO and Bartlett's Test results for market competition

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.603
Bartlett's Test of Sphericity	Approx. Chi-Square	138.523
	df	3
	Sig.	.000

Source: Calculations by the Author

4.6.4 Top Management Support

Top management support is developed by using three factors as described in Table 4.6.5.

Table 4.6.5 Coding of top management support variable

	Variable Code	Questionnaire Statement
Top Management Support	TMS1	I get enough opportunities to implement new GSM practices.
	TMS2	I can easily discuss with the management about my problems when implementing GSM
	TMS3	I have the authority to influence on suppliers on GSM

Source: questionnaire Statement

By using SPSS the correlation coefficient matrix was generated. As shown in Table 4.6.6 the correlation coefficients between all three items are greater than 0.3 which concludes that these factors are suitable for factor analysis of market competition.

Table 4.6.6 Inter-Item Correlation Matrix for top management support

Inter-Item Correlation Matrix			
	TMS1	TMS2	TMS3
TMS1	1.000	.803	.655
TMS2	.803	1.000	.535
TMS3	.655	.535	1.000

Source: Calculations by the Author

According to KMO test the measurement for top management support is 0.659 which is above 0.6 and it indicates the sampling is adequate and data is in order for analysis (Table 4.6.7).

Table 4.6.7 KMO and Bartlett's Test results for top management support

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.659
Bartlett's Test of Sphericity	Approx. Chi-Square	268.501
	df	3
	Sig.	.000

Source: Calculations by the Author

4.6.5 Facilitating Conditions

Facilitating conditions is developed by using three factors as described in Table 4.6.8.

Table 4.6.8 Coding of facilitating conditions variable

	Variable Code	Questionnaire Statement
Facilitating conditions	FC1	Sufficient budget is allocated for GSCM implementations
	FC2	I receive well explained guide lines to implement GSCM
	FC3	I have the authority to influence on suppliers on GSCM

Source: questionnaire Statement

By using SPSS the correlation coefficient matrix was generated. As shown in Table 4.6.9 the correlation coefficients between all three items are greater than 0.3 which concludes that these factors are suitable for factor analysis of market competition.

Table 4.6.9 Inter-Item Correlation Matrix for facilitating conditions

Inter-Item Correlation Matrix			
	FC1	FC3	FC2
FC1	1.000	.362	.424
FC3	.362	1.000	.695
FC2	.424	.695	1.000

Source: Calculations by the Author

According to KMO test the measurement for facilitating conditions is 0.619 which is above 0.6 and it indicates the sampling is adequate and data is in order for analysis (Table 4.6.10).

Table 4.6.10 KMO and Bartlett's Test results for facilitating conditions

KMO and Bartlett's Test		
Kaiser-Meyer- Olkin Measure of Sampling Adequacy.		.619
Bartlett's Test of Sphericity	Approx. Chi-Square	146.157
	df	3
	Sig.	.000

Source: Calculations by the Author

4.6.6 Customer Perception

Customer perception is developed by using three factors as described in Table 4.6.11.

Table 4.6.11 Coding of customer perception

	Variable Code	Questionnaire Statement
Customer perception	CP1	Customers are willing to reduce the number of shopping bags used
	CP2	Customers are willing to use reusable bags and packaging
	CP3	Customers are willing to spend on environmentally healthy products

Source: questionnaire Statement

By using SPSS the correlation coefficient matrix was generated. As shown in Table 4.6.12 the correlation coefficients between all three items are greater than 0.3 which concludes that these factors are suitable for factor analysis of market competition.

Table 4.6.12 Inter-Item Correlation Matrix for customer perception

Inter-Item Correlation Matrix			
	CP1	CP2	CP3
CP1	1.000	.879	.345
CP2	.879	1.000	.378
CP3	.345	.378	1.000

Source: Calculations by the Author

According to KMO test the measurement for customer perception is 0.605 which is above 0.6 and it indicates the sampling is adequate and data is in order for analysis. (Table 4.6.13).

Table 4.6.13 KMO and Bartlett's Test results for customer perception

KMO and Bartlett's Test		
Kaiser-Meyer- Olkin Measure of Sampling Adequacy.		.605
Bartlett's Test of Sphericity	Approx. Chi-Square	433.542
	df	3
	Sig.	.000

Source: Calculations by the Author

4.6.7 Employee Perception

Employee perception is developed by using five factors as described in Table 4.6.14.

