Model for Green Supply Chain Adoption: An Empirical Analysis of Industrial Sectors in MENA Developing Countries

By

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Declaration of Authenticity and Author’s Rights

This thesis is the result of the author’s original research. It has been composed by the author and has not been previously submitted for examination, which has led to the award of a degree.

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Dedication

I would like to dedicate this thesis to everyone who played a role in my academic accomplishments: my family and my friends, who supported me with love and understanding. Without you, I could have never reached this current level of success.

Acknowledgement

I am greatly thankful to GOD who gave me such strength and enabled me to accomplish this energy intensive and demanding work successfully.

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List of Abbreviations

AHP	Analytic Hierarchy Process
AMOS	Analysis of a Moment Structures
ANP	Analytic Network Process
CC	Cost Cluster
CP	Corporate Performance
DDPA	Driving and Dependence Power Analysis
EE	Effort Expectancy
EMS	Environmental Management System
EMS	Environmental Management Systems
EP	Environmental Performance
EPI	Environmental Performance Index
FC	Facilitating Conditions
GAMS	General Algebraic Modeling System
GDM	Group Decision Making
GLPI	Green Logistics Performance Index
GM	General Motors
GP	General Practitioner
GSCI	Green Supply Chain Integration
GSCM	Green Supply Chain Management
HR	Human Resources
HSM	Hazardous Substance Management
IDT	Innovation Diffusion Theory

IDT	Innovation Diffusion Theory
IEM	Internal Environmental Management
IS/IT	Information system/ Information Technology
ISM	Interpretive Structure Modeling
LPI	Logistics Performance Index
MADM	Multiple Attribute Decision Making
MNC	Multinational Companies
NGO	Non- Government Organization
NPSW	National Policy on Solid Waste
NRBV	Natural Resource-Based View
PC	Pollution Control Cluster
PE	Performance Expectancy
PEOU	Perceived Ease of Use
QC	Quality Cluster
RBV	Resource-Based View
RC	Resource Consumption Cluster
RDT	Resource Dependence Theory
ROI	Return on Investments
SC	Supply Chain
SCD	Supply Chain Design
SCM	Supply Chain Management
SEM	Structural Equation Modeling
SI	Social Influence

SPSS	Statistical Package for Social Sciences
SSCM	Sustainable Supply Chain Management
SSCPs	Sustainable Supply Chain Processes
TAM	Technology Acceptance Model
TOE	Technological, Organizational and Environmental
TRA	Theory of Reasoned Action
UTAUT	Unified Theory of Acceptance and Use of Technology
VIF	Variance Inflation Factor

Abstract

Because of the role of the green supply chain in reducing environmental damage and negative impacts to industries around the world, it has become important for companies. GSCM practices are considered to be environmentally friendly and help improve energy efficiency, water use efficiency, waste management, environmental preservation, reuse and recycling, toxic and hazardous materials management and finally transportation routes. On the emerging economy side, the adoption and practice of green supply chain management systems have not been widely discussed yet. In this research, the researcher demonstrated the importance and the impact of Technology-Organization-Environment (TOE) dimensions, firm practices and supply chain practices on the supply chain practices and the green supply chain adoption and the Supplier Relationship Management and Customer Relationship Management. This research aims to identify the various drivers and barriers that affect companies' decision to adopt the green supply chain in industries, as well as setting the dimensions of TOE in promoting the adoption of green supply chain systems. Firstly, the research presented the opinions of previous literature on the barriers and motivations that affect the adoption of GSCM, as well as a review of the literature that discusses the dimensions of TOE. Then a research methodology was developed that aims to collect and analyze appropriate data aiming to address the research question, and it conducts an experimental study on how the research variables are statistically related, which are Customer Relationship, Supplier Relationship, Supplier Selection, Internal Collaboration, Top Management Support, Green Supply Chain Management, Coercive Pressure, Normative Pressure, Mimetic Pressure, Market Pressure, Green purchasing, Barrier for GSCM, and Drivers for GSCM by using statistical tools, discussing the research results in a critical manner, then comparing them with the results of previous literature, shedding light on the theoretical and practical research contributions and determining the limits of research and future research areas. The deduction approach has been utilized in this research as well as the quantitative method using a structured questionnaire that has been collected from 405 respondents. The researcher has implemented a triangulation method to validate the dimensions of the research through qualitative data obtained through interviews and were then analyzed through making extracts of the interviews that can help in making overall assessment of the responses and help in comparing the responses obtained from the management. Also, the researcher has used focus groups to validate the proposed conceptual framework. The research indicated that there is a significant relationship between the environmental, organizational and Technological dimensions and firm practices and supply chain practices. There is a significant relationship between drivers, barriers and firm practices and supply chain practices and the green supply chain adoption, and there is a significant relationship between Green Supply Chain Adoption and both Supplier Relationship Management and Customer Relationship Management.

