THE BARRIERS OF ADOPTING GREEN SUPPLY CHAIN MANAGEMENT IN SMALL MEDIUM ENTERPRISES: AN EMPIRICAL STUDY ON FOOD AND BEVERAGE MANUFACTURING FIRMS IN SELANGOR, MALAYSIA

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BY

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A research project submitted in partial fulfillment of the requirement for the degree of

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DECLARATION

We hereby declare that:

(1) This postgraduate project is the end result of our own work and that due acknowledgement has been given in the references to ALL sources of information be they printed, electronic, or personal.

(2) No portion of this research project has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutes of learning.

(3) The word count of this research report is **18,333**.

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DEDICATION

Dedicated to:

Dr Peter A/L Yacob

Supervisor who is supportive, encouraging and motivating that had guided me throughout the process of this research project.

Universiti Tunku Abdul Rahman (UTAR)

For giving me the opportunity and facilities to conduct this research project.

Family members and friends

Who are supportive regardless of the situation, the moral support provided gave me the strength and motivation to complete this research project.

Respondents

To all respondents who were willing to spend their precious time to complete the questionnaires for this research study.

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LIST OF ABBREVIATIONS

α	Cronbach Alpha
β	Regression Coefficient
KMO	Kaiser-Meyer-Olkin
R2	Coefficient of Determination
SCM	Supply Chain Management
SPSS	Statistical Package for the Social Sciences
SSR	Sum of Squared Residuals
GHG	Greenhouse Gas
CO2	Carbon Dioxide
F&B	Food and Beverage
NGO	Non-Government Organization
SME	Small Medium Enterprises
GSCM	Green Supply Chain Management
ISO	International Organization for Standardization
EMS	Environmental Management System

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PREFACE

This research project was written as partial fulfilment of the requirement for the degree of Master of Business Administration (Corporate Management) at Universiti Tunku Abdul Rahman (UTAR). This research project is carried out to analyse the relationship between the barriers and the adoption Green Supply Chain Management (GSCM) among the food and beverage SMEs located in Selangor, Malaysia. This research also determines which barrier is more crucial and implications for conceptual, policymakers and managerial are also discussed in detail.

Previous study on green practices in Malaysia focuses on the perception of GSCM challenges of green practices, green purchasing adoption and green innovation initiatives. This study provides preliminary understanding on the barriers and setbacks of the implementation of GSCM among the F&B manufacturing SMEs. Understanding barriers of a new adoption is important for a successful implementation of a new concept in an organization. By identifying the barriers it allows the organizations to develop suitable strategies and planning more effectively and efficiently. Furthermore, this study focuses on the SMEs in Malaysia because the Malaysia government further commits in developing the SMEs by implementing the Malaysia Industrial Master Plan (IMP3) spanning for the year 2006 to 2020 (Hoq, Ha & Said, 2009). Besides that, SMEs accounts for 95.4 per cent of companies in the manufacturing sector in Malaysia.

ABSTRACT

This study investigated the barriers for food and beverage manufacturing SMEs located in Selangor, Malaysia in adopting Green Supply Chain Management (GSCM). Three questions were asked in this context of study, does the food and beverage manufacturing SMEs in Selangor willing to implement GSCM to contribute to a better environment? The second question is whether do the five barriers (Perception on company's environmental impact, organizational barriers, technological barriers, financial barriers and informational barriers) hinder the food and beverage manufacturing SMEs in Selangor from adopting green supply chain management? The last question is which barrier has the most impact to hinder food and beverage manufacturing SMEs in Selangor in implementing GSCM? In order to address this question, a quantitative survey is being conducted and a total of 200 responses were collect by means of surveys. A conceptual framework was developed and the result of the study indicates that the barriers to adopt GSCM are perception on company's environmental impact, organizational barriers, technological barriers, whereas financial and informational barriers are not significant in this study. These results provide important implications for policymakers, researches and manufacturers to continue to develop plans and strategies to further promote GSCM within Malaysia and also other manufacturing industry.

Keywords: Barriers, Green Supply Chain Management (GSCM), Manufacturing SMEs

CHAPTER 1: INTRODUCTION

1.0 Introduction

Traditionally, business had been focusing on corporate strategy that reduce cost and maximize profits. They place much focus supply chain management (SCM) because a good SCM can help to achieve cost reduction and improve profit that place the organization in competitive advantage. Besides that, in the 20th century, many organizations strategies relate to reduce waste to save cost instead for environmental purpose, only after moving into the 21st century, the term "green" gains momentum and popularity to protect the environment and for organization's reputation (Zhang et al., 2009). This is because there increase in the concerns about the environmental issues such as consumer health, greenhouse gases (GHGs), limitation of resources and global warming (Lee, 2010). This had stress many firms to manufacture goods that will reduce pollution, environmental friendly, and safe to use (Mathiyazhagan & Haq, 2013). Besides that, there are several literatures that illustrates the advantages for business if they take up environmental practices (Perron, 2005; Mudgal et al., 2009; Mudgal et al., 2010; Kannan et al., 2008; Carter & Rogers, 2008; Hsu & Hu, 2008; Sarkis et al., 2011; Shipeng & Linna, 2011).

One of the concepts that had been applied to many companies in the European countries is the green supply chain management (GSCM). GSCM practices allow companies to achieve better environmental target and promote sustainability awareness through the industry or market by ensuring that the stakeholders supply products that meets the environment requirement (Brady, 2005; Envirowise, 2001). Therefore, this dissertation will address the barriers for small medium enterprises (SMEs) in adopting green supply chain management (GSCM) specifically in the food and beverage manufacturing firms in Selangor, Malaysia. The areas covered

in this chapter will be the research background, problem, objectives, questions, significance, scope of study, limitation of study, the definition of the variables, organization of the thesis and summary.

1.1 Background of the Study

The Malaysia government places high importance on the manufacturing sector in view of the fact that the government is well aware that this sector contributes to the industrial foundations of the country (Ab Rahman et al., 2008). Malaysia's manufacturing industry is blooming as the year goes by, the Malaysia's index of industrial production increased by 4.2% in year 2017, and the top growth is the manufacturing industry with 6.7% (RM 60.5 billion) of growth from last year (Department of statistics, 2017). In many countries, the SMEs play a part in the development of the country in terms of economy. SMEs are also important in Malaysia in view to the government's focus and plans for the SMEs. In the year of 1971, the Malaysia government implements the New Economic Policy (NEP) to improve the citizen's welfare and restructure the ethnic economic imbalances (Hoq, Ha & Said, 2009). The Malaysia government further commits in developing the SMEs by implementing the Malaysia Industrial Master Plan (IMP3) spanning for the year 2006 to 2020 (Hoq, Ha & Said, 2009). In Malaysia, 95.4% of companies in the manufacturing sector are of SMEs (SME Malaysia, 2011). Selangor is the state that has the most manufacturing SMEs in Malaysia with a total of 8,314 firms and that accounts to 22% of the all the manufacturing SME in Malaysia (SME Malaysia, 2011). The major subsector that contributes to the manufacturing sector growth is the food and beverages and tobacco (15.4%), electrical and electronics products (9.7%) and petroleum, chemical, rubber and plastic products (3.0%) (Department of statistics, 2017). This illustrates that the Malaysia food and beverage (F&B) industry is growing at a fast pace and this industry accounts to approximately 9.8% of the country's exports in year 2015 (Euromoney institutional investor company, 2016). Specifically, the food and

beverage manufacturing SME constitute to approximately 15.8% of the total manufacturing SME in Malaysia (Department of statistics, 2017).

The environment pollution in Malaysia is getting from bad to worse with the growth of manufacturing sector. The environmental issues are one of the most important concerns for the Malaysian citizens and the government (Eltayeb, Zailani & Ramayah, 2011). In the year 1974, the environmental quality act of Malaysia had been established, there had been revision from time and currently it has included 18 new regulations to allow projects of assessments on sewage, clean air, and industrial seepage (Rao, 2004). Many other non-governmental organizations (NGOs) were form to follow up and monitor the country's environmental issues and updates (Eltayeb, Zailani & Ramayah, 2011). According to the Department of Statistics of Malaysia (2016), industrial sector contributes to 2.8% of the source of emission of pollutants to the atmosphere in Malaysia, which is equivalent to 85,965 tonnes coming after motor vehicles and power plant. In order to achieve a hazard free and clean environment, green supply chain management (GSCM) is one of the tools to combat the continuous environmental issues in Malaysia (Mathiyazhagan & Haq, 2013).

GSCM offers organizations the approach to maintain quality control in the global market and competitiveness, enhancing industrial networks, safeguard quality product and customer contentment while keeping the environment green (Min & Kim, 2012). This method allows lives to stop deteriorating, sustain the resources in a systematic ways, prevent pollution and conserve the energy (Min & Kim, 2012). Organization needs to be alert in not only improving their performance but integrate environmental actions into their strategies to reduce the pollution source, organizations. They also need to balance between compliance with legislations, optimizing profit while fulfilling their stakeholders' objectives (Younis, 2016). Businesses that can achieve these goals while satisfying their stakeholders' interests can be a potential value for the company (Ayuso et al., 2014; Russo & Foutus, 1997). In spite of the increasing importance of GSCM, there are

organizations which fail to adopt this strategy and the reason for the failure is often due to the hurdles during the transition of adopting GSCM (Govindan et al., 2014). Organizations need to equip themselves to overcome these hurdles which are called as barriers. They should identify the barriers during the initial stages of adopting GSCM. Since the manufacturing SMEs in Selangor and particularly in the food and beverage industry accounts to the highest sector in the manufacturing industry in Malaysia, thus, it is important to further understand their barriers of the adoption of GSCM.

1.2 Problem Statement

The rate of increase in the manufacturing SMEs environmental protection expenditure is rising on an uphill trend from year to year. In actual fact, the manufacturing SMEs environment protection expenditure is on increasing trend from year 2014 to 2016. A total of 13.9 percent of environmental protection expenditure noted in year 2014 (Economic Census, Department of Statistics Malaysia, 2015) and consequently increased to 14.8 percent in year 2015 (Economic Census, Department of Statistics Malaysia, 2016). The expenditure increasing trend appears to continue in year 2016 with a drastic rise to 15.2 percent (Economic Census, Department of Statistics Malaysia, 2017). The increment in the expenditures evidently shows that the environmental issues in manufacturing SMEs severity are worsening and uncontrollable. Even though, the manufacturing SMEs environment protection expenditure for the year 2017 yet to be published, it is forecasted that the spending on years 2017 will be greater than current expenditure due to the worsening environmental issues in manufacturing SMEs.

In evidence of the available data, the spending trend of Malaysian government towards environment protection found to be mounting over the years and it can be

seen that progress does not seem so apparent in Malaysia towards adoption of green supply chain management in F&B manufacturing SMEs. Despite the Malaysian government's recognition of environmental problems and the introduction of Green Technology policy, there is, in fact, a couple of research, conceptually and empirically on SME greening found within the Malaysia context but none of this research clearly describes the countermeasures or improvement in environmental awareness nor behavior among F&B manufacturing SMEs in Malaysia. In fact, Malaysia is one of the countries where issues related to environment pollution are becoming more critical. From the trends in Global CO2 emissions report (2016), Malaysia is one of the eight largest CO2 emitting countries which contribute to 0.7% of the world's CO2 emission.

In Malaysia, the SMEs are considered the backbone of industrial development and play a vital role to the economy growth of Malaysia (Musa & Chinniah, 2016). The SMEs in Malaysia contributes 41% of the country's GDP compared to 32% in 2012, and most of the local SMEs are suppliers for multi-national companies (MNCs) globally (Musa & Chinniah, 2016). Selangor is the state that has the most manufacturing SMEs in Malaysia with a total of 8,314 firms and that accounts to 22% of the all the manufacturing SME in Malaysia (SME Malaysia, 2011). These pollutions will have adverse effects on ecology, operational performance, environmental performance, economic performance and social performance (Global CO2 emissions report, 2016). In order to achieve higher profit and market share, businesses will need to step up in lowering the impacts and risks towards the environment (van Hock & Erasmus, 2000). Given the pressures from local and international stakeholders, it is essential to understand the reasons why Malaysia SMEs are relatively slow in adopting GSCM in their organizations and outline counter measures to overcome it.

Although the above studies provide some evidence of evaluating greening factors, none has exclusively investigated the pattern and dimension of green supply chain adoption among F&B manufacturing SMEs. Thus, an examination of the F&B

manufacturing SMEs is a worthwhile pursuit for not only understanding the green behavior of SMEs generally and F&B manufacturing SMEs specifically, but also contributing to the literature by undertaking a study focusing on a single industry within a relatively homogenous geographic, economic and political environment. This enables a degree of control for variations in the environmental influences on the firm's behavior and allows for a more effective and holistic examination of the firm-specific and managerial variables that affect the greening process. Therefore, an inclusive framework to research on adoption of green supply chain management in Malaysian F&B manufacturing SMEs is strongly recommended to minimize the impact and conserving the environment as a whole.

1.3 Objectives of the Study

1.3.1 General Objectives

The general objective of this study is to determine the barriers in adopting green supply chain management (GSCM) in small medium enterprises (SMEs) specifically in the food and beverage manufacturing firms in Selangor, Malaysia.

1.3.2 Specific Objectives

Based on the aforementioned, the general objective can be broken into a few specific objectives, which can be addressed as follow:

(a) To determine the direct relationship of perception on company's environmental impact towards adoption of GSCM among food and beverage manufacturing SMEs in Selangor.

(b) To assess the direct relationship of organizational barriers towards adoption of GSCM among food and beverage manufacturing SMEs in Selangor.

(c) To examine the direct relationship of technological barriers towards adoption of GSCM among food and beverage manufacturing SMEs in Selangor

(d) To determine the direct relationship of financial barriers towards adoption of GSCM among food and beverage manufacturing SMEs in Selangor.