Table 4.6.14 Coding of employee perception

	Variable Code	Questionnaire Statement
Employee Perception	EP1	the unnecessary use of electricity is reduced in the outlet
	EP2	the waste of water is minimized in the outlet
	EP3	the use of polythene is minimized in the outlet
	EP4	the use of plastic is minimized in the outlet
	EP5	the waste of food is minimized in the outlet

Source: questionnaire Statement

By using SPSS the correlation coefficient matrix was generated. As shown in Table 4.6.15 the correlation coefficients between all items are greater than 0.3 which concludes that these factors are suitable for factor analysis of market competition.

Table 4.6.15 Inter-Item Correlation Matrix for employee perception

Inter-Item Correlation Matrix					
	EP1	EP2	EP3	EP4	EP5
EP1	1.000	.953	.475	.468	.354
EP2	.953	1.000	.498	.503	.301
EP3	.475	.498	1.000	.720	.399
EP4	.468	.503	.720	1.000	.397
EP5	.354	.301	.399	.397	1.000

Source: Calculations by the Author

According to KMO test the measurement for employee perception is 0.658 which is above 0.6 and it indicates the sampling is adequate and data is in order for analysis. (Table 4.6.16).

Table 4.6.16 KMO and Bartlett's Test results for employee perception

KMO and Bartlett's Test		
Kaiser-Meyer- Olkin Measure of Sampling Adequacy.		.658
Bartlett's Test of Sphericity	Approx. Chi-Square	968.292
	df	10
	Sig.	.000

Source: Calculations by the Author

4.7 Hypothesis Testing

The results quoted from each and every response of the survey was analyzed using SPSS statistical package. Firstly, the sum of the responses grouped for each factor was calculated. Then using multiple liner regression, the relationships of the theoretical framework were calculated.

Multiple linear regression analysis "is the technique that enables additional factors to enter the analysis separately so that the effect of each independent variable can be estimated. It is valuable for quantifying the impact of various simultaneous influences upon a single dependent variable" (Sykes, 1993, p. 8)

The summarized results of multiple liner regression are presented in the table 4.7.1 (See Appendix C) and the hypothesizes testing in the proposed model is carried out based on the path coefficient analysis.

Table 4.7.1 Hypotheses testing results for entire sample

Path (Hypothesis)	Standardized Coefficient (β)	t -value	Hypothesis Testing Result
MC → GSCM (H1)	.847	22.405	Supported
CP → GSCM (H2)	.874	25.306	Supported
GR → GSCM (H3)	.957	46.286	Supported
TMS → GSCM (H4)	.978	66.092	Supported
EP → GSCM (H5)	.903	29.456	Supported
FC → GSCM (H6)	.828	12.273	Supported
TU → GSCM (H7)	.950	34.129	Supported

Source: Calculations by the Author

According to the results of the path analysis presented in table 4.7.1 the hypotheses results can be summarized as follows.

The path coefficient of market competition and GSCM implementation is 0.847 and the t value is 22.405 at the level of 0.05 level of significance (p< 0.05) it can conclude the H1 is supported and in words it can be concluded that market competition has a positive impact on GSCM implementation.

The path coefficient of customer perception and GSCM implementation is 0.874 and the t value is 25.306 at the level of 0.05 level of significance (p< 0.05) and it can conclude the H2 is supported and it interprets that market competition has a positive impact on GSCM implementation.

The third hypothesis discussed about the relationship between government rules and regulations and GSCM. According to the analysis the path coefficient is 0.957 and the t value is 46.286 at the level of 0.05 level of significance (p< 0.05) and it can conclude that H3 is supported which proposes that government rules and regulations has a positive relationship on GSCM implementation.

The fourth hypothesis measured the relationship of top management support and GCSM implementation. The path coefficient is 0.978 and the t value is 66.092 at the level of 0.05 level of significance (p< 0.05) which denotes that the top management support has a positive impact on GSCM implementation.

The fifth hypothesis discussed the relationship of employee perception and GCSM implementation. According to the analysis the path coefficient is 0.903 and the t value is 29.456 at the level of 0.05 level of significance (p< 0.05) which can conclude that favorable employee perception has a positive impact on GSCM implementation.

Then as the sixth hypothesis the relationship of facilitating conditions and GSCM implementation was analyzed. According to the analysis the path coefficient is 0.828 and the t value is 12.273 at the level of 0.05 level of significance (p< 0.05) and it can conclude that H6 is supported with the interpretation of facilitating conditions has a positive impact on GSCM implementation.