Keywords: TOE Dimensions, Green Supply Chain Management Practices, Green Supply Chain Adoption.

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Chapter One: Introduction

1.1 Preface

In recent decades, global levels of industrialization have increased, which in turn led to an increase in industries ’consumption of energy and materials, and this has led to an increase in environmental wastes and increased rates of carbon emissions, toxic pollution and chemical spills. In recent times, competitive, organizational and societal pressures have increased on companies, and this is what led companies to take steps to improve their environmental and economic performance. And the problem of environmental degradation has become an obstacle burdening companies, industries and governments at the present time. Among them, companies realized the benefits resulting from adopting green systems and how they affect relationships between suppliers and customers within the company (Fritz et al., 2017). Due to pressures on industries from stakeholders, companies have begun to adopt Green Supply Chain Management (GSCM). GSCM practices include energy efficiency, environmental conservation, water use efficiency, toxic and hazardous materials management and transportation optimization. GSCM's practices are considered to be environmentally friendly (Popovic et al., 2018).

Kaur et al. (2018) indicated that GSCM practices can be adopted in the product design stage, the supplier and exporter selection process, the procurement and logistical control stage, the manufacturing and production process until the product delivery stage to the end user and finally during the end-of-life period of the product. Sodhi and Tang (2018) stated that GSCM promises to act as a link between environmental management and supply chain management. The product life cycle includes the period from product design to end-of-life management. Emerging Asian economies tackle GSCM as it is a relatively new topic in its manufacturing fields, and this has given remarkable attention to regulatory institutions, customers, industry and academia (Fritz et al., 2017).

Industries in developing countries, on the other hand, are not so responsive to the cause of environmental conservation, as they are in a competition for faster economic growth, and because massive technological advancement in their economies are booming. This has created a scenario in which they will most probably emerge in the near future as the global top polluters; therefore, there is a larger need for developing countries to pay higher attention to environmental issues and GSCM activities (Soda et al., 2016). So far, research in implementing GSCM is still insufficient and small in number in this area.

This chapter includes an introduction to the research; the chapter begins with an introduction to the chapter, then the research background on the context of GSCM, companies ’adoption of GSCM, the dimensions of GSCM and the technological, organizational and environmental (TOE) dimensions. Then, the chapter deals with the research gap, research problems and its questions and objectives. A summary of the methodology used in the research will be presented. The chapter then proceeds to present the theoretical importance of the research. Finally, the final section presents an outline of all the chapters presented in the paper. Figure 1-1 shows the chapter outline.