(e) To assess the direct relationship of informational barriers towards adoption of GSCM among food and beverage manufacturing SMEs in Selangor.

1.4 Research Questions

When addressing a research problem, an inclusive approach is needed to address the research problem. As such, to achieve the above objectives, the present study attempts to answer the following research questions:

(a) Is there any direct relationship between perception on company's environmental impact and adoption of GSCM among food and beverage manufacturing SMEs in Selangor?

(b) Is there any direct relationship between organizational barriers and adoption of GSCM among food and beverage manufacturing SMEs in Selangor?

(c) Is there any direct relationship between technological barriers and adoption of GSCM among food and beverage manufacturing SMEs in Selangor?

(d) Is there any direct relationship between financial barriers and adoption of GSCM among food and beverage manufacturing SMEs in Selangor?

(e) Is there any direct relationship between informational barriers and adoption of GSCM among food and beverage manufacturing SMEs in Selangor?

1.5 Significance of The Study

This research is expected to achieve and contribute to a few parties after it has been completed as followed.

1.5.1 Researchers / Practitioners

This study's goal is to provide guidance and reference for future researches to conduct their studies. Many studies have analyzed the adoption of GSCM however there are limited studies concerning the barriers of implementing GSCM in Malaysia. This research aims to provide practical contribution that would further enrich the knowledge and understanding of researchers on the barriers of adopting GSCM among the food and beverage manufacturing SMEs. There is a necessity to initiate more studies in Malaysia because many academicians around the world have been working on the barriers of GSCM such as China and India. Therefore, this study intends to reduce the literature gap, provide data that are supportive to the subject in order for researches to establish more research in the similar scope in future.

1.5.2 Manufacturing SMEs

This research may help the manufacturing firms in Malaysia to evaluate the barriers that hinders the food and beverage SMEs in implementing GSCM. By evaluating the four types of barriers, it will certainly provide better understanding on the details of the barriers and how to overcome these barriers. Other than that, there might be a new point of view and perspective and new findings that was not known or paid less attention by the SMEs. It will help manufacturing SMEs mitigate the barrier and also risks which in turn would assist them to make better informed decisions in the future when there are credible studies and information available.

1.5.3 Policymakers

This research intends to contribute to the policy makers of Malaysia to provide insights to the current progress of green practices among small medium enterprises. It may also help policy makers to understand the barriers that the SMEs are facing in regards to the implementation of GSCM and the efforts could be executed by policymakers to further improve the current situation. The findings of this research may also assist policymakers to properly outline measures in planning, developing and implementing GSCM among SMEs in Malaysia. When there is sufficient support and resources from the policymakers, this will further develop the SMEs to the next level in green practices and apply the green practices into their current supply chain.

1.6 Scope of The Study

This study focuses on green supply chain management (GSCM) and the research would highlight the barriers for Malaysia SMEs in adopting this concept. Market analysis had been carried out in the state of Selangor, Malaysia among the food and beverage small and medium enterprises (SMEs). This is would be helpful to understand whether the main barriers which are organizational, technological, financial and informational barriers are the reasons that the refrain the SMEs from implementing green supply chain management (GSCM). By knowing the reasons of the barriers, it will provide insights to policymakers and the manufacturing SMEs the understanding and develop methods to overcome the barriers. This will encourage the manufacturing SMEs further to put into practice green practices in their organizations to achieve the company and country's goals and vision.

1.7 Limitation of The Study

This research focuses on the supply chain of the food and beverage sector and does not attempt to examine the other SCM in other business sectors because the research field is too large. This study also focuses on small medium enterprises and does not examine all the manufacturing firms because it is labour and time intensive in data collection for all manufacturing firms in Malaysia. Therefore, this study only focuses in the food and beverage SMEs within Selangor, Malaysia area. In addition, this study concerns the accessibility of the data due to the involvement of respondents is small medium enterprises and it is relative difficult to access to the correct person in charge in the firm to obtain their response.

1.8 Definition of Terms

1.8.1 Green Supply Chain Management (GSCM)

This section begins with identifying and defining the definition of supply chain management to further define green supply chain management (GSCM). According to Handfield et al., (2002), the supply chain encompasses all activities associated with the flow and transformation of goods from raw materials (extraction), through the end user, as well as associated information flows. Material and information flow both up and down the supply chain (Handfield et al., 2002). There are a number of definitions that evolves for GSCM over the years; GSCM is the dealing of the relationships of SCM to the natural environment and involves the adding of the "green" component to the SCM (Hervani, Helms & Sarkis, 2005). "GSCM refers to the way in which innovations in supply chain management and industrial purchasing may be considered in the context of the environment (Green et al., 1996, p. 188)". Zhu and Sarkis (2004) defines

GSCM includes adding the environmental perspective into product sourcing, selection, design, manufacturing, and the delivery of product and also reverse logistics. From these definitions, it sums up the GSCM definition in the formula below (Hervani, Helms & Sarkis, 2005).

Green Supply Chain Management (GSCM) = Green Purchasing + Green Distribution/Marketing + Green Manufacturing/Materials Management + Reverse Logistics

1.8.2 Perception on Company's Environmental Impact

The perception on company's environmental impact seeks to identify what are the perceptions of these companies in terms of their environmental impacts (Analoui, Farhad & Karami, 2002).

1.8.3 Organizational barriers

The organizational barriers refer to the hindrances in the flow of information or concept from the management to employees (Business jargons, n.d.). According to Pun (2006), any success for green management practices relies on the maturity level of the management leadership and commitment. Organizational is a barrier when there is a lack of management's participation, support, leadership and interests in the new processes and practices (Mudgal et al., 2010).

1.8.4 Technological Barriers

The business dictionary (2017a) defines technology as the application of useful information in the activities such as production, utilization, design of products and services and also the organization of human activities. The technology barriers are the constraint or hindrances to apply and use technology (Oxford dictionary, 2017). Technology is able and has the function to provide huge amount of data in a short period of time regardless of the distance and allows collaboration among and between business functions and partners (Oxford dictionary, 2017).

1.8.5 Financial Barriers

Financial is a wide terminology to describe financial industry and many aspects of finance such as financial constraints, planning and more (Business dictionary, 2017b). Barrier is defined as an obstacle or stoppage that prevents access or movement (Oxford dictionary, 2017). Therefore, financial barriers are described as the inaccessibility to finances and financial supports.

1.8.6 Informational Barriers

Information is data which is specific, organized, timely and accurate for a purpose presented within a context which provides meaning and significance that leads to understanding of an uncertainty (Business dictionary, 2017c). Information is valuable because it can affect decision,

outcome and behaviour (Oxford dictionary, 2017). Hence, the informational barriers are the inability or limited access in obtaining data in an accurate and timely manner.

1.9 Organization of Thesis

This study consists of five chapters.

Chapter 1: Research Overview

Chapter one is an introductory chapter which includes the background of the study, problem statement, objectives of the study, research questions, significance of the study, scope and limitation of study, definition of the terms, organization of the thesis and summary.

Chapter 2: Review of literature

Chapter two describes the literatures that had been review of this research topic and the variables involved. The relevant theoretical model used in the literature review and conceptual framework of this study will be covered in this chapter. It is then followed by a conclusion to conclude the overall of this chapter.

Chapter 3: Research Methodology

Chapter three describes the overview of the research methodology that will be applied in the research. The methodology outlines the research philosophies and design, the sampling procedures, questionnaire development and operationalization of variables. It follows with data collection, validity, pilot study, data analysis methods and ends with ethical considerations and chapter summary.

Chapter 4: Analysis and interpretation of data

In this chapter, the response rate and examination of data will be presented. It follows by the test of normality and mutlicollinearity test, the demographic profile of respondent and percentage distribution of variables and goodness of measure. The results of this research will be presented through reliability analysis, correlation and linear regression analysis.

Chapter 5: Discussion and Conclusion

Lastly, chapter five is the summary of the whole research in which constructive discussions and conclusion will be outline. The summary of results, implications of the study, the potential limitations of the study as well as recommendations for the future research will be illustrated.

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1.10 Chapter Summary

In brief, this chapter has provided a background of the study, and the next chapter will present the literature review which is related to the study. This introductory chapter presents the research background and problem statement. From the problem statement, the research questions and research objectives are developed followed by significance, scope and limitations of the study, the definitions and organization of the thesis.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

Chapter two presents the literature pertinent to this study. This chapter will review the barriers for F&B manufacturing SMEs in Malaysia to adopt GSCM in which had been identified in research over the years.

2.1 Theoretical Perspective

2.1.1 Resource Based theory

The resource based theory is a model that is introduce after the emergence of the papers of Wenerfelt (1984) and Barney (1991), this theory implies that an organization has competitive advantage in the industry if they own resources which includes both tangible and intangible resources. The tangible resources refer to all physical assets and financial reserve. The intangible resources are such as knowledge, employee skills, attributes, reputation and corporate culture (Barney, 1991). Younis (2016) states that if the firm properly and effectively manage these assets it will elevate the firm's performance and outperform their competitors. These assets also allow the firm to implement strategies to achieve their set goals and vision to gain competitive advantage in the market (Barney, 1991; Daft & Lengel, 1986). These studies were further supported by Conner's (1991) study which affirms that it is not possible to evaluate only on firm's resources. The importance of the firm's resources is determined by the interaction of firm's valuable resources with

the market conditions. These are the factors that enable the firm to fully maximize market opportunities and avoid competition or threats to gain competitive advantage.

There is an extension of the resource based theory whereby Helfat and Peteraf (2003) included the integration of dynamic capabilities and Hart (1995) added natural resources into this theory. Dynamic capabilities refer to the ability of higher management in making adjustments of the company's resources such as resource allocation, integration, acquisition and developing new organizational strategy (Eisenhardt & Martin, 2000). For the natural resource based view by Hart (1995), his study illustrates the mixture of investments that could be used to improve environmental competency of an organization. These investments include investments in people, systems, process, strategies and technologies. Therefore, it can be said that both dynamic capabilities and investment perspective could be considered into this theory with the adoption of environmental training and practices. According to Carter and Carter (1998) and Foerstl et al., (2010), with the help of these resources and capabilities, the greening of supply chain would be of value, rarity, non-substitutability and inimitability. Sarkis (2009) also emphasize that these resources will be added business value to the firms' GSCM. Researchers such as Zhu and Sarkis (2004), Hart (1995) and Vachon and Klassen (2007) have use the resource based view theory and stress on the importance of environmental factors to achieve competitive advantage. Guang Shi et al., (2012) also emphasize that the GSCM research to date has use resource based theory as a motivating factor in the adoption of GSCM practices. Thus, this research will identify whether organization's resources such as perception of the company's environmental impact, organizational, technological, informational and financial resources are useful to understand whether they are a barrier in the adoption of GSCM.

2.1.2 Stakeholder theory

Besides the resource based view theory, there are also studies that depicts the various stakeholder pressures that companies faced in the different levels of capabilities of developing environmental strategies (Buysse & Verbeke, 2003; Sarkis et al., 2010). The definition of stakeholder defined by Freeman (1984, p. 26) is as "any group or individual who can affect or is affected by the achievement of an organization's objectives." This theory depicts that there is benefits from the integration and collaboration with other functions of the organization (Wong et al., 2015). There are both external and internal stakeholders as well; internal stakeholders are normally firm's employees, external stakeholders refer to customers, shareholders, government and the society (Freeman, 1984).

The external stakeholders do not have power over the organizational resources; rather they bring about coercive pressures because they have the capability to legalize or influence public opinion towards the firm's environmental practices (Freeman, 1984). Therefore, firms must comply with these environmental regulations if not they are oblige to penalties and fines and these pressures and threats will lead to bad reputation and image towards the firm. The internal stakeholders requires extensive training because employees are both the initiator and receivers of any strategies and activities the firm developed (Daily & Huang, 2001). In order for employees to gain the correct perception, commitment and understanding, it requires firm's support and commitments from top level managers (Zhu et al., 2008). Managerial interpretations (Sharma, 2000), attitudes and views (Cordano & Frieze, 2000), values and leaders (Egri & herman, 2000) and decisions will manipulate the management decisions on environmental activities.

Ayuso et al., (2014) supported that this theory connects to corporate social responsibility and it aids in the relationship between the firm and society and may also provide managers of the firm direction. Sarkis et al., (2011) and

Chien and Shih (2007) research uses the stakeholder theory to understand the relationship between the impact of stakeholders and GSCM and found significant positive relationship. Wong et al., (2015) states that based on this theory, firms collaborate their environmental management practices with relevant stakeholders to allow them to further contribute to green practices. Liu et al., (2012) affirms that this theory is relevant in discussing GSCM issues rather than other management activities. Therefore, correct perception, commitment and understanding are required in adopting new environmental programs within the firm because the stakeholders in the company are important in the adoption of these programs. In brief, it is important to understand whether the perception of the respondents and the organization itself such as their commitment and cultures are barriers to the implementation of GSCM. The theoretical model reviewed above which are resource based theory and stakeholder theory gives the theoretical basis for this research. The following sections will discuss the previous studies on this topic and the detail literature review of each independent variables and dependent variable.