Finally, the relationship of technology usage and GSCM implementation was analyzed. The path coefficient is 0.950 and the t value is 34.129 at the level of 0.05 level of significance (p< 0.05) which denotes that the top technology usage has a positive impact on GSCM implementation.

CHAPTER 5. DISCUSSION

5.1 Introduction

This chapter summarizes results and findings of the research. In addition, it will provide the knowledge contribution of the research study and also recommendations for future directions of the research topic. The research questions and the answers revealed form the empirical study is further described in this section with the identified recommendations.

5.2 Research Findings Discussion

Analysis results provide answers to the initial research questions discussed in this study and also provide necessary recommendations for super markets to consider when implementing GSCM practices.

5.2.1 Key Areas of GSCM in Super Market Industry

There are six main key aspects of GSCM identified based on the background study of the super market industry. Currently these factors are focused by many outlets but as a whole there is more room to be expanded.

5.2.1.1 Electricity management

Electricity management is a main area to be focused when implementing GSCM. Also, the efficient use of electricity leads to the sustainable development of the business. In super markets the main electricity consumption is used for refrigeration. The second highest consumption is used for ventilations. Maintaining the refrigerators regularly is important to improve the quality of refrigerating with the minimum usage of electricity. Electronic devices should be upgraded to latest technologies with minimum energy consumption.

Daylight management is another fact to be considered. In possible cases use daylight should be used as much as possible in day times. Outlet front glasses should not be blocked to disturb day lightning and car parks should be planned in a way to utilize day light efficiently.

Solar power can be used in outlets to minimize the electricity consumption. Solar lightning systems can be used for car parks and also large outlets can plan for implementing solar panels.

Inside outlets during daily operations they are many practices which can be implemented to reduce the excess usage of electricity implementation of a set of ground rules inside the outlet for all employees can be done.

5.2.1.2 Water management

Water management is another area to be discussed when implementing GSCM Super Markets. When comparing to electricity water utilization is lower in outlets. All staff should plan to preserve water by managing the excess usage. Also, as a company water purification system can be implemented in large scales complexes in order to reserve water.

5.2.1.3 Waste management

As the next key area waste management is discussed. Supermarkets make a significant contribution to food waste. The highest food waste are bread items, vegetables and fruits. Currently all waste is collected by municipal councils and the company itself has no process to manage their own waste.

Operational staff of the outlet has a main responsibility to reduce the food waste generation. Stocks should be managed in effective ways and continuous check on food items is very important.

Another key fact to be considered is the amount of stocks maintaining. Outlets should receive only the required amount of food items and excess stocks should not be maintained. Proper analytics can provide accurate data to manage the receiving stock for outlets.

As a company the top management can pay their attention to invest in projects such as bio gas generation out of the food waste generated in outlets. Recycling of waste is another are which can be focused on.

5.2.1.4 Eco friendly marketing campaigns

Green marketing is a lobal concept that the entire world is focusing on. Green marketing mainly focuses on protecting the ecological environment. Strong marketing campaigns should be carried out to promote ecofriendly products. Also, the staff should be trained and made aware of these concepts.

5.2.1.5 Reduction of polyethene usage

Reduction of polythene usage can be mainly done by reducing the usage of shopping bags. Shopping bags are mostly used for the packaging of vegetables and fruits. Alternative eco-friendly solutions for shopping bags should be introduced and customers should be encouraged to reduce the number of shopping bags used. For vegetable and fruit counters per bags can be introduced to use where necessary.

Polythene usage should be minimized not only at customer purchases but also at outlet operations. There is a possibility of reducing the usage of polythene at day to day work. Mostly polytene is collected as packaging of goods. Suppliers should be made aware to reduce the amount of polythene use and the deliveries from central warehouses should be more focused on reducing the polythene packaging. Instead they can be planned with reusable packaging.

5.2.1.6 Promotion of reusable packaging

Currently the company has introduced reusable customer bags and customers have given the chance to purchase them at outlets. Also, customers should be encouraged to bring them to the outlet at their next visit and some rewarding program can be arranged for those customers who reuse the packaging.

A significant amount of cardboard is collected at outlets from the various packaging of goods. Currently there is no proper mechanism to manage these and outlets sell them t outside vendors. As a company the management should focus on a proper mechanism to manage and recycle the collected cardboard and get use of it.