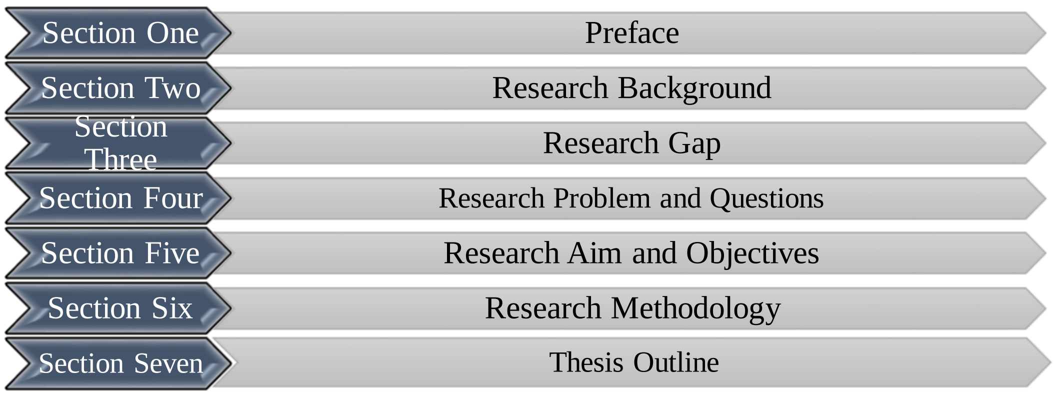

Figure 1- 1: Chapter One Outline

1.2 Research Background

Some clients and stakeholders lack the ability to differentiate between the company and its suppliers. Because of the pressures that companies face from their stakeholders, companies are making an effort to adopt green supply chains, as a form of preserving the environment and improving environmental performance. GSCM is an initiative adopted by many organizations as a way to address environmental issues (Govindan et al., 2015). Lately, the GSCM concept is gaining popularity all over the world. Corporate accreditation of GSCM is a way to genuinely demonstrate their commitment to sustainability. GSCM practices are implemented and approved in various stages of supply, as well as in green information systems, and internal environmental management. GSCM practices improve cooperation with customers, investment recovery and environmental design. GSCM is defined as the ability to enhance corporate efficiency and increase synergies between business partners and pioneering companies, as it helps in enhancing green performance of companies, reducing waste and achieving cost savings (Hwang et al., 2016).

Increasing the competitive advantage and improving the company's image are among the features that are expected from the synergy step (Govindan and Soleimani, 2017). There is a lot of literature that deals with the steps of adopting GSCM. However, many previous studies and empirical studies have not identified the factors that could affect the accreditation of GSCM for SMEs in the Southeast Asia region (Tseng et al., 2019). However, this scarce research cannot be applied to all emerging countries due to different cultures and different levels of economic development among countries. Also, the literature does not address GSCM accreditation by means of technology-organization-environment theories and how it affects suppliers and customers. There are no models to help explain the theoretical contribution to GSCM practices (Aboelmaged, 2018).

Therefore, researchers have to rely on common literature and models used in innovation diffusion research. Technology-Organization-Environment (TOE) model developed by Tornatzky and Fleisher is widely used and explains the adoption of innovation at the organizational level. TOE is a theoretical model at the enterprise level that consists of three components that influence adoption decisions, which are technology, organization and environment (TOE) dimensions (Baker, 2012):

- The technological dimensions include the internal and external technologies of the company.
- The organizational dimensions include the characteristics of the company, including the size of the company, the human resources, the board of directors and the connections among the employees. It also includes the resources of the company.

- The environmental regulatory dimensions include the size and structure of the industry, the regulatory environment and the firm's competitors.

Applying the model of Technology-Organization-Environment (TOE) on Supply Chain Management was adopted by some researchers such as (Huang et al., 2016; Haque et al., 2019; Lin et al., 2020), who investigated the impact of Technology-Organization-Environment (TOE) on Supply Chain Management, and the results found that Technology-Organization-Environment (TOE) had significant impacts on Supply Chain Management.

In this research, the researcher demonstrated the impact of Technology-Organization-Environment (TOE) dimensions, environmental dimensions, government and market (competitive pressure), organizational dimensions (top management support and centralization) and environmental dimensions (compatibility, complexity and IT infrastructure), firm practices and supply chain practices on the supply chain practices and the green supply chain adoption and the Supplier Relationship Management and Customer Relationship Management.