2.2 Previous studies on barriers of adopting green supply chain management (GSCM) in small medium enterprises (SMEs).

Green supply chain management had been developed past years and it is continuously developing (Schaper, 2002; Dube, & Gawand, 2011). It was firstly highlighted in 1960s of the importance of environmental initiatives with economic development in developed countries (Schaper, 2002). Schaper (2002) stated that many governments in developed countries responded to this by putting more attention on the environment and enacts laws to watch over the environment. However, these green initiatives are only being implemented by large

organizations which have sufficient resources and SMEs are usually neglected. One of the reasons stated by Musa and Chinniah, (2016), it might be due to the limited knowledge that SMEs are exposed to the concept of environmental management. Revell and Rutherfoord (2003) also highlighted that the SMEs are not to be neglected because they are important to the economy and the environment because SMEs have a significant impact on the ecological systems due to their vast numbers. SMEs is also part of the economic growth in all nations and they are facing issues with protecting the environment with the ongoing globalization (Huang, Tan, & Dong, 2012; Musa, & Chinniah, 2016). Therefore, greater attention is required for the SMEs in the social and environmental management literature (Moorthy, 2012). Many countries such as Australia, United Kingdom, the USA and Europe manage to reveal some of the findings of SMEs and environment initiatives, firstly most of the small medium business owners believe that the environment is vital and protection is required to preserve the environment. Secondly, SMEs are also less likely to adopt environmental management systems, standards and audit than larger firms (Hutchinson & Chaston, 1994; Merritt, 1998; Petts et al., 1999; Tilley, 1999).

Many researchers' studies on the adoption of GSCM among SMEs had been increasing (Perron, 2005; Ramakrishnan et al., 2015; Mudgal et al., 2010; Sarkis et al., 2011; Shipeng, 2011; Yacob et al., 2013; Parmar, 2016). There had been researches that focus on the internal and external barriers of adopting GSCM practices (Yacob et al., 2012; Srivastav & Gaur, 2015; Wooi & Zailani, 2010; Zhu & Geng, 2013; Deepak & Mathiyazhagan, 2014). Zhu et al., (2010)'s research specifically analyze the external barriers which identify that the deficient in external cooperation will caused lower GSCM performance. According to Walker et al. (2008), the external barriers are such as industry specific barriers, regulations, and supplier commitment, whereas the internal barriers are the lack of cost and legitimacy. Furthermore, there are research on the environmental management in SMEs and the difficulty for SMEs in improving environmental performance (Clark, 2000) and the factors that cause the increase in adoption of EMS in SMEs (Hitchens et al., 2003). In regards to barriers in adopting GSCM, Perron's (2005) research has described four main barriers that hinder the adoption

of GSCM among SMEs which are informational, resources, technical and attitudinal and perceptions barriers. The findings of Van Hemel and Cramer (2002) were similar to Perron (2005) research which he states that SMEs do not recognize that it is their task to keep the environment green and SMEs do not have substantial and clear information in regards to the environmental benefits in greening their productions. Van Hemel and Cramer's (2002) research also reveal that SMEs is unable to find resolution in designing green products and Luken and Stares (2005) found that there are barriers for SMEs suppliers to provide green materials. In addition, there are also customers that prefer normal products over green products which results in negative motivation for firms to implement GSCM (Kramer, 2006).

In Asia, there are studies that reveal the company size is one of the barriers of adoption GSCM (Parmar, 2016; Lee, 2008) and also due to the higher cost to adopt GSCM among SMEs (Anbumozhi & Kanda, 2005). Lee (2008) and Zhu et al., (2012) also found that in order to improve the understanding of environment enhancement, the government plays a role to address this. In addition, Lee (2008), Zhu et al., (2012) and Abdullah et al., (2016) identified that the SME's firm size and the lack resources or skill is found to be a significant factor for a firm to practice GSCM. Firms that have more potential to incorporate prevention of environment pollution are firms with more and greater resources (Lee, 2008). Mudgal et al., (2010) found that the relationship among the barriers using ISM model and ranks the barriers of adoption of GSCM accordingly. In Malaysia context, Wooi and Zailani (2010) illustrates in their research that there had also been increasing of research in examining the challenges that hinder SMEs from implementing GSCM in Malaysia. The environmental issues have become an apprehension for the Malaysian government (Eltayeb & Zailani, 2009) and the Environmental Quality Act that was established in year 1974 had been amended several times to implement green practices and activities (Rao, 2004). However, the participation in green practices is lower for Malaysian firms as compared to multinational companies and foreign based companies (Eltayeb & Zailani, 2009). Wooi and Zailani (2010) and Kamaruddin et al., (2013) study found that the top barrier in adopting GSCM among Malaysia SMEs is resource barrier followed by

the technical barrier. The research on this topic in Malaysia is limited; thus, it provides an opportunity to investigate further the relationship between SMEs and the barriers in adopting GSCM in Malaysia.

2.3 Review of the Literature

2.3.1 Adoption of Green Supply Chain Management (GSCM)

In order to understand GSCM, SCM needs to be defined and understand. According to Mudgal et al., (2009), SCM had been introduced due to the increased competition in the international markets and it is a recent development in management theory. GSCM is basically greening the supply chain with the objective of balancing environmental issues and company's performance (Mudgal et al., 2009). GSCM research has been increasing interest from both practitioners and academic field (Fortes, 2009; Sarkis et al., 2011; Zhu & Cote, 2004). In 1980s, the "quality revolution" and "supply chain revolution" have sparked firms to become more environmentally conscious (Srivastava, 2007). There is also increase of consciousness among government, customers and multinational companies in enhancing the environment and acts as a driver for manufacturers to focus on greening their business (Jiang, Zhang, & Sutherland, 2012; Schaper, 2002). Shipeng and Linna (2011) explain that GSCM focuses on the environmental issues in both the upstream and downstream of the SCM.

GSCM aim is to preserve our resources and surrounding environments to prevent lives from deteriorating (Min, & Kim, 2012). GSCM is also the creation and implementation practices using various Rs which are reduce, reuse, rework, recycle, remanufacture, reverse logistics, refurbish, reclaim and more (Dube & Gawand, 2011). In addition, Khushbu and Shah (2014)

illustrates that GSCM is taking the environment consideration from product design, manufacture, sales, material choice and the entire manufacturing process and would be able to improve the products' international competitiveness, protect the environment and have continuous sustainable development within the firm. The adoption of GSCM differs from organizations and also type of the industry and also the firm's position in the supply chain (Younis, 2016). Lo (2013) investigate the type of GSCM practices the firms adopt in accordance to their firm's position (upstream, midstream and downstream), the results show that firms that are in the downstream position focus on green purchase, design and internal environmental management, firms in the upstream are more conservative in implementing GSCM and firms in the midstream focus more on green logistics and manufacturing.

Eltayeb and Zailani (2009) also investigated on the adoption of GSCM and their research focuses on the adoption of GSCM initiatives in Malaysia. They found that green design is the most highly adopted GSC initiative followed by green purchasing and lastly reverse logistics. Their studies also reveal that the GSCM initiatives are generally classified into three major categories which are green purchasing, eco-design, and reverse logistics. Therefore, this research intends to study the adoption GSCM in Malaysia with the support of the theoretical model of resource based theory and stakeholder theory.

2.3.2 Perception of Company's Environmental Impact

Several past studies show that the internal attitude and perception of the employee is a barrier to the adoption or implementation of GSCM (Perron, 2005; Hillary, 2004; Schaper, 2002). De Canion (1998) and Hillary (2004) explain that internal barriers have more or greater barrier as compared to external barriers and many internal barriers relates to environment perception

and attitudes. Positive attitudes and perception have been found to be an important factor to the introduction of environmental initiatives in the firm (Naffziger et al., 2003) and the personal attitudes and perception of business owners is one of the motivational factors for environmental initiatives (Dulipovici, 2001). In UK and the Netherlands, Revell and Rutherfoord (2003) conducted a comparative study on SMEs and environmental issues found that it is the attitudes and perception of the SMEs that caused the low environmental performance. In addition, the environmental management and the environmental investments of the company rely on the top management's attitude and perception on environmental issues (Lee & Rhee, 2007). Tilley's (1999) study further reinforces these finding; it shows that SMEs do not have sufficient motivation to switch from pro-environmental attitudes to long term behavior.

Many SMEs also doubt and disbelief the environmental initiatives, these perceptions had developed into a barrier in implementing environmental practices (Rutherfoord et al., 2000; Gerrans & Hutchinson, 2000). Tilley (1991) concluded that the barriers of the current environment perception in SMEs are too overwhelming for drivers to overcome. With the support of past studies and research, it could conclude that there is significant relationship between the perception of company's environmental impact and the adoption of GSCM. Therefore, this study intends to look into other barriers to have a better and clearer understanding of the other significant barriers in adopting GSCM in Malaysia.

H_1: Perception on company's environmental impact has a positive significant relationship with the adoption of green supply chain management

2.3.3 Organizational Barriers

Ojo et al., (2014), Griffin et al., (2004) and Govindan et al., (2014) mentioned that the commitment, guidance, support and leadership from the top management will significantly impact the success of the firm's environmental management practices. Many other authors such as Sharma (2000), Jayant and Azhar (2014), Kamaruddin et al., (2013) have also supported that the role of top management determines the proactiveness of a firm in environmental initiatives. Besides that, Ojo et al., (2014) suggested that not only the top management but the middle management's commitment and support are positively related to GSCM, while, New et al., (2000) illustrate that the personal commitment of individuals has positive relationship to GSCM as well. Thus, it could conclude that the commitment from both the top management, middle management and every individual in the firm is important to the success of GSCM. The lack of commitment is a barrier in adopting and implementing GSCM within a firm. Besides the commitment from the management, the company's culture is also part of the organizational barriers in adopting GSCM. Jayant and Azhar (2014) and Abdullah et al., (2016) reveal that the resistance of change in the company culture is one of the factor. Their findings are consistent with Dashore and Sohani (2008) study, which depicts that poor organization culture such as top level management's weak involvement in motivating the employees, will lead to barrier in GSCM. Rewards and motivation is also part of the organizational culture to overcome the barriers (Srivastav & Gaur, 2015).

In addition to the management commitment and organizational culture, corporate social responsibility and recycle and reuse efforts are also included as the elements of organizational barrier. Mudgal et al., (2010) suggests that corporate social responsibility is part of the organizational commitment. As a result, if the company lacks of corporate social responsibility it will be a significant barrier to the adoption of GSCM practices (Mudgal et al., 2010). Apart from corporate social responsibilities, Jayant and Azhar, (2014) added

that the efforts of companies implementing recycling and reuse efforts and sustainability certification (ISO 14001) are part of the organizational barriers that has significant impact on the adoption of GSCM. These research and findings support that there is significant relationship between organizational barriers and adoption of GSCM.

H_2: Organizational barriers have a significant positive relationship with the adoption of green supply chain management.

2.3.4 Technological Barriers

Several researches identify a few elements that is categorize under the technological barriers for the firms to adopt GSCM. SMEs are usually slower in responds as compared to multinational companies to the newest trends of technology due to their lack of technical resources (Zhu & Geng, 2013; Al-Abady & Iman Nuwayhid, 2010). Govindan et al., (2014), Jayant and Azhar (2014) and Muduli et al., (2011) research also shows that technological barrier is the first barrier among other barrier category in the adoption of GSCM. Wooi and Zailani (2010) found that technical barrier is the key barrier for the firms in Malaysia manufacturing sector in implementing GSCM. Some authors includes the lack of new technology processes, applications, resources and expertise, fear of failure, complexity of design of GSCM and more as part of the technological barrier in implementing GSCM (Deepak et al., 2014; Parmar, 2014; Govindan et al, 2014). Sarkis (2003) highlighted that for every green practices implemented require varying technologies and for companies to continuously improve their environment performance in their supply chain, they need to include technological characteristics. An example is to have information systems such as electronic data interchange that is suited and developed from a greening perspective. Every organization needs to take in considerate in updating and developing

themselves with the newest trends in technology in the implementation of GSCM (Mudgal et al., 2010).

If companies take into consideration the technological barriers, they will be able to perform GSCM; a case study of Xie Li Dyeing Company in Kuala Lumpur is a good example that is able to improve their environmental efficiency with technology. Xie Li Dyeing Company is located in Rawang, Kuala Lumpur replaced their outmoded dyeing machines into new machine which helped the company save enormous amount of electricity and water (Rao, 2004). The ratio of the water consumed in volume of the old machine versus the newly changed machine was 8 to 1. This also led to reduction of fuel and chemicals used and energy savings (Lumbao, 1998). These research and case study shows that technology is one of the barriers in the adoption of GSCM among companies which leads to a developed hypothesis 3 below.

H_3: Technological barriers have a significant positive relationship with the adoption of green supply chain management.

2.3.5 Financial Barriers

Govindan et al., (2014) explains that financial resources are the fundamental in allowing the adoption of many environment practices and many other studies report this as a significant barrier. Financial is essential to support the manpower and also infrastructure of any green practices (Ravi & Shankar, 2005). Govindan et al., (2014) and Deepak et al., (2014) further explains that these elements such as lack of finances, non availability of bank loans, high cost of hazardous waste disposal and high investments in green practices will hinder the adoption of GSCM. Hervani et al (2005) explains that the top management must provide financial strategic support in order to overcome the internal organizational limits and pressures to implement GSCM. Rao (2004) further illustrates that in the South East Asia, companies' financial

resources is one of the important barriers that limits the implementation of green production. In order to overcome this, in the year 2010, the Prime Minister of Malaysia announced to fund RM 1.5 billion funds to advance the green technology among manufacturing firms. However, Wooi and Zailani (2010) reveal that the soft loans provided by the government might not be sufficient to encourage the adoption of GSCM among Malaysia manufacturing firms. Apart from this, other studies reveal that environmental management programs need high level of funding. Nikolaou and Evangelinos (2010) reveal that companies spend more than 20% of their revenues in adopting environmental changes, training and investing in green equipments. Muduli and Barve, (2011) added that the higher the staff turnover the frequency of training employees will lead to increase of required financial funds. SMEs also face financial constraint to fund expensive EMSs and certification (Adams et al., 2012). Accordingly, this study hypothesis that:

H_4: Financial barriers have a significant positive relationship with the adoption of green supply chain management.