Introducing refillable products to market can also reduce the waste generation in product life cycle. Most of the household washing detergents and cleaning products

can be made available in refillable packaging. Customers should be made aware to use them also the operational staff should be trained to market them to customers.

5.2.2 Internal Factors Influencing the Implementation of GSCM

Based on the analysis results four main internal factors of the company has been identified as key areas to be focused on when implementing GSCM.

5.2.2.1 Top management support

Top management support can be discussed in various aspects in current organizational structure all decision making is done by the top management and mainly driven by the head office. Outlets will receive the operational instructions to implement the decisions made.

GSCM is a process which can be implemented collaboratively with all employees. The involvement of operational and executive staff can add the customer experience for planning the implementation of GSCM. According to the analysis the current management practices on GSCM do not have much involvement of the staff located in outlets. Also, they are given less chances to implement new ideas related to the subject. Staff involvement should be improved and should welcome the implementation ides of the staff. It will be very worthful science they have the direct customer experience and also since they really experience the customer responses.

Top management should be open to all employees for discussion and there should be an open forum implemented to discuss the issues of GSCM implementations. The outlet network represents different levels of customer bases and different level of cultural aspects. An open forum will always help each other to share their experiences and expand their knowledge.

Suppliers are one of the main stake holders of the implementation of GSCM. Mostly suppliers meet the company staff at outlets at their deliveries. Control and monitoring of supplier activities is handled by the executive staff of outlets. Since the concept is still new to suppliers they should be closely monitored and get adhered to

the process. In order to get better results some authority should be delegated t executive staff to deal with suppliers and manage implementation process of GSCM.

5.2.2.2 Use of technology

Technology has become one of the main driving forces in any industry in the entire world. Super marketing is one such competitive industry which is driven by technology. At present there are many technologies used at outlets and the satisfactory level of them by employees does not rate in high although it exceeds 50% from the sample.

Almost all employees believe that new technologies can drive the GSCM implementation in a faster track and they have a hope of adopting new technologies. There are many examples from the world for which new technologies have supported of implementing GSCM. Countries such as Japan and China are more focusing on the development of new technologies for GSCM.

According to the current statistics energy preservation is a key area to be facilitated by technology. Electricity management can be well implemented by upgrading refrigerating with new technologies. Similarly, new technologies can resolve the problems all aspects of GSCM such as water management, green packaging, green marketing and green distribution.

5.2.2.3 Employee perception

Employees are one of the main key stakeholders in the process of implementing GSCM. Currently there are many practices followed by the staff with related to the key areas identified, although they have not received any training on GSCM. Employees by themselves has a need of implementing GSCM even they are not conceptually sound on. Educating employees on "green" concepts will drive the implementation of GSCM in a more effective and fruitful path.

5.2.2.4 Facilitating conditions

A well facilitated environment is one of the main factors for the success of any project. Implementation f GSCM deal with many supported services such as budget allocations, staff training, well explained implementation instructions and facilitated office environment.

Budget allocations should be well planned and it is recommended to allocate some budget reservations for outlet executive staff for the expenses of outlet specific requirements. According to the analysis the staff is not satisfied with the allocated budget.

Knowledge management is another key area to be focused on. According to the analysis results current level of awareness of employees regarding GSCM is very low. Most of them has not received any training on GSCM. By providing instructions for such employees who do not have any idea about the concepts to implement GSCM it will lead them to blindly follow the instructions and they will consider it only as a part of their day to day routines. This will affect the effectiveness of the process so it is very important to train the employees well and make them aware of the importance of GSCM.

Encourage the task force is another key fact to be considered. To encourage the staff an internal grading can be introduced to outlets with related to GSCM implementations and a rewarding program can be introduced to recognize the outlets with higher levels of implementation.

5.2.3 External Factors Influencing the Implementation of GSCM

Based on the analysis results three main external factors of the company has been identified as key areas to be focused on when implementing GSCM.

5.2.3.1 Market competition

At present GSCM has become an effective marketing tool in super market industry in Sri Lanka. Competitors are driving towards "green" and many eco-friendly projects are being launched. Implementing GSCM has become of the essentials to face the market competition.