It has been noted that GSCM has identified related studies in the manufacturing field. One of the studies has found that the Indian companies are actively adopting all the things in the sets of internal environmental management and investment recovery activities, but they are not so concerned with green buying, eco design and consumer collaboration with activities of environmental concern. With respect to environmental sustainability, the findings added that more focus needs to be paid to working with second-tier suppliers. In addition, in terms of GSCM performance for Indians and Chinese firms, it was noted that these firms ought to focus on reducing the cost of raw materials and energy usage, as well as waste disposal and waste discharge spending. The study reported that Indian firms' performance regarding their environment and operations was considered to be moderately important (Vijayvargy and Agarwal, 2013).

In the same manner, Amemba et al. (2013) analyzed the company's role in a supply chain in its industry influencing the company's attitude towards green strategies using empirical data analysis. For the high-tech sector, twelve companies were selected. This category of business is classified into three groups that are

Upstream (Supplier Relationship Management), Midstream (across department relationship management), and Downstream (Customer Relationship Management) (raw material source, original product manufacturer / original equipment maker and brand firm). It was argued that the supply chain's status is related to the challenges faced by the company when implementing green practices. There is also greater competitive risk when the firm is close to the Supplier Relationship Management. There are risks of higher competition as the company is nearer to Customer Relationship Management. The external and internal driving force of companies is directly consistent in supporting the adoption of green systems with the different types of problems that may face the companies' supply chains.

The internal driving force of a company corresponds to the things and situations that happen within the organization, and it is possible that this force affects negatively or positively, positively linked with the volatility of demand it encounters but negatively with the challenges of competition and supply, and there are many types of internal driving forces (organization strategy, organization structure and technological capacity) (Lo, 2013). Additionally, an external driving force corresponds to the things, situations, and events that happen outside the organization; a positive correlation exists with the external driving force of the company and the competition and supply risks it encounters, and a negative relationship with the fluctuations of production. In addition, it discusses the connection between corporate willingness to support green activities and its place in the supply chain, and there are many types of external driving forces, such as customer requirement, competition and change in technology (Lo, 2013).

The impact of GSCM practices on the overall environmental performance dimension is achieved by improving the environmental status of the institutions. In light of economic performance, decision-makers and managers believed that the benefits of GSCM did not cover the increased costs incurred by adopting GSCM, as the results of economic performance were not as satisfactory as the results of operational and environmental performance. Operating Performance, GSCM practices are seen as enhancing and improving product quality to a great extent. GSCM's practices are based on increasing product line offerings and capacity, which is an agent of product flexibility. As for the acceptance and accreditation part, if GSCM is seen as giving more environmental and operational benefits and fewer economic benefits, this could reduce the companies' accreditation step for GSCM. In the event that the economic benefits are not significantly available, mid-level managers need to work on forming new methods of convincing top management of the strengths of the GSCM to adopt various advantages (Zhao et al., 2013).

Adopting green supply chain management constitutes an important pathway to meet the criteria for this certification, and from that the organization will develop a new framework or plan that takes into account the integration between each batch of the supply chain to create a green supply chain that begins with the design, production and delivery of the product or service itself. The standard quality certification as an engine is linked to the integration of the comprehensive management of environmental quality that provides the opportunity for new innovations in order to create new methodologies, whether in the production process or in the operational processes; an organization can reduce the amount of its emissions on the one hand and reduce the regulatory use of energy on the other hand. Thus, the financial resources of the organization will be utilized in a more efficient manner (Dashore and Sohani, 2013).

The importance of GSCM has been discussed by many researchers. They also extensively compared the application of the green supply chain among organizations. There are, however, different barriers to GSCM adoption that can be external or internal to the organization. Industries may recognize GSCM's importance, but it may not be practical to put it into practice most of the time. While searching the way for Green practices, the firms may face different problems. There may be different barriers or obstacles, such as absence of government legislation, infrastructure, organizational factors, high costs, etc.