2.3.6 Informational Barriers

Ojo et al., (2014), Abdullah et al., (2016), and Hölzl and Janger, (2014) research found that if there is lack of knowledge and information on environmental impact, it will lead to reduce of adoption of GSCM. Companies also find difficulties in conveying environmental information and benefits to their stakeholders due to lack of knowledge of the green products and process (Sarkis et al., 2011). AlKhidir and Zailani (2009) affirm this statement by stating if there is improved communication and informational linkage, this could help the organization adopt green practices. Laosirihongthong et al., (2014) states that information sharing and training is also essential to ensure the implementation of green practices. A case study in

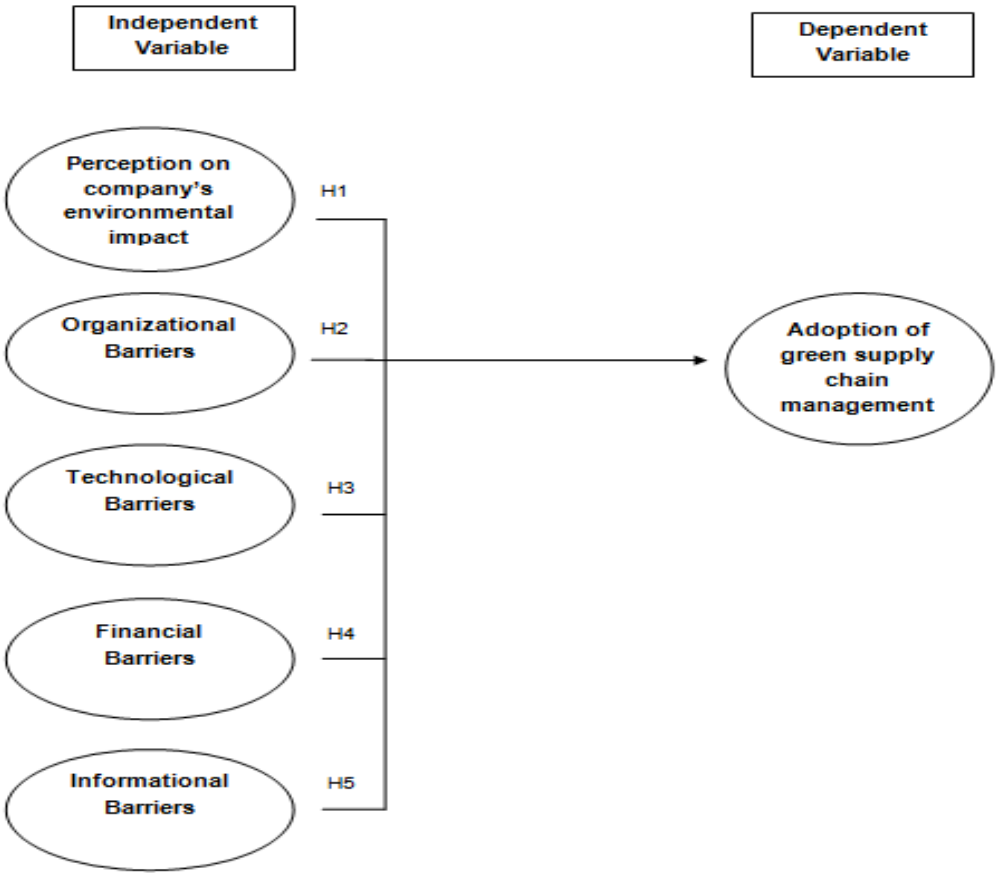
Thailand shows that effective and efficient dissemination of information will lead to increase of adoption of GSCM. According to Rao (2004), Thana Paisal Company (Thailand) which is an established company that perform bleach and dyeing textile business has 150 employees. The owner of the company became aware of green technology when the Thailand government had more strict regulations on textile industries and after being exposed to environmental management. The owner took effort and time to organized waste minimization campaign monthly to disseminate information and educate the benefits of green management to their employees. This implementation eventually leads to 18 percent and 61 percent in water and energy savings respectively (The Federation of Thai Industries, 1995). This case study and literature review shows that there is significant relationship between informational barriers and adoption of GSCM in which supports the development of the following hypothesis.

H_5: Informational barriers have a significant positive relationship with the adoption of green supply chain management.

2.4 Proposed Theoretical / Conceptual Framework

The main objective of this study is to examine the relationship between the barriers and the adoption of GSCM among food and beverage SMEs in Selangor, Malaysia. Resource based model introduce by a few authors such as Wenerfelt (1984) and Barney (1991) and stakeholder theory (Freeman, 1984) are used as a theory to support this study and as the foundation to develop the proposed conceptual framework. It is measured using five dimensions which are perception of company's environmental impact, organizational barriers, technological barriers, financial barriers and informational barriers. A conceptual framework has been developed and presented in Figure 2.0.

Figure 2.0: Conceptual framework



Source: Developed for the research

2.5 Chapter Summary

This chapter summarizes the review of past studies and identifies the five types of independent variables which are perception of company's environmental impact, organizational barriers, technological barriers, financial barriers and informational barriers that would affect the implementation of GSCM among the food and beverage manufacturing SMEs in Selangor. The findings of past researchers are used to support the theoretical framework and hypotheses. The details of the general idea of research methodology are review in the next chapter.

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CHAPTER 3: METHODOLOGY

3.0 Introduction

The research methodology is a systematic way for conducting research by using data collection and analysis. Research is done with the help of study, observation, analysis, comparison and reasoning. This chapter describes how the research is carried out in terms of research philosophies, design, sampling procedures, questionnaire development and operationalization of variables, data collection, validity, pilot study, data analysis methods and the ethical considerations.

3.1 Research Philosophies

Many researchers in the field use the quantitative approach which includes the research of Laosirihongthong et al., (2013) which they investigate both the proactive and reactive green practices and their impact on the intangible and tangible performance of the firms. Another research also uses quantitative approach to examine the direct and indirect factors between GSCM implementation and business performance (Lee et al., 2012). Other researchers such as Zhu and Sarkis (2004) examined the relationships between operational practices and performance among early adopters of GSCM practices in Chinese manufacturing enterprises.This study adopted a quantitative approach and the primary aim of the study was to determine the barriers that the Malaysia food and beverage SME manufacturing firms in adopting GSCM. The collection of quantitative data was gathered through questionnaires. The quantitative method is chosen due to the fact that there is quantification in the data collection and data analysis is involved.

3.2 Research Design

The nature of this research is a casual research which describes the cause and effect relationship between the independent variable and dependent variable. This research is being conducted to investigate the relationship between the five variables namely company's perception on environmental impact, organizational barriers, technological barriers, financial barriers and informational barriers and the adoption of GSCM. This study aims to understand the strength of both the variable's relationship, to understand how immense the five barriers will prevent firms from adopting GSCM. The study is also based on reviewing the previous researches and theoretical models to develop the five hypotheses. Furthermore, the research collects primary data by the distribution of questionnaires to test the existing theory and the developed hypothesis from the theoretical models. The concepts in the study are operationalized to ensure clarity of definitions and its emphasis to explain causal relationship between the barriers and GSCM adoption.

3.3 Sampling Procedures

3.3.1 Selection of Study Area

Target population is a group of people who meet the criteria of the studies. In this study, the identified target populations are the food and beverage manufacturing SMEs based in Selangor. Based on the statistics by SME Malaysia (2015), the total number of food and beverage manufacturing SMEs in Selangor is 948 firms.

3.3.2 Selection of Respondents

The samples were obtained from the food and beverage manufacturing SMEs that are located in Selangor. The sampling elements of this study are mainly focus on the SMEs firms that are still in operation and are manufacturers that produce food and beverage items. Selangor state is selected because this state has the most food and manufacturing SMEs in Malaysia (SME Malaysia, 2015). In addition, the food and manufacturing SMEs is chosen because the major subsector that contributes to the manufacturing sector growth in Malaysia is the food and beverages and tobacco (15.4%), followed by electrical and electronics products (9.7%) and petroleum, chemical, rubber and plastic products (3.0%) (Department of Statistics, 2017). The respondents are top management; middle management and the rest were from supervisory and non-managerial level positions. This illustrates that the information received was from people who has knowledge and sufficient experience in their organizations which provided quality information for this research.

3.3.3 Selection of Sample Size

Sample size is extremely important in all research studies. Sufficient sample size will increase validity and reliability of the studies. Decent sample size is required to reduce the error margin to the minimum. Deficient sample size can result in problems such as under-coverage, selection bias, poor data collection quality and misspecification of target population. There are a total of 948 of food and beverage manufacturing SME in Selangor state which is the total population size (SME Malaysia, 2015) and a sample of 269 is required according to Krejcie and Morgan (1970).

Table 3.0: Table for Determining Sample Size of a Known Population

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

Source: Krejcie & Morgan, 1970

3.3.4 Selection of Sampling Method

Sampling technique may be broadly categorized as probability and non-probability. In this study, researcher selects non-probability sampling as the research method due to the difficulties to access sampling frame. In this research, judgment sampling technique was used in selecting appropriate sample. This is the best way of collecting information quickly and more accurate as researcher is able to obtain a large number of completed questionnaires that is able to generate data for analysis purpose. Judgmental

sampling is being defined as a form of convenience sampling in which the population elements are selected based on researchers‟ judgment (Sekaran & Bougie, 2010). Nevertheless, the targeted population was carefully selected to reduce the occurrence of sampling error.

3.4 Questionnaire Development and Operationalization of Variables

Self-administered questionnaire survey was employed for this study. An online survey tool was employed due to the convenience and cost effective and the response can be easily exported into SPSS for further analysis. The questionnaires are separated into two sections and consist of forty-one questions. Section A is demographic profile which includes the respondent's demographic data. Section B consisted of twenty-seven questions which are divided into five parts – six latent variables (perceptions of the company's impact towards the environment, organizational barriers, technology barriers, financial barriers, informational barriers, and green supply chain management adoption). This section is related to the barriers that prevent the firms of adopting GSCM in their organization.

3.4.1 Measurement Scale

There are four basic types of scale (1) nominal; (2) ordinal; (3) interval; and (4) ratio (Sekaran & Bougie, 2010). Nominal scale and ordinal scale are categorized as non-metric whereas interval scale and ratio scale are categorized as metric. Nominal scale is a scale that categorizes the variable of interest into mutually exclusive group (Sekaran & Bougie, 2010). Ordinal scale is a scale that rank-ordering the qualitative differences in the variable

of interest in a meaningful way (Sekaran & Bougie, 2010). Interval scale is a multipoint scale that taps the differences, order and the equality of the magnitude of the differences in the responses (Sekaran & Bougie, 2010).

There are total of 2 sections in this questionnaire, listed as Section A and B. Nominal scale and ordinal scale are used for questions in Section A. In section B, only likert scale is being used. The 5-point Likert scale in section B allows the respondents to indicate how strongly they agree or disagree with the statement of the questions. The range is from “strongly disagree”, “disagree”, “neutral”, “agree”, to “strongly agree” an also “very low impact”, “low impact”, “moderate impact”, “high impact”, to “very high impact”.

3.4.2 Demographic Variables

The demographic variables are used to measure and indicate the profile of the respondents. It has seven questions in this section which is gender, age, education level, occupation status, service duration, environmental system in the company and the official certification that the company has. Demographic information of respondents is important for this study as frequencies, means, standard deviations and variances are to be calculated by using these information.

3.4.3 Independent Variables

There are five independent variables in this construct of questionnaires and measurements of these independent variables are as followed.

Company's perception on environmental impact is to measure the company's current perception of their impact towards the environment. This measurement includes the pollution such as waster generation, air pollution, water pollution, deposits to land, health and safety hazards, noise pollution and heat/visual/light pollution. This is to determine whether the perceptions of the company's impact will affect their GSCM adoption.

Organizational barriers are to measure whether the organization itself is the restrictions towards adopting GSCM. The questions involve elements such as the top management commitment, middle management commitment, corporate social responsibilities, company's culture and recycling and reuse efforts.

Technological barriers are to measure whether the technology is the restrictions towards adopting GSCM. The questions involve elements such as IT applications, resistance towards advance technology, high fear of failure, lack of technical expertise and complexity of design and structure of GSCM.

Financial barriers are to measure whether the financial is the restrictions towards adopting GSCM. The elements involve are such as the cost of GSCM, availability of bank loans, cost of proper disposal, cost of environmental friendly materials and cost of green certification.

Informational barriers are to measure whether information is the restriction towards adopting GSCM. The questions are constructed with the considerations of elements such as sufficiency of knowledge in green practices, reverse logistics and environmental impact. The customer's and supplier's awareness are also one of the elements.

3.4.4 Dependent Variables

Adoption of green supply chain management, the elements that are in this section are to understand the value of GSCM within the companies. The elements included in the questionnaire of this section are whether GSCM adoption is able to contribute to a greener environment, enhance company's competitive position in local and global market, enhance their brand and image, and enhance plant and employee's safety.

3.4.5 Origin of Construct

Table 3.1: Table of Construct

Construct	Sources
Company's perception on environmental impact	Govindan et al., (2014)
Organizational Barriers	Govindan et al., (2014) Abdullah et al., (2016)
Technological Barriers	Govindan et al., (2014) Abdullah et al., (2016)
Financial Barriers	Govindan et al., (2014)
Informational Barriers	Govindan et al., (2014)

	Abdullah et al., (2016)

Source: Developed for the research

3.5 Data Collection

The data collection is an important element in conducting the research; it is process to measuring the research variables and enables to answer the research question. A data collected must be accurate to avoid negative impact on result of study and will lead to invalid result and essential to maintain the integrity of research. This study conducted a survey to obtain quantitative data to testing of statistical of the hypotheses. A quantitative data is useful as a research approach to build the nature of the study and have showed an extension in identifying the current nature needed. The survey conducted using the mail questionnaire to the food and beverage manufacturing SMEs in Selangor, Malaysia. Mail questionnaire method is useful for this study and it give advantages because it covers overall wide geographical area with lower cost and time as compared to hand delivered questionnaire to the SMEs. An augmented sampling method was used for this study. The measurements are based on random sample from the Malaysia population and it is augmented by the information from independent sample of cases.