According to the analysis customers are more attracted to super markets more towards "green". To win the market "green" practices should be more implemented at the points where the customer meets the business. For that there are many new concepts to be implemented. As discussed in waste management waste recycling projects can be implemented based on large scale outlets. Customers can be given the chance to dump recycling items like plastic bottles and polythene at these points and it will attract more customers to outlets. Currently the same practice is done at high way entrances. Recycling can be outsourced to third party vendors which can add man additional benefits to the company.

5.2.3.2 Consumer perception

Consumers are moving towards "green" and according to the present statistics consumers present at super markets value "green" products more and also, they are willing to pay on eco-friendly products sometimes even it costs more. "Green" has become a main key to win consumers of food and beverages. From company perspective this will be an additional advantage of implementing GSCM. Also, since the market is busy with "green" implementations customers have more choices in the market. This has led the industry in a more competitive way. Favorable consumer perception on GSCM has become one of the main driving forces of implementing "green" in super markets. The management should always focus on consumer interests and should implement necessary initiatives to grab more and more "green" consumers to the business. As discussed, existing customer loyalty program should be coupled with GSCM implementation and may focus on implementing rewards schemes for "green" customers. Parallelly consumer awareness can be improved by the marketing programs and it will help to make the implementation process efficient.

5.2.3.3 Government rules and regulations

As general public is more conscious of environmental issues, the stakeholders in the supermarket industry are also more concern about the environmental effects of the products they produce or purchase. The supermarket industry needs to cater this need. The government has set rules and regulations which the industry needs to comply with. By setting these rules and regulations the government tries to promote the green production and consumption throughout the supply channels. In this study it is observed that majority   of respondents who are the stake holders in the supermarket industry are not clearly aware the prevailing rules and regulations in relation to the GSCM.   In that case the government, environmental organizations and other

responsible agencies has a responsibility to educate the general public about the prevailing laws which are to be adhered by the stakeholders in the supermarket industry in relation to supply chains. By doing so the general public will get an idea about the standards which should be expected from the supply chains in the supermarket industry. Then they can set their level of expectations in relation to maintaining green practices in supermarket industry. Then the customers can set the trends of demand and the industry will automatically switch to green practices in order to cater the need. With the emerging needs of environmental conservation, the logistic professionals in the supermarket industry have a moral obligation to adhere to the government rules and regulations of the country in relation to GSCM. It is observed that the stakeholders including customers in this industry are now aware about the government rules and regulations in relation to use of bio degradable polythene. The government controls and maintains the standards according to the legislations and the supply chains have been designed accordingly. There the government has played a key role in educating general public on the prevailing laws in relation to use of polythene and has strictly pushed the market and supply chains to adhere in to the law. This shows that the government should strengthen the prevailing laws and should educate the general public and the stakeholders in the industry about the rules and regulations in relation to GSCM. This will lead to standardize the green supply chains in the super market industry.

From the company perspective all employees should be made aware of the rules and regulations and necessary controls should be implemented to meet the government compliances.

5.2.4 Blocking issues of implementing GSCM

According to the analysis GSCM is implemented in many outlets which represents the majority of the sample. But the level of implementation is not satisfactory when

compared to the industry practices and the competitor involvements on GSCM. The company runs in a very basic level of "greening"

Rather discussing on blocking factors, the researcher would like to elaborate some factors as delaying forces for the implementation of GSCM.

Knowledge management is one key fact that is identified. All employees are not sound with a satisfactory level of education on GSCM in both theoretical and practical aspects. As recommended the company should take necessary initiatives to fill the knowledge gap of employees to fasten the implementation process.

Absence of a company policy on GSCM is another drawback which was identified in the current organization structure. Employees are not aware of the company rules and regulations. The company should have a proper vison and mission on implementing "green". This should be coupled with the government rules and regulations in the country.

Lack of support services is another delaying factor of implementing GSCM. Currently there are no proper mechanisms implemented on processes such as recycling water and waste, energy managing and green marketing. This will lead many problems when implementing GSCM and so that as recommended the necessary initiatives should be taken to implement other support services within the company itself or by outsourcing.

5.3 Conclusion

Super market industry in Sri Lanka is struggling to implement GSCM and it has developed as a new model for companies to achieve their objectives and reach their profit goals by depressing their risks environmental preservation and influences and while increasing their ecological efficiency. In this thesis, the researcher has presented an analysis to study the most important factors and issues on GSCM practices for super market industry. The study of this thesis has studied some different parameters which related internal and external to super market industry based on the available literature and collected data from the questionnaire.