3.6 Validity

Validity relates to whether findings of the subject matter studied are associated with current business practices. In other words, whether the measurements are measuring what they set out to assess. Since most of the questions were adapted from previous studies, disparities of business environments are part of the reason

that some level of deficiency in regards to face validity exists. According to Zikmund (1991), face validity or content validity entails subjective judgment on the accuracy of responses towards predetermined questions by means of logical valuation. The items in the questionnaire ought to acquire input of experts from both academia and industry to warrant content validity (Devellis, 2016). Initial assessments were made on the measurement items to minimize the discrepancies between the questionnaire and measured concept.

3.7 Pilot Study

The main purpose to conduct the pilot test is to test the respondents' understanding towards the question. It is a pre-testing process that is conducted before actual set of questionnaire is being distributed. Pilot test functioned as a checker for reliability of the questionnaires and allow researcher to make amendments such as rearrange the sequences of questions and amend construction error of question to ensure the effectiveness of the actual questionnaire. Adequate pilot test was done to check the validities and correctness of questionnaires; a total of 30 pilot test samples for questionnaire were distributed from 14th till 30th June 2017 to the food and beverage SMEs located in Selangor. Most of the respondents are able to complete the questionnaire without any further query and there is no ambiguous wording. Therefore, no amendments were done to the questionnaire before being distributed to the target respondents. The rule of thumb shows that is shown in table 3.1, in which if α is more than 0.60 is deemed to be reliable.

Table 3.2: Cronbach's Alpha Coefficient (α)

Coefficient alpha (α)	**Level of Reliability**
0.80 - 0.95	Very good reliability
0.70 - 0.80	Good reliability
0.60 - 0.70	Fair reliability
Less than 0.60	Poor reliability

Source: Sekaran and Bougie, (2010).

Table 3.3: Reliability Test for Pilot Test

No	Construct Name	Cronbach's Alpha
1	Company's perception on environmental impact	0.884
2	Organizational Barriers	0.865
3	Technology Barriers	0.865
4	Financial barriers	0.792
5	Informational Barriers	0.829
6	Green supply chain management adoption	0.777

Source: Developed for the research

3.8 Data Analysis Methods

Data pre-screening was conducted in the course of primary data collection. Upon collection of each questionnaire response, it was checked to ensure that no questions were left incomplete. The statistical software, Statistical Package for the Social Sciences (SPSS) version 22 was utilized in this study by coding all questions with numeric values and entering the primary data for analysis. Appropriate representative names, data types, data values and data measurement types such as scale, ordinal or nominal were set for each item. According to Sekaran (2003), data analyses involves three objectives; (1) getting a feel for collected data, (2) testing the goodness of data, and (3) testing hypothesis for the study. In order to meet these three objectives as well as the objectives of this study, the following sections explain all analysis techniques used to assess the research objectives and hypothesis.

3.8.1 Normality Test

The normality test is conducted to determine if the data set is normally distributed. The skewness and kurtosis test are being conducted to determine the distribution. Hair (2014) explain that the sample is considered normally distributed when both skewness and kurtosis are zero, but that this situation is unlikely to occur. They further explain that a rule of thumb regarding skewness is significant when it is +1 or under -1 (Hair, 2014). For Kurtosis, the distribution is considered as significant is from -2 to 2 (Hair, 2014).

3.8.2 Multicollinearity Analysis

Multicollinearity defined to measure the high correlation among independent variables. The singularity occurs when perfect correlations among the variables exist. These problem can be detect by examining the correlation matrix, squared multiple correlations and tolerances. Tolerances value and variance inflation factor (VIF) are two important measures for evaluating both pair wise and multiple variable collinearity test.

3.8.3 Descriptive Analysis

According to Babbie (1990), descriptive study is used not only for descriptive purposes but also for determining the relationships between

variables at the point of investigation. Descriptive analysis refers to “the transformation of raw data into a form that would provide information to describe a set of factors in a situation that will make them easy to understand and interpret” (Sekaran, 2003; Zikmund et al., 2013). Sekaran (2003) further stated that descriptive statistics are “statistics that describe the phenomena of interest”. In this study, demographic data are analyzed using descriptive analysis methods such as frequency distribution, percentage and cumulative percentage to better understand the sample data. Furthermore, a percentage distribution of variables was conducted to obtain an overview of respondent’s perception towards the variables of interest and subsequently, the distribution of data is estimated.

3.8.4 Factor Analysis

Factor analysis is a method used to variability among the observed, correlated variables in terms potentially lower numbers of unobserved variables is defines as factor. Hair et al., (2010) define factor analysis as "an interdependent technique whose purpose is to define the underlying structure among the variables in the analysis". Factor analysis can be used for data reduction or data summarization. In data reduction, the aim is to reduce the number of variables to ease the application of the multivariate technique. On the other hand, in data summarization, the researcher defines a new small set of factors that represent the original variables. This research used factor analysis for data summarization to ensure that items of each variable loads significantly on those variables by examining the factor loadings and the rotated component among the items. Moreover, the used of factor analysis allows to construct validity of a questionnaire using KMO and Barlett’s test (Rattray & Jones, 2007).

3.8.5 Reliability Analysis

Reliability is capability of research instrument in terms of measuring consistently. Cronbach's Alpha functions to determine internal consistencies of a test or scale. Alpha computed is referring to reliability of a test associated with other tests having identical quantity items and identical constructs that are measured. It is denoted in a value ranging from 0 to 1. Hair et al. (1998) suggested that a cronbach alpha value between 0.6 and 0.9 is acceptable. Table 3.1 shows the rule of thumb for cronbach alpha analysis.

3.8.6 Correlation Analysis

The correlation analysis in this study uses the Pearson's Correlation Coefficient as an analytical tool which has the sole purpose of determining the strength of relationship between the independent variable(s) and dependent variable(s). The value ranges from -1 to +1, whereby the positive or negative signs indicate occurrence of either positive or negative correlations. The "0" value indicates a zero relationship between the two different variables. The rules of thumb regarding the range of coefficient and the strength of association proposed by Hair et al., in 2012 is shown in Table 3.3 below.

Table 3.4: Rules of Thumb of Pearson Correlation Coefficient

Coefficient range	Strength of Association
± 0.91 to ± 1.00	Very strong
± 0.71 to ± 0.90	High
±0.41 to ± 0.70	Moderate
±0.21 to ± 0.40	Small but definite relationship
±0.01 to ± 0.20	Slight, almost neglible

Source: Hair, Wolfinbarger, Bush, and Ortinau (2012)

3.8.7 Multiple Regression Analysis

Multiple linear regressions could examine the significance of relationship between the IV(s) and DV. It manifests the extent of effect an independent variable is varied, while the other independent variables are held constant. The multiple regression equation of this is written as:

$Y= a + bX1 + cX2 + dX3 + e$

Y = the value of the Dependent variable (Y),

a = a constant; equals the value of Y

when the value of X1=X2=X3=0

b, c, d = the slope of the regression line

X1, X2, X3 = the value of each Independent variable (X)

E = a random term associated with each observation.

3.9 Ethical Considerations

This research was done in accordance to the ethical guidelines as specified by the University Tunku Abdul Rahman, Perak. Participants of this study was kept completely anonymous in this research, the benefit of assuring the participants of anonymity were that they would be more willing to participant in the questionnaires and reveal more quality information. This quality information includes the current status of the green efforts of the company. Participants was also informed that the results of the study could be sent to them as an option as a token of appreciation to their participation.

3.10 Chapter Summary

Chapter 3 discussed about the methodologies adopted to conduct a business research. The research design, data collection method, sampling design, research instrument, constructs measurement, data processing and methods of data analysis that applied in this study were outlined clearly in this chapter. The next chapter will be the detail data analysis in which all the data were obtained through methodologies specified in this chapter.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

This chapter shows the results of the survey collected from 207 food and manufacturing SMEs in Selangor, Malaysia. The results are analysed using SPSS software. The results cover normality test, multicollinearity test, demographic profile of respondents, central of tendency, factor analysis, reliability analysis, correlation analysis, multi-regression analysis, t test, Annova and the summary of hypothesis testing.

4.1 Response Rate

In total, 948 questionnaires were distributed to the food and beverage manufacturing SMEs in Selangor, Malaysia. Out of 948 questionnaires that being distributed, minimum 269 samples are required according to Krejcie and Morgan (1970). The questionnaires are distributed via online and 207 questionnaires were returned. The reason that is not able to obtain the required samples of 269 distributed via online is due to time constraint of the limited time frame to complete this dissertation. According to Dillman (2011), the respondent rate via email tends to be lower and comparatively difficult to other methods of survey. In addition, a total of 7 questionnaires were removed from further analysis due to its incomplete nature. Therefore, only 200 questionnaires analysed using the SPSS software.

4.2 Examination of Data

The data has undergone different process such as questionnaire checking, data editing, data coding, data transcribing and data cleaning to ensure that the data are examined. Questionnaire checking is executed to ensure that all questionnaires were answered and with quality. The content of the questionnaire measures the appropriateness by undergoing pilot test and the reliability test using the IBM SPSS (Version 22.0) software. The reason of checking questionnaire is to ensure that the quality of the questionnaire is integral. The next process which is data editing involves improving the level of precision and accuracy of the questionnaires. The checking of mistakes is conducted by the supervisor, research and also the respondents. Questionnaires with incomplete answers or double answers are assumed as missing values and are discarded. Data coding involved assigning a code for each response of the questions respectively. Codes formulated are simple and easy. For instance, genders of respondents are assigned as "1" for male and "2" for female. Coding enables easier interpretation of data as compare to lengthy alphabetical descriptions. Coded data will be transcribed onto the SPSS software's database system. Data transcribing is the fourth stage in the data processing process. According to Malhotra and Peterson (2006), data transcribing refers to the process of transferring coded facts from the questionnaires into the computers via key punching. In this study, the data from the questionnaires were directly entered into the SPSS statistical software once it has been coded. The last stage of process is data cleaning, this process is to identify data which have extreme value, logically inconsistent and out of range (Malhotra & Peterson, 2006). In this stage, it involved checking for consistencies as well as treating any missing responses in the completed questionnaire. Questionnaires were checked meticulously. Besides that, consistent checking is required to check for any missing or incomplete data or data that is out of range. All these errors could be identified using the SPSS system. Missing values including the values of variables which are unknown as a result of equivocal answer in question happened in data cleaning process.

4.3 Test of Normality

Normality test conducted to determine if a data set is normal distribution. For this study, the skewness and kurtosis normality test were use to measure normality. Acceptable values of the skewness ranges from -1 to 1. The acceptable values of kurtosis are -2 to 2 (Hair, 2014). The results show that the skewness and kurtosis values of this study fall within the suggested ranges. Therefore, data of this study is normal distributed.

Table 4.0: Normality test

Variables	**Skewness**	**Kurtosis**	**SD**
Company's perception on environmental impact	-.045	-1.207	0.73121
Organizational Barriers	-.165	-1.412	0.66783
Technology Barriers	.018	-1.246	0.45633
Financial barriers	-.053	-1.113	0.46774
Informational Barriers	-.160	-.809	0.35787
Adoption of GSCM	-.286	-.921	0.49719

Source: SPSS output

4.4 Multicollinearity

Multicollinearity test was performed before multiple regression analysis. The highly correlated between independent variables will cause multicollinearity problem. For this study, the multicollinearity test was conducted. Multicollinearity problem exists when a variable's tolerance value is less than 0.10 and VIF is greater than 10. The values of tolerance were more than 0.1 and

VIF values were less than 10. As shown in the multicollinearity results below, there is no multicollinearity problem is detected.

Table 4.1: Multicollinearity test

Model		Collinearity Statistics	
		Tolerance	**VIF**
1	Perception on company's environmental impact	.205	4.884
	Organizational barriers	.156	6.424
	Technology barriers	.725	1.380
	Financial barriers	.437	2.286
	Informational barriers	.252	3.967

a. Dependent Variable: Adoption of GSCM

Source: SPSS output

4.5 Demographic Profile of Respondents

This section provide the analysis of the respondent's demographic profile which includes, gender, age group, education level, occupation status, year of service, the validity of EMS system and EMS certification using the one-way frequencies analysis.

4.5.1 Gender

Table 4.2 illustrates the gender information of the respondents. The majority of the respondents in this study are male, where they made up 63% of the

total respondents. Meanwhile, the remaining 37% of the target respondents is female.

Table 4.2: Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	126	63.0	63.0	63.0
	Female	74	37.0	37.0	100.0
	Total	200	100.0	100.0	

Source: SPSS output

4.5.2 Age Group

Table 4.3 is the age demographic of the respondents, there are 10% of the respondents are from ages 18-25 years old, 20.5% of age 26-35 years old, 21.5 % of the age 36 to 45 years, 28% of 46-55 years old and 20% which are above 55 years old.

Table 4.3: Age Group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-25	20	10.0	10.0	10.0
	26-35	41	20.5	20.5	30.5
	36-45	43	21.5	21.5	52.0
	46-55	56	28.0	28.0	80.0
	Above 55	40	20.0	20.0	100.0
	Total	200	100.0	100.0	

Source: SPSS output

4.5.3 Level of Education

As portrayed in Table 4.4, there are 20% of the respondents holds a cert or diploma, 66.5% who holds undergraduate degree, 13% that owns a master degree and only 0.5% of PhD holder.

Table 4.4: Level of Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Cert/diploma	40	20.0	20.0	20.0
	Undergraduate Degree	133	66.5	66.5	86.5
	Master Degree	26	13.0	13.0	99.5
	PhD	1	.5	.5	100.0
	Total	200	100.0	100.0	

Source: SPSS output

4.5.4 Occupation Status

As seen from table 4.5, from the total respondents there are 7.5% of fresh graduates followed by 12.5% of junior executive, 23% of senior executive, 37% of managers and 20% of top management. This result portrays that the most respondents are of managerial level.

Table 4.5: Occupation Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fresh graduate	15	7.5	7.5	7.5
	Junior Executive	25	12.5	12.5	20.0
	Senior Executive	46	23.0	23.0	43.0
	Manager	74	37.0	37.0	80.0
	Top management	40	20.0	20.0	100.0
	Total	200	100.0	100.0	

Source: SPSS output

4.5.5 Service Duration

Table 4.6 shows the distribution of the service duration of the respondents, there are 9.5% that works for less than 1 year, 10% that works from 1 year to less than 3 years, 15% works for 3 years to less than 5 years, 28% that works from 5 years to less than 10 years and the largest percentage is 37.5% that works for more than 10 years.

Table 4.6: Service Duration

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 1 year	19	9.5	9.5	9.5
	1 year to less than 3 years	20	10.0	10.0	19.5

	3 years to less than 5 years	30	15.0	15.0	34.5
	5 years to less than 10 years	56	28.0	28.0	62.5
	10 years or more	75	37.5	37.5	100.0
	Total	200	100.0	100.0	

Source: SPSS output

4.5.6 Environment Management System (EMS)

Table 4.7 shows the distribution of the SMEs that has environmental management system in placed in their companies. There are 8.5% that has EMS, 73% that do not have an EMS in placed and 37% are implementing in progress.

Table 4.7: Environment management system (EMS)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	EMS	17	8.5	8.5	8.5
	Non-EMS	146	73.0	73.0	81.5
	In progress	37	18.5	18.5	100.0
	Total	200	100.0	100.0	

Source: SPSS output

4.5.7 Environment Certification

Table 4.8 shows the distribution of the SMEs that has environmental certification in placed in their companies. There are 7% that has ISO 14001 and 93% that does not have environmental certification.

Table 4.8: Environmental Certification

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ISO 14001	14	7.0	7.0	7.0
	None	186	93.0	93.0	93.0
	Total	200	100.0	100.0	

Source: SPSS output

4.6 Percentage Distribution of Variables

4.6.1 Central Tendencies Measurement of Constructs

The use of frequency analysis would be able to generate frequency tables and charts, in which information pertaining to the frequencies of phenomena occurrence and variability of the set is provided. Furthermore, the mean of sample distribution is able to obtain from the frequency analysis performed. Table 4.9 shows the summary of the central tendency for the variable of respondent's perception of environmental impacts. The mean value for all questions related to this variable falls within the range of 1.50 to 3.10. The question of the respondents' perception of the environmental impacts of their company, they perceive that their company contributes to air pollution the most compared to other type of pollution because this pollution has the highest mean score of 3.10 and heat/visual/light pollution has the lowest mean

score of 1.50. On the other hand, the mode score for the majority of the questions related to perception of environmental impact in this study is 3. The findings of this study indicate that the majority of the target respondents in this study have chosen "Neutral" to all the questions related to their perception of environmental impacts.

Table 4.9: Central Tendency for Company's Perception on Environmental Impact

No	Questions	N	Mean	Mode	Standard Deviation
P1	Waste Generation	200	2.70	2.50	.783
P2	Air Pollution	200	3.10	3.00	.833
P3	Water Pollution	200	2.70	3.00	.902
P4	Deposits to land	200	2.70	2.50	.783
P5	Health and safety hazards	200	2.40	2.00	.491
P6	Noise pollution	200	1.80	1.50	.874
P7	Heat/visual/light pollution	200	1.50	1.50	.501

Source: SPSS output

Table 4.10 shows the summary of the central tendency for the variable of organizational barriers. The mean value for all questions related to this variable falls within the range of 2.80-3.90. The company culture has the highest mean score of 3.90 and top management commitment has the lowest mean score of 2.80. From the mean value, we could conclude that the company culture is the highest organizational barrier while the lowest barrier is the top management commitment. The mode score for the majority of the questions related to organizational barriers in this study is 3 and 4. The findings of this study indicate that the majority of the target respondents in this study have chosen "Neutral and Agree" to all the questions related to organizational barriers.

Table 4.10: Central tendency for Organizational Barriers

No	Questions	N	Mean	Mode	Standard Deviation
O1	The top management commitment in adopting green supply chain management (GSCM) is low.	200	2.80	2	.750
O2	The middle management commitment in adopting green supply chain management (GSCM) is low.	200	3.50	4	.673
O3	The company is less concern on corporate social responsibility.	200	3.00	3	.777
O4	The company's culture hinders the implementation of GSCM.	200	3.90	4	.540
O5	The company is less concern on recycling and reuses efforts throughout the supply chain.	200	3.80	3	.750

Source: SPSS output

Table 4.11 shows the summary of the central tendency for the variable of technology barriers. The complexity of the design/structure of GSCM has the highest mean score of 4.10 and company's resistance and fear of high failure has the lowest mean score of 2.80. From the mean value, we could conclude that the highest technology barrier is the complexity of design/structure of GSCM has the highest barrier while the lowest barrier is the resistance in adopting advance technology and fear of failure. The mode score for the majority of the questions related to organizational barriers in this study is 4. The findings of this study indicate that the majority of the target respondents in this study have chosen "Agree" to all the questions related to technology barriers.

Table 4.11: Central tendency for Technology Barriers

No	Questions	N	Mean	Mode	Standard Deviation
T1	The company lacks of IT applications to implement GSCM.	200	3.40	4	.802
T2	The company is resistant in adopting advance technology for GSCM.	200	2.80	3	.602
T3	There is a high fear of failure if the company implements GSCM.	200	2.80	2	.874
T4	The company lacks of technical expertise in this field.	200	3.50	4	.673
T5	There is complexity of design/structure to implement GSCM.	200	4.10	4	.702

Source: SPSS output

Table 4.12 shows the summary of the central tendency for the variable of financial barriers. The overall cost of GSCM implementation has the highest mean score of 4.40 and company's resistance and fear of high failure has the lowest mean score of 2.80. From the mean value, we could conclude that the highest technology barrier is the complexity of design/structure of GSCM while the availability of bank loan and the higher cost for waste treatment has the lowest mean value of 3.40. The mode score for the majority of the questions related to financial barriers in this study is 4. The findings of this study indicate that the majority of the target respondents in this study have chosen "Agree" to all the questions related to financial barriers.

Table 4.12: Central tendency for Financial Barriers

No	Questions	N	Mean	Mode	Standard Deviation
F1	It is overall costly to implement GSCM for the company.	200	4.40	4	.491
F2	There is non/restricted availability of bank loans to encourage GSCM.	200	3.40	4	.665
F3	The cost is higher for waste treatment than proper disposal.	200	3.40	3	.459
F4	The training cost is high if the company implements GSCM.	200	4.02	4	.618
F5	It is more costly to purchase environmental friendly materials.	200	3.42	4	.921
F6	The cost of financing green supply chain certification such as ISO 14001 is high.	200	3.56	4	.623

Source: SPSS output

Table 4.13 shows the summary of the central tendency for the variable of informational barriers. The awareness of supplier of GSCM has the highest mean score of 3.60 and company does not have sufficient knowledge in green practices has the lowest mean score of 3.04. From the mean value, we could conclude that the most of the SMEs supplier are not aware on GSCM, however, most of the food and beverage manufacturing SMEs has knowledge in green practices. The mode score for the majority of the questions related to informational barriers in this study is 4. The findings of this study indicate that the majority of the target respondents in this study have chosen “Agree” to all the questions related to informational barriers.

Table 4.13: Central tendency for Informational Barriers

No	Questions	N	Mean	Mode	Standard Deviation
I1	The company does not have sufficient knowledge in green practices.	200	3.04	2	1.007
I2	Our customers are less aware or concern about GSCM.	200	3.10	3	.702
I3	Our suppliers are less aware or concern about GSCM.	200	3.60	4	.665
I4	The company does not have sufficient knowledge in reverse logistics adoption.	200	3.40	2	1.116
I5	The company does not have sufficient knowledge in environmental impact.	200	3.40	4	1.022

Source: SPSS output

Table 4.14 shows the summary of the central tendency for the variable of GSCM adoption. GSCM adoption is able to contribute to a greener environment in Malaysia has the highest mean score of 4.40 and GSCM adoption is able to enhance plant and employee's safety has the lowest mean score of 3.30. From the mean value, we could conclude that the most of the SMEs is aware that implementing GSCM is able to lead to a greener environment but is rather skeptical on whether GSCM adoption is able to lower their operational cost. The mode score for the majority of the questions related to informational barriers in this study is 4. The findings of this study indicate that the majority of the target respondents in this study have chosen "Agree" to all the questions related to GSCM adoption.

Table 4.14: Central tendency for GSCM adoption

No	Questions	N	Mean	Mode	Standard Deviation
G1	GSCM adoption is able to contribute to a greener environment to Malaysia.	200	4.40	4	.491
G2	GSCM adoption is able to enhance the company competitive position in the Malaysia market.	200	3.50	5	.501
G3	GSCM adoption is able to enhance the company competitive position in the global market.	200	4.10	4	.540
G4	GSCM adoption is able to enhance the company image and brand.	200	4.20	4	.602
G5	GSCM adoption is able to enhance plant and employee's safety.	200	3.30	2	.642

Source: SPSS output

4.7 Reliability Analysis

Cronbach's Alpha reliability test was used to check for the internal consistency of the data. According to Sekaran & Bougie (2016), the closer the Cronbach's alpha value to 1 is, the higher is the internal consistency reliability. Table 4.15 shows the level of reliability for each Cronbach's alpha ranges. Table 4.16 explain that the ranges of the reliability coefficient, from .867 to .930. The highest reliability

coefficients were the green supply chain management adoption (0.930), followed by perception on company's environmental impact (0.885), informational barriers (0.883), technological barriers (0.868), organizational barriers (0.867) and lastly is financial barriers (0.792). All the cronbach alpha values are above than 0.6; therefore the data of this study is reliable.

Table 4.15 Cronbach's Alpha Coefficient (**α**)

Coefficient alpha (α)	**Level of reliability**
0.80-0.95	Very good reliability
0.70-0.80	Good reliability
0.60-0.70	Fair reliability
Less than 0.60	Poor reliability

Source: Sekaran, U., & Bougie, R. (2016).

Table 4.16: Reliability Test Results

No	**Construct Name**	**No of items**	**Cronbach's Alpha**
1	Perception on company's environmental impact	7	0.885
2	Organizational Barriers	5	0.867
3	Technological Barriers	5	0.868
4	Financial Barriers	6	0.792
5	Informational Barriers	3	0.883
6	Adoption of GSCM	3	0.930

Source: Developed for the research

4.8 Goodness of measure

4.8.1 Factor Analysis

Hair *et al.* (2010) define factor analysis as "an interdependent technique whose purpose is to define the underlying structure among the variables in the analysis". Factor analysis can be used for data reduction or data summarization. KMO and Bartlett's Test of Sphericity was conducted as an additional measure to confirm the statistical significance of the correlation among the variables. As shown in table 4.17, the probability associated with the Bartlett test is less than 0.001, which satisfies this requirement. In addition, the overall KMO for the set of variables included in the analysis was 0.564, which exceeds the minimum requirement of 0.5 for overall KMO (Budaev, 2010). Hence, no variables will need to be excluded. It also shows that the proportion of variance in the variables was caused by underlying factors and could be able to proceed factor analysis.

Table 4.17: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.564
Bartlett's Test of Sphericity	Approx. Chi-Square	625.096
	df	15
	Sig.	.000

Source: SPSS output

4.8.2 Total Variance Explained

As extracted from the results in Appendix B, factor 1 to 8 shows an eigenvalue of more than 1; the factors contribute to 81.070% of the variability in the original variable. The total variance explained is above the minimum valued of 60% which recommended by Hair *et al.* (2010).

Table 4.18: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.344	28.315	28.315	9.344	28.315	28.315
2	4.327	13.113	41.428	4.327	13.113	41.428
3	3.648	11.053	52.481	3.648	11.053	52.481
4	3.000	9.091	61.573	3.000	9.091	61.573
5	2.071	6.277	67.850	2.071	6.277	67.850
6	1.923	5.829	73.678	1.923	5.829	73.678
7	1.377	4.174	77.853	1.377	4.174	77.853
8	1.062	3.218	81.070	1.062	3.218	81.070
9	0.960	2.908	83.978			
10	0.908	2.753	86.731			
11	0.757	2.294	89.025			
12	0.646	1.958	90.984			
13	0.532	1.612	92.596			
14	0.507	1.535	94.131			
15	0.418	1.266	95.396			
16	0.292	0.886	96.282			
17	0.266	0.807	97.089			
18	0.217	0.658	97.747			
19	0.187	0.568	98.315			
20	0.184	0.557	98.872			
21	0.100	0.304	99.176			
22	0.081	0.245	99.420			
23	0.060	0.181	99.601			
24	0.052	0.157	99.759			
25	0.023	0.070	99.829			
26	0.015	0.045	99.874			
27	0.014	0.043	99.917			

28	0.012	0.036	99.953	
29	0.010	0.030	99.983	
30	0.004	0.012	99.995	
31	0.001	0.004	99.998	
32	0.001	0.002	100.000	
33	0.000	0.000	100.000	

Source: SPSS output

4.8.3 Rotated Component matrix

Overall, 33 items using 5 likert-type scale were used to measure perception on company's environmental impact, organizational barriers, technological barriers, financial barrier, informational barriers, and adoption of GSCM. These factors were extracted using the PCA, followed by a Varimax (orthogonal) rotation. The results shown in Table 4.19 demonstrate a degree of convergent validity for all items as they had loadings above 0.50 on their expected constructs (Hair et al., 2010). Henceforth, items with loading less than the above mentioned value are excluded to aid interpretation of factors.