The subjected case study elaborates that discussed internal factors and external factors are equally important for a successful implementation of GSCM. The concept is still new for super market industry in Sri Lanka but the company has recognized the importance of "go green" and trying to put it into practice. The company is lack of knowledge, experience and related technological advances for effective implementation of GSCM. Also, the management should more focus on implementing the related support services such as recycling within the company itself.

5.4 Future research

This research can be further extended for other leading supermarkets to get more accurate data on the entire business segment of the country. Furthermore, this research can be extended to examine the nature of suppliers and distributers who are linked with supermarkets and to explore the green nature of a product throughout the entire life cycle.

REFERENCES

Adapting for a Green Economy: Companies, Communities and Climate Change. (2011).

Batcha, S. (2017). Holistic Approach of Research Work. International Journal of Scientific And Research Publications, 4(7), 1-2.

Brown, J. D. (1996). Testing in language programs. Upper Saddle River, NJ: Prentice Hall Regents.

Chandra, C., & Kumar, S. (2000). Supply chain management in theory and practice: a passing fad or a fundamental change? *Industrial Management & Data Systems*, *100*(3), 100-114. doi: 10.1108/02635570010286168

Chin, T., Tat, H., & Sulaiman, Z. (2015). Green Supply Chain Management, Environmental Collaboration and Sustainability Performance. *Procedia CIRP*, *26*, 695-699. doi: 10.1016/j.procir.2014.07.035

Chopra S, Meindl P. Supply chain management: strategy, planning, and operation. 4th ed. Upper Saddle River, New Jersey: Pearson Education,Inc; 2010

Coakes S. J. SPSS: Analysis without anguish: Version 12.0 for Windows. Queensland, Australia: Wiley; 2005.

Competitiveness Through Green Productivity, China, 25-27 May.

Daily, B.F. and Huang, S. (2001) 'Achieving sustainability through attention to human resource factors in environmental management', International Journal of Operations & Production Management, Vol. 21, No. 12, pp.1539–1552.

Fiksel, J. (1996). Design for Environment: Creating Eco-Efficient Products and Processes. New York: McGraw-Hill.

Fortes, J. (2009). Green supply chain management: A literature review. Otago Management Graduate Review, 7, 51-62.

Frederick, Howard & Elting, Jens. (2013). Determinants of green supply chain implementation in the food and beverage sector. Int. J. of Business Innovation and Research. 7. 164 - 184. 10.1504/IJBIR.2013.052577.

Gilbert S. Greening supply chain: enhancing competitiveness through green productivity. Tapei, Taiwan; 2001. p. 1–6.

Govindarajulu, N. and Daily, B.E. (2004) 'Motivating employees for environmental improvement', Industrial Management & Data Systems, Vol. 104, No. 4, pp.364–372.

Holt, D. (2009). An Empirical Study of Green Supply Chain Management Practices Amongst UK Manufacturers. Journal of Manufacturing Technology Management, 20(7), 933-966. http://dx.doi.org/10.1108/17410380910984212.

Huang J. (2001). Eco-Efficiency and an overview of green productivity, Conference on Enhancing Competitiveness Through Green Productivity, China, 25-27 May.

Hwa, T. J. (2001). Green Productivity & Supply Chain Management, Conference on Enhancing

Jayarathna, Chamari. (2017). The Level of Green Supply Chain Practices Adoption in Sri Lankan Manufacturing Companies. International journal of supply chain management. 5.

Jesús Ángel del Brío, Beatriz Junquera & Mónica Ordiz (2008) Human resources in advanced environmental approaches–a case analysis, International Journal of Production Research, 46:21,6029-6053, DOI: 10.1080/00207540701352094

Kline, R. (2007). Principles and practice of structural equation modeling (4th ed.). New York: Guilford Press.

Kamolkittiwong, A., & Phruksaphanrat, B. (2015). An Analysis of Drivers Affecting Green Supply Chain Management Implementation in Electronics Industry in Thailand. Journal of Economics, Business and Management, 3(9). http://dx.doi.org/10.7763/JOEBM.2015.V3.299.

Lee, S.-Y. & Rhee, S.-K. (2007) The change in corporate environmental strategies: a longitudinal empirical study. Management Decision, Vol. 45, No. 2, pp. 196-216.

Lee, Y.H., Kim, S.H. (2000), Optimal production distribution planning in supply chain management using a hybrid simulation analytic approach. In: Proceeding of the 2000 Winder Simulation Conference, Department of Industrial Engineering, Hunyung University

Lu, L. Y., Wu, C. H., & Kuo, T. C. (2007). Environmental principles applicable to green supplier evaluation by using multi-objective decision analysis. International Journal of Production Research, 45(18-19), 4317-4331.

Lund, R.T. (1984). Remanufacturing. Technology Review, 87, 18–23

M. Nelson, D., Marsillac, E., & Rao, S. (2012). Antecedents and Evolution of the Green Supply Chain. Journal Of Operations And Supply Chain Management, (Special Issue (December), 29–43.

Miller, S. (1997) 'Implementing strategic decisions: four key success factors', Organization Studies, Walter de Gruyter GmbH & Co. KG., Vol. 18, No. 4, p.577.

Ninlawan, C., Seksan, P., Tossapol K. & Pilada, W. (2010). The implementation of green supply chain management practices in electronics industry. Proceedings of the International Multi Conference of Engineers and Computer Scientists, Hong Kong, March 17 – 19.

Pham, Khuyen. (2017). The Factors Affecting Green Supply Chains: Empirical Study of Agricultural Chains in Vietnam. Journal of Management and Sustainability. 07. 135-143. 10.5539/jms.v7n2p135.

Srivastava, S. K. (2007). Green Supply Chain Management: A State of the Art Literature Review. International Journal of Management Review, Vol. 9 No. 1, pp. 53-80.

Sykes, A.O.(1993). An introduction to regression analysis

The Ten Principles | UN Global Compact. (2019). Retrieved from
https://www.unglobalcompact.org/what-is-gc/mission/principles

Tinsley, H. (2006). Handbook of applied multivariate statistics and mathematical
modeling (pp. 265–296). San Diego: Acad. Press.

Wanninayake, W M C & Randiwela, Pradeep. (2007). THE IMPACT OF VISUAL
MERCHANDISING ON CONSUMER STORE CHOICE DECISIONS IN
SRI LANKAN SUPERMARKETS.

Wibowo, M., Handayani, N., & Mustikasari, A. (2018). Factors for implementing
green supply chain management in the construction industry. Journal Of
Industrial Engineering And Management, 11(4), 651. doi: 10.3926/jiem.2637

APPENDIX

A. Questionnaires

Analysis of Factors Influencing the Implementation of Green Supply Chain Management Practices: A Case Study on a Leading Supermarket in Sri Lanka

You are kindly invited to participate in a research study conducted by Mr G.H.D.D Dharmarathna one of the students of Master of Business Administration on Supply Chain Management and in Faculty of Engineering at University of Moratuwa. The purpose of this research is to identify the Factors Influencing the Implementation of Green Supply Chain Management Practices

Your participation will involve providing answers to the given questionnaire

There are no known risks associated with this research and your personal data or institutional data will not be collected.

This research is carried out only for academic purpose and there are no hidden objectives. The results of this research may help to identify the factors influencing the implementation of green supply chain management practices and it will help the management to make decisions when implementing green supply chain management at super markets.

The data you provide through the questionnaire will not share with any other external party and the privacy of data will be highly protected.

Your participation in this research study is voluntary. You may choose not to participate and you may withdraw your consent to participate at any time. You will not be penalized in any way should you decide not to participate or to withdraw from this study.

If you have any questions or concerns about this study or if any problems arise, please contact Mr.G.H.D.D.Dharmarathna at Faculty of Engineering, University of Moratuwa at 0727758343.

5.4.1 Questionnaire to be filled by sales persons

A Study on Factors Influencing the Implementation of Green Supply Chain

Management Practices in Sri Lanka

1. Gender:

Male		Female	

2. Age   :

15-20		21-25		26-30		31-35		36-40	
41-45		46-50		51-55		56-60			

3. Job Category:

Chief cashier	
Cashier	
Grocery	
Butcher	
Produce	

4. Your highest educational qualification.

Degree	
Diploma	
Advance Level	
Ordinary Level	
Other (Please specify)	

5. Do you know anything about green supply chain management?

Yes		No	

If "Yes" Please answer 5.1

5.1 Have you received any training or awareness on green supply chain management from your work place?

Yes		No	

If "No" How did you get awareness on Green supply chain management?

……………………………………………………………………………………………

…………………………………………………………………………………………..