Perceived to the rotated component matrix in Table 4.19,, 10 items were dropped from further analysis. Three items (Question F2, F4 and F6) having a strong factor loading > .50, but displayed cross loading with other components. Seven items (Question F1, F3, F5, I1, I2, G1 and G4) showed a weak loading of < .50. Pertaining to weak loading, it is observed that all 5 items for financial barrier construct (F1, F2, F3, F4 and F5) were dropped from further analysis as this factor unable to maintain a strong factor. In support, Tabachnick and Fidell (2001) stated that a factor with fewer than 3 items is generally weak and unstable, whereas factor with above 5 items are desirable and indicate a solid factor. Even though 10 items were dropped from further analysis, due to the small sample size (200 respondents), the factor loadings in Table 4.19 showed that the model is a reasonable but an imperfect fit of the data (Browne & Cudeck, 1993).

Table 4.19: Rotated Component Matrix

	1	2	3	4	5	6	7	8
P1	**0.787**	-0.342	0.263	-0.245	0.014	0.021	-0.038	-0.054
P2	**0.639**	-0.265	0.122	-0.368	0.353	0.276	0.023	-0.064
P3	**0.685**	-0.237	0.189	-0.133	-0.298	-0.037	0.311	0.065
P4	**0.603**	-0.394	0.295	-0.211	0.247	0.006	0.122	0.234
P5	**0.647**	-0.218	0.239	0.095	-0.231	-0.533	0.110	0.114
P6	**0.552**	-0.231	0.168	-0.037	0.199	-0.376	0.419	-0.224
P7	**0.621**	-0.246	0.274	0.016	-0.201	-0.325	-0.105	0.405
O1	-0.007	**0.889**	0.130	0.055	-0.017	-0.286	-0.172	-0.159
O2	0.005	**0.728**	0.050	-0.187	0.034	0.214	0.270	-0.118
O3	-0.213	**0.739**	0.192	-0.195	0.115	0.035	-0.346	0.001
O4	0.088	**0.839**	-0.009	-0.092	-0.030	0.019	-0.206	0.097
O5	-0.214	**0.623**	0.138	-0.414	0.136	0.494	0.077	0.242
T1	-0.141	0.378	**0.728**	0.115	0.020	0.138	0.022	-0.006
T2	-0.139	0.376	**0.752**	0.074	-0.020	-0.096	0.074	0.021
T3	-0.055	0.121	**0.662**	0.474	0.064	0.243	-0.086	-0.056
T4	-0.234	0.585	**0.605**	-0.199	-0.043	-0.097	0.025	-0.037
T5	-0.080	0.217	**0.740**	0.402	0.021	0.262	-0.027	-0.057
F1	0.391	0.477	-0.209	0.349	0.180	-0.339	0.147	0.115
F2	**0.596**	0.345	-0.128	0.092	-0.386	0.014	0.136	-0.172
F3	0.328	0.046	-0.042	-0.141	-0.724	0.256	0.247	-0.302
F4	0.395	**0.662**	-0.305	0.263	0.255	0.094	0.247	0.157
F5	0.580	0.524	-0.255	0.119	-0.182	0.225	0.381	0.064
F6	0.274	0.407	-0.230	0.240	**0.687**	-0.123	0.290	0.111
I1	0.652	0.503	-0.160	0.227	-0.248	-0.148	-0.239	-0.118
I2	0.283	0.457	-0.211	-0.067	-0.283	0.450	-0.151	0.509
I3	-0.151	0.468	-0.197	**0.689**	0.012	0.164	-0.217	-0.134
I4	-0.217	0.166	-0.064	**0.665**	0.430	0.228	-0.187	-0.425
I5	0.136	0.308	-0.008	**0.704**	0.001	-0.261	-0.446	0.022
G1	0.195	-0.379	-0.368	0.341	0.063	0.104	-0.104	-0.020
G2	0.216	-0.462	-0.063	-0.096	**0.700**	0.321	-0.042	-0.039
G3	0.247	-0.543	-0.068	0.243	**0.661**	0.095	0.067	0.010
G4	0.067	-0.048	0.473	0.371	0.371	0.128	0.076	0.064
G5	0.247	-0.543	-0.068	-0.037	**0.661**	0.095	0.067	0.010

Extraction Method: Principal Component Analysis.
a. 8 components extracted.
Source: SPSS output

4.9 Correlation Analysis

A correlation coefficient would be significant if the p- value is more than the correlated significance level. When negative coefficients are obtained, this indicates that both variables analyzed are having a negative relationship. This means that when a variable increase, the other variable decreases. In contrast, if two variables are having positive relationship whereby when the former variable increases, the latter also increases, this will be indicated by a negative Pearson correlation coefficient. The rules of thumb regarding the range of coefficient and the strength of association proposed by Hair et al., in 2012 is shown in Table 4.20 below.

Table 4.20: Rules of Thumb about Pearson Correlation Coefficient

Coefficient range	Strength of Association
± 0.91 to ± 1.00	Very strong
± 0.71 to ± 0.90	High
±0.41 to ± 0.70	Moderate
±0.21 to ± 0.40	Small but definite relationship
±0.01 to ± 0.20	Slight, almost negligible

Source: Hair, J., Wolfinbarger, M., Bush, R., & Ortinau, D. (2012)

Table 4.21 shows the results of the Pearson Correlation Coefficient of this study. The Pearson Correlation Coefficient for most of the variables is between± 0.01 to ± 0.7 this illustrates that all of the independent variable has relationship with the dependent variable. All the independent variables which are perception on company's environmental impact (.187), organizational barriers (.370), technological barriers (-.154), and informational barrier (.155) has small but definite relationship with the dependent variable of adoption of GSCM.

Table 4.21: Summary of Pearson Correlation Analysis

Variables	P	O	T	I	G
P	1	.841**	.011	.416**	.187**
O	**.841****	1	-.099	.725**	.370**
T	.011	**-.099**	1	-.124	-.154*
I	.416	.725**	**-.039**	1	.062
G	.187**	.370**	-.154*	**.155***	1

**. Correlation is significant at the 0.01 level (1-tailed).

*. Correlation is significant at the 0.05 level (1-tailed).

Note: P:Perception on company's environmental impact, O: Organizational barriers, T: Technological barriers, I: Informational barriers, G: Adoption of GSCM

Source: SPSS output

4.10 Multiple Regression Analysis

The relationship between adoption of Green Supply Chain Management and company's impact and barrier was examined by testing the following research hypothesis:

H_1: Perception on company's environmental impact has a significant relationship with the adoption of green supply chain management.

H_2: Organizational barriers have a significant relationship with the adoption of green supply chain management.

H_3: Technological barriers have a significant relationship with the adoption of green supply chain management.

H_5: Informational barriers have a significant relationship with the adoption of green supply chain management.

Given that the assumptions held, a multiple regression was performed between adoption of green supply chain management as the dependent variable and company's impact and barriers (perception on company's environmental impact, organizational barriers, technological barriers, and informational barriers) as the independent variable. Preliminary analysis was conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity.

Table 4.22: Multiple Regression Analysis between Adoption of Green Supply Chain Management and Company's Impact and Barrier

Independent Variables	**β**	**Sig**
Perception on company's environmental impact	-.782	.000***
Organizational Barriers	1.433	.000***
Technological Barriers	-.074	.223
Informational Barriers	-.569	.000***
R^2	.307	
Adj R^2	.293	
R^2 Change	.416	
F	21.616	

Significant levels: ***p < 0.001; **p < 0.01; *p < 0.05

Source: SPSS output

With reference to Table 4.22, multiple regression was conducted to analyse the influence and predictive power of perception on company's environmental impact,

organizational barriers, technological barriers, informational barriers towards adoption of green supply chain management. When all four independent variables regressed against adoption of green supply chain management, the total variance explained by the model was 30.7 percent, where $F(4, 195) = 1.616$, $p < .001$).

Among the four variables, organizational barriers found to be strongly influence dependent variable ($\beta = 1.433$, $p < 0.001$) and makes the strongest unique contribution in explaining adoption of green supply chain management compared to perception on company's environmental impact, technological barriers and informational barriers. Hereafter, H_2 is supported. Despite the fact, perception on company's environmental impact and informational barriers contributed negative beta coefficient towards adoption of green supply chain management ($\beta = -.782$ and $-.569$), the p-value found to be significant and therefore H_1 and H_5 are supported. However, technological barrier ($H_{3)}$ is not supported since this variable contributed negative beta coefficient to adoption of green supply chain management ($\beta = -.074$, $p > 0.10$).

4.11 Descriptive Analysis

Table 4.23 below provides mean and standard deviation of the four dimensions of barriers in this study excluding financial barriers because this independent variable had been dropped off according to the results of component matrix. The scale used for the independent variable is 1 to 5 (with 3 is middle point), the table shows that the barriers towards adoption of GSCM is informational barriers (mean = 3.7583, standard deviation = .68479). Followed by technology barriers (mean = 3.3200, standard deviation = .59207), organizational barriers (mean = 3.0110, standard deviation = .79779) and perception on company's environmental impact (mean = 2.6500, standard deviation = .73121). The suggestion therefore is

that, the main barrier is the informational, followed with technological then organizational barriers and perception on company's environmental impact. In contrast, the barrier that has the slightest impact is the perception on company's environmental impact.

Table 4.23: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Perception on company's environmental impact	200	1.43	3.71	2.6500	.73121
Organizational Barriers	200	1.40	4.00	3.0110	.79779
Technological Barriers	200	2.40	4.00	3.2970	.59207
Informational Barriers	200	2.33	4.67	3.7583	.68479
Valid N (listwise)	200				

Source: SPSS output

4.12 Summary of Hypothesis Testing

The below table shows that summary of the hypothesis testing, the results shows that only three hypothesis is accepted out of five and there is significant relationship between the three latent variables which are perception on company's environmental impact, organizational barriers, informational barriers with the dependent variable of adoption of GSCM.

Table 4.24: Summary of Hypothesis Testing

Research Hypothesis	**Results**
H_1: Perception on company's environmental impact has a significant relationship with the adoption of green supply chain management.	**Accepted**

H_2: Organizational barriers have a significant relationship with the adoption of green supply chain management.	**Accepted**
H_3: Technological barriers have a significant relationship with the adoption of green supply chain management.	**Rejected**
H_4: Financial barriers have a significant relationship with the adoption of green supply chain management.	**Not tested**
H_5: Informational barriers have a significant relationship with the adoption of green supply chain management.	**Accepted**

Source: Developed for this research

4.13 Chapter Summary

This chapter studies the developed hypothesis and the result obtained is to accept the hypothesis and reject null hypothesis. This illustrates that only three independent variables have significant relationship with the adoption of GSCM. The next chapter will further describe the results that had been obtained and discuss the implication of this study with provision of few recommendations relevant to this study.

CHAPTER 5: DISCUSSION, CONCLUSION AND IMPLICATIONS

5.0 Introduction

In this chapter, discussion of major findings and implications of the study will be performed. Apart from that, limitations of the study and the recommendations for future research are also highlighted. Last but not least, the overall conclusion of the whole research project is developed to project a clear picture and idea of this research project.

5.1 Interpretation of Results

The findings of this study are discussed in details whereby the three research questions are summarized and explained within the context of current academic knowledge. The perception of company's environmental impact, organizational barriers and technological barriers towards the adoption of GSCM will be explained.

5.1.1 Organizational Barriers

The results from Table 4.24 provide the evidence that organizational barriers have impact on the adoption of GSCM. Hypothesis 2 is supported and has significant positive relationship with adoption of GSCM. This result is supported by the past research by Rojsek (2001), Ojo et al., (2014), Griffin et al., (2004), Govindan et al., (2014) and Pun (2006), they describe that commitment, guidance, support and leadership of the top management will significantly impact the success of the firm's environmental management practices because they are the key drivers. Many other authors such as Sharma (2000), Van den Bosch and Van Riel (1998), Aragón-Correa (1998), Jayant and Azhar (2014) and Kamaruddin et al., (2013) has also supported that the role of top management determines the proactiveness of a firm in environmental initiatives. Not only the top management but also the middle management's support and commitment are positively related to GSCM (Carter & Carter., 1998). Dashore and Sohani (2008) also explains that poor organization culture such as top level management's weak involvement in motivating the employees will lead to barrier in GSCM. In addition to the commitment of the management team, company's culture also plays a significant role in the organization. Thompson (2002), Jayant and Azhar (2014) and Revell et al., (2003) reveal that the resistance of change in the company culture is one of the organizational factor.

In summary, the results suggest that SME owners or management team's commitment and organizational culture will lead to potential organizational barrier and this barrier has potential to impact the adoption of GSCM within the company. Thus, any research aimed at identifying the barriers in GSCM must consider the commitment and culture of the SMEs and their relationship with the environment.

5.1.2 Perception of Company's Environmental Impact

Hypothesis 1 is supported and has significant positive relationship with adoption of GSCM in accordance to the results in Table 4.24. De Canion (1998) and Hillary (2004) explain that internal barriers have more or greater barrier as compared to external barriers and many internal barriers relates to environment perception and attitudes. According to Naffziger et al., (2003) and Dulipovici, (2001), positive attitudes and perception have been found to be an important factor to the introduction of environmental initiatives in the firm. The study by several researches such as Rutherfoord et al., (2000); Gerrans & Hutchinson, (2000) depicts that many SMEs also doubt and disbelief the environmental initiatives, these perceptions had developed into a barrier in implementing environmental practices. These past researches affirm and provide support to this research's results of the significant positive relationship between perception of company's environmental impact and adoption of GSCM.

In view to the past research and the results, it is concluded that the perception of the company's impact on the environment is positively related to the adoption of GSCM. Thus, SMEs owners and managers need to consider this criterion of the perception of their stakeholders in order to manage GSCM within their company.

5.1.3 Informational Barriers

The results from Table 4.22 show that there is significant positive relationship between technological barriers and the implementation of GSCM, thus, Hypothesis 5 is accepted. Accordingly, informational barrier has the most

impact to hinder food and beverage manufacturing SMEs in implementing GSCM. This result is in line with Ojo et al., (2014), Abdullah et al., (2016), and Hölzl and Janger, (2014) research found that if there is lack of knowledge and information on environmental impact, it will lead to reduce of adoption of GSCM.

Companies also find difficulties in conveying environmental information and benefits to their stakeholders due to lack of knowledge of the green products and process (Sarkis et al., 2011). AlKhidir and Zailani (2009) affirm this statement by stating if there is improved communication and informational linkage, this could help the organization adopt green practices. From the results and also the past studies as support, we could conclude that there is significant positive relationship between informational barriers and adoption of green supply chain management in this study is supported by past findings. The SMEs managers or owners need to enhance their knowledge on GSCM and improve their communication on it to further improve their adoption of GSCM.

5.2 Implications of The Study To Public Or Private Policy

In this section, conceptual, practical, policy and managerial implications, limitations and suggestion for future studies are discussed based on the empirical results of this study. These implications are imperative to manufacturing SMEs who pursue GSCM to achieve better business performance.

5.2.1 Conceptual Implications

This study presents practitioners with a 33 item measurement scale for evaluating the different barriers in adopting GSCM practices. The results all the 18 items are critical attributes of the three underlying barriers of GSCM adoption, this study manage to provide a conceptual contribution in emphasizing the relationship between the barriers and the adoption of GSCM. The findings from this study enhance the existing literature on GSCM by discussing on the barriers specifically among the F&B manufacturing SMEs in Malaysia. Previous study on green practices in Malaysia focuses on the perception of GSCM (Morthy 2012), challenges of green practices (Musa & Chinniah, 2016), green purchasing adoption (Ramakrishnan et al., 2015), green innovation initiatives (Wooi & Zailani, 2010; Abdullah et al., 2016; Eltayeb et al., 2011), etc. This study provides better understanding on the potential of the implementation of GSCM among the F&B manufacturing SMEs. By understanding the specific type of barriers will aid the firms to improve and motivate their environmental performance. Other sectors of manufacturing SMEs within Malaysia could also learn from the implications of this study since they have the similarity in the same manufacturing industry and company size.

5.2.2 Policy Implications

The results of this study provide a few policy implications for the government bodies. Firstly, this study points out the specific barriers that are stopping the F&B SMEs in implementing GSCM. Although the government bodies has established a few agencies such as Teknologi Hijau dan Air (KeTTHA), Green Technology Malaysia (GTM), Department of Environment (DOE), Sustainable Energy Development Authority of Malaysia (SEDA),

Kementerian Sumber Asli dan Alam Sekitar (NRE) and more, but, the results of the implementation of SMEs are clearly not as expected. According to the Department of Statistics of Malaysia (2016), industrial sector contributes to 2.8% of the source of emission of pollutants to the atmosphere in Malaysia, which is equivalent to 85,965 tonnes coming after motor vehicles and power plant. From the trends in Global CO2 emissions report (2016), Malaysia is one of the eight largest CO2 emitting countries which contribute to 0.7% of the world's CO2 emission. The government agencies will need to step up into understanding the barriers and provide the correct incentives, approach and awareness that are more effective. For example, policymakers should direct their attention towards these barriers such as perception barriers and technological barriers to provide more support to the SMEs within Malaysia.

Specifically in the perception barrier, this study finding suggests that SMEs do not have the correct perception about GSCM. This might be due to the lack of awareness and understanding of the advantages of GSCM. Therefore, policymakers could reduce this barrier by providing more training and activities for SMEs to participate in order change their perception of GSCM. Policymakers should also encourage the collaboration of SMEs with the government and other SMEs or even multinational companies for knowledge sharing of the implementation of GSCM. In regards to technological barrier, the results show that the current technology and infrastructure provided by the government might be lacking. Policymakers could implement strategies such as use of cleaner technologies and provide more funds for implementation of technology to increase the adoption of GSCM. The policymakers could assist the SMEs overcome these barriers with the correct approach and solution.

5.2.3 Managerial Implications

The above results reveal that there are three main barriers of the adoption of GSCM for the managerial groups within the F&B SMEs manufacturing firms in Selangor, Malaysia. The first implication is that the managerial level needs to plan ahead to the future by focusing on the adoption of GSCM and remove these barriers to ease their adoption of GSCM. Furthermore, it is essential for the SMEs not to focus only on the barriers, but also mitigating the risks of adoption of GSCM to understand whether this current supply chain has the ability to sustain the adoption of GSCM. Managers will also need to be able to plan both short term and long term goals of GSCM in order to gain a successful implementation. The second implication is the increase of awareness and knowledge of GSCM within firms. Top management needs to take the initiative of change management by implementing awareness among the stakeholders. They could hold environmental awareness seminars for their stakeholders and educate them about the benefits and advantages of GSCM. With the training and seminars, it will help in the change of perception that is negative towards GSCM. In addition, the management could also set KPIs and provide rewards for internal stakeholders to gain their interest towards GSCM.

The third implication is the collaboration and integration with external stakeholders such as government, customers and suppliers etc. The managers and owners of SMEs will need to put take extra effort to maintain good relationship with government agencies, customers and suppliers to obtain valuable information and technology upgrade in regards to GSCM. With the help of external stakeholder, especially the government, SMEs would be able to access to the latest green technology and the information of GSCM in a more effective manner. Furthermore, SMEs would be able to gain monetary loans and funds in order to aid their process of adopting GSCM.

5.2.4 Limitations and Suggestions for Future studies

There were some limitations in this study. For example, the study was limited to firms in the manufacturing SMEs. The limitation is time constraint to complete this project limits the time period for data collection. Thus, this study is only conducted based on 200 useable responses received during the data collection period. Although this number of responses is sufficient for conducting the research, bigger sample size is expected to have better generalizability for the population at large.

In addition, the sample size was also lower than expected due to a low response rate via email distributed method. According to Dillman (2011), the respondent rate via email tends to be lower and comparatively difficult to other methods of survey. This research faced the same problem with 948 surveys distributed via email, 207 questionnaires were returned with 200 usable responses (21.8%) indicating a low response rate among Malaysia respondents on email survey. Thus, the response received from this region may not be able to represent the population in the region. Despite of having these limitations in the study, they do not detract from the significance of findings but merely provide platforms for future research.

For future research, in order to obtain better results, researches may allow to extend this study to other state's manufacturing SMEs in Malaysia to understand any additional barriers that will impact the adoption rate of green supply chain management within the SMEs. This will provide better generalizability to the population at large. Researchers should also take a longer time frame for data collection in order to have a larger amount of responses for analysis purpose. Besides that, other survey methods for data collection could be adopted to obtain higher response rate. As such, this study lays the foundation for future research in other sectors as well as other

manufacturing industry which is growing significantly in Malaysia. According to Nee, (2011), there are only 118 SEMs that are certified with ISO 14001 as up to year 2009. Further studies might also investigate the impact of EMS certifications such as ISO 14001 with adoption of green supply chain management to understand whether environmental certification plays a role in improving the adoption rate of green supply chain management in Malaysia.

5.3 Conclusion

The research aimed to identify several barriers related to the adoption of green supply chain management among the food and beverage manufacturing SMEs in Selangor, Malaysia. The findings of this study suggest that the perception of company's environmental impact, organizational barriers and technological barriers have significant relationship with the adoption rate of GSCM. There is also relationship with between informational barriers and adoption of GSCM, but they are not correlated. The financial barriers are not further studied in this project as intended due to factor loading issue. The research objectives, research questions and hypothesis have been address and this study also contributes to the gap of the problem statement. The findings of this study provide a contribution to the practical industry. The results of this study can be used as a guideline by various parties such as manufacturing SMEs, policy makers, and researchers to formulate their communication and business strategies related to adoption of GSCM.

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APPENDICES

APPENDIX A: Questionnaire

UNIVERSITI TUNKU ABDUL RAHMAN

FACULTY OF BUSINESS AND FINANCE

The barriers to adopting green supply chain management (GSCM) in the food and beverage manufacturing small medium enterprises (SMEs) in Selangor, Malaysia

Dear respondents,

I'm a postgraduate MBA student from Universiti Tunku Abdul Rahman. In view of study purpose, we are required to perform a study on the current issues in the organizations of Malaysia. The purpose of this survey is to study the barriers toadopting green supply chain management (GSCM) in the food and beverage manufacturing SMEs in Selangor, Malaysia. There would be mainly five factors in this survey to further understand this research. The five barriers listed company's perception on environmental impact, organizational barrier, technological barrier, financial barrier and informational barrier

1) There are TWO (2) sections in this questionnaire, appreciate your assistance to answer ALL questions in ALL sections.

2) Completion of this survey form will take approximately 5 minutes.

3) We ensure that the contents of this questionnaire will be kept strictly confidential and only for academic purposes.

Thank you for your participation.

Yours Sincerely,

Name	Student ID	Email Address
Michelle Ong Ern Rui	16ABM01247	michelle.ernrui@gmail.com

Final Year Project Supervisor: Dr. Peter A/L Yacob

Section A: General Information

Kindly read EACH question carefully and provide the best suited answer by placing a TICK (v) in the boxes provided.

1. What is your gender?

- ☐ Male
- ☐ Female

2. What is your age?

- ☐ 18-25
- ☐ 26-35
- ☐ 36-45
- ☐ 46-55
- ☐ Above 55

3. What is the highest level of education you received?

- ☐ Cert/Diploma
- ☐ Undergraduate Degree
- ☐ Master Degree
- ☐ PhD

4. What is your occupation status in the company?

- ☐ Fresh graduate
- ☐ Junior Executive
- ☐ Senior Executive
- ☐ Manager
- ☐ Top Management

5. How long have you been in this company?

- ☐ Less than 1 year
- ☐ 1 year to less than 3 years
- ☐ 3 years to less than 5 years

☐ 5 years to less than 10 years
☐ 10 years or more

6. Is there currently an Environmental Management system in place in your company?

☐ Yes
☐ No
☐ In progress

7. If yes, what is the company official certification?

☐ ISO 14001
☐ Others, please specify:

Section B: Supply Chain Management towards Customer Retention

This section inquires about your view on the barriers of adopting green supply chain management (GSCM) in your company. You are required to indicate the extent of your agreement for each statement based on the 5-point likert scale.

NO	Questions	Very low impact	Low Impact	Moderate Impact	High Impact	Very High Impact
PART A: Company's perception on environmental impact						
1	**Waste generation**	☐	☐	☐	☐	☐
2	**Air pollution**	☐	☐	☐	☐	☐
3	**Water pollution**	☐	☐	☐	☐	☐
4	**Deposits to land**	☐	☐	☐	☐	☐
5	**Health and safety hazards**	☐	☐	☐	☐	☐
6	**Noise pollution**	☐	☐	☐	☐	☐
7	**Heat/ visual/ light pollution**	☐	☐	☐	☐	☐

NO	Questions	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Part B. Organizational Barriers						
1	**The top**	☐	☐	☐	☐	☐

	management commitment in adopting green supply chain management (GSCM) is low.					
2	**The middle management commitment in adopting green supply chain management (GSCM) is low.**	☐	☐	☐	☐	☐
3	**The company is less concern on corporate social responsibility.**	☐	☐	☐	☐	☐
4	**The company's culture hinders the implementation of GSCM.**	☐	☐	☐	☐	☐
5	**The company is less concern on recycling and reuses efforts throughout the supply chain.**	☐	☐	☐	☐	☐

No.	**Questions**	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
Part C. Technological Barriers						
1	**The company lacks of IT applications to implement GSCM.**	☐	☐	☐	☐	☐
2	**The company is resistant in adopting advance technology for GSCM.**	☐	☐	☐	☐	☐
3	**There is a high fear of failure if the company implements**	☐	☐	☐	☐	☐

	GSCM.					
4	**The company lacks of technical expertise in this field.**	☐	☐	☐	☐	☐
5	**There is complexity of design/structure to implement GSCM.**	☐	☐	☐	☐	☐

NO	**Questions**	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
Part D. Informational Barriers						
1	**The company does not have sufficient knowledge in green practices.**	☐	☐	☐	☐	☐
2	**Our customers are less aware or concern about GSCM.**	☐	☐	☐	☐	☐
3	**Our suppliers are less aware or concern about GSCM.**	☐	☐	☐	☐	☐
4	**The company does not have sufficient knowledge in reverse logistics adoption.**	☐	☐	☐	☐	☐
5	**The company does not have sufficient knowledge in environmental impact.**	☐	☐	☐	☐	☐

NO	**Questions**	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
Part E. Green supply chain management adoption						
1	**GSCM adoption is able to contribute to a greener environment to Malaysia.**	☐	☐	☐	☐	☐
2	**GSCM adoption is able to enhance the company competitive position in the Malaysia market.**	☐	☐	☐	☐	☐

3	**GSCM adoption is able to enhance the company competitive position in the global market.**	☐	☐	☐	☐	☐
4	**GSCM adoption is able to enhance the company image and brand.**	☐	☐	☐	☐	☐
5	**GSCM adoption is able to enhance plant and employee's safety.**	☐	☐	☐	☐	☐

Thanks for Your Cooperation