6. Do think that you can create an environmentally friendly environment at your outlet?

Yes		No	

7. Does your company have rules and regulations to protect environment?

Yes		No		Not aware of	

Please mark the most suitable answer (X)

8. Do you follow following practices at your outlets?

	Strongly Agree	Agree	Disagree	Strongly Disagree
the unnecessary use of electricity is reduced in the outlet				
the waste of water is minimized in the outlet				
the use of polythene is minimized in the outlet				
the use of plastic is minimized in the outlet				
the waste of food is minimized in the outlet				
There is a proper mechanism to manage garbage				

9. How is your customer experience?

	Strongly Agree	Agree	Disagree	Strongly Disagree
encourage customers to use reusable customer bags				
encourage customers to reduce the number of shopping bags use				
Customers are willing to reduce the number of shopping bags used				
Customers are willing to use reusable bags and packaging				
Customers are willing to spend on environmental healthy products				

Questionnaire to be filled by executive officers

1. Your experience in super market industry?

0-5 yrs		6-10 yrs		11-15yrs	
16-20 yrs		21-25 yrs		26-30 yrs	

2. Do think that you can create an environmentally friendly environment at your outlet?

Yes		No	

3. Does your company have rules and regulations to protect environment?

Yes		No		Not aware of	

4. Why do you think that GSCM should be implemented?

	Since it is a company regulation
	Since it is forced by the government
	Since it is necessary to meet the market competition
	Since it is a social responsibility

5. How does the company management promote GSCM?

	Strongly Agree	Agree	Disagree	Strongly Disagree
I get enough opportunities to implement new GSM practices.				
I can easily discuss with the management about my problems when implementing GSM				
I have the authority to influence on suppliers on GSM				

I receive well explained guide lines to implement GSM				
I receive enough training on GSM				
I have enough budget reservations for green supply chain management				

6. How does the market behave in GSM?

	Strongly Agree	Agree	Disagree	Strongly Disagree
My competitors are promoting GSM than in my company				
Customers are more attractive on GSM implementations				
Competitors receive additional benefits from GSM				

7. What are the key areas that you are focusing on?

	Electricity management
	Water management
	Waste management
	Eco friendly marketing campaigns
	Reduction of polythene usage
	Promotion of reusable packaging

8. Are you aware of the government rules and regulations on GSM in super market industry?

Yes		No	

9. Have you taken necessary implementations to meet government compliances?

Yes		No	

10. Do you think that the usage of new technologies can improve green supply chain management (GSCM)?

Yes		No	

11. Are you satisfied with the technological solutions currently used within the company with related to GSCM?

Yes		No	

12. Any other practices you use to implement GSCM?

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
…………………………………………………

13. Any other comments

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………….

B. The Morgan Table

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—N is population size. S is sample size.

Source: Krejcie & Morgan, 1970

C. Regression Analysis Results

Analysis results of market competition and GSCM implementation.

Table C.1 Analysis of MC and GSCM

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.595	.338		1.758	.080
	MC	.602	.027	.847	22.405	.000

a. Dependent Variable: GSCM

Analysis results of customer perception and GSCM implementation.

Table C.2 Analysis of CP and GSCM

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.098	.327		-.301	.764
	CP	1.047	.041	.874	25.306	.000

Analysis results of government rules and regulations and GSCM implementation.

Table C.3 Analysis of GR and GSCM

Model		B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-.378	.185		-2.038	.043
	GR	.699	.015	.957	46.286	.000

a. Dependent Variable: GSCM

Analysis results of top management support and GSCM implementation.

Table C.4 Analysis of TMS and GSCM

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.119	.123		.967	.335
	TMS	1.337	.020	.978	66.092	.000

a. Dependent Variable: GSCM

Analysis results of employee perception and GSCM implementation.

Table C.5 Analysis of EP and GSCM

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.585	.198		2.947	.004
	EP	.518	.018	.903	29.456	.000

a. Dependent Variable: GSCM

Analysis results of facilitating conditions and GSCM implementation.

Table C.6 Analysis of FC and GSCM

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.587	.576		1.019	.312
	FC	.945	.077	.828	12.273	.000

a. Dependent Variable: GSCM

Analysis results of technology usage and green supply chain management implementation.

Table C.7 Analysis of TU and GSCM

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-.524	.263		-1.990	.049
	TU	.711	.021	.950	34.129	.000

a. Dependent Variable: GSCM