Also, TOE model has been integrated with the environmental structure, and this is what makes it one step ahead of the other models. It was also found that the TOE model is one of the most suitable models for industry (Gangwar et al., 2015). Based on the comparisons of the theoretical model presented by the research, the TOE model was included, which was validated in previous experimental studies. Many previous literatures relied on the TOE model, as a theoretical basis in their research, in order to examine the regulatory acceptance of new technologies (Zailani et al., 2015). The TOE model has some limitations, although it is considered to be a comprehensive model. Developed countries are characterized by an abundance of resources. Some factors (comparative advantage, compatibility, complexity, organizational readiness, senior management commitment, training and education) are assumed to be more relevant to the larger organizational context compared to companies in developing countries.

On the other hand, Yu et al. (2014) that GSCM with Mods can be defined as a joint environmental effort between local companies and suppliers that the companies deal with in order to implement environmental and ecological management activities. It focuses on the inbound or Supplier Relationship Management portion of the supply chain of an item and of institution. For insight on the use of ecologically and environmentally sustainable methods in terms of purchasing processes and resource handling procedures, companies will consider their suppliers. Institutions are gradually dealing with the environmental performance of their suppliers to ensure that the materials and equipment supplied by them are friendly to the environment. In the Chinese auto sector, some global auto manufacturers (such as Toyota, General Motors (GM), Ford) have been required to obtain quality assurance certifications, such as ISO 14001.

Building collaborations and business entities with the Customer Relationship Department regarding them contributes to the successful use of GSCM's activities. Chinese research has shown that consumer pressure is an important force of Chinese projects to enhance their environmental image and activities. In addition, knowing the needs of the end user is part of GSCM, as it serves as an integral angle of appreciation and value development. Given the increasing environmental demands of consumers, it is important for businesses to cooperate with green packaging consumers on the environment, achieve ecological goals as a whole and establish joint environmental planning (Kuei et al., 2015).

1.3 Research Gap

1. The research gap is represented in the previous literature regarding GSCM, where the previous literature lacks support for the accreditation of GSCM.
2. The research deals with studying several variables by examining the impact of environmental dimension, organizational dimension, technological

dimensions, drivers and barriers, on firm practices and green supply chain adoption, as there is no combined model to study these variables together in previous studies.

3. The field of application on experts of the industrial sector, where there is a study of a previous study examining the variables of the study (environmental dimension, organizational dimension, technological dimensions, drivers, barriers, firm practices and green supply chain adoption).

1.4 Research Problem and Questions

Nowadays, any firm around the world needs to adjust the procedures of supply chain into the green procedures to meet the new adjustments of the trading. Especially in emerging economics, there is a huge movement to develop and enhance the supply chain industry and department, but there are many obstacles that may prevent the breakthrough happen and it still in its inception and it has not been widely embraced. It could be indicated that there are main barriers to implementing GSCM practices, such as inadequate knowledge and support, insufficient technology and infrastructure, lack of government regulations, financial constraints and unsupportive organizational and operational policies. The research problem focuses on the drivers and barriers of adopting the GSCM, which raise the following research questions:

1. To what extent the TOE dimensions affect the firm practices and supply chain practices?
2. What are the drivers and the barriers that affect the green supply chain adoption?
3. Is there a relationship between green supply chain adoption and Supplier Relationship Management?
4. Is there a relationship between green supply chain adoption and Customer Relationship Management?

These questions are raised due to the fact of having several definitions for sustainable supply chain management process and the difference between this and green supply chain management process. Also, the factors affecting green supply chain management process are different in the literature, where TOE dimensions are considered to be one of the factors groups that affect the firm practices and supply chain practices. Also, reviewing the literature, it was observed that there are many drivers and barriers that affect the green supply chain adoption, but few research studies focused on drivers and barriers of green supply chain adoption in the developing countries in the MENA region. Therefore, it becomes important to study if such adoption could lead to supplier and customer relationship management, specifically in the developing countries in the MENA region. By answering the above questions, it could be easy for managers and decision makers in the developing countries in the MENA region to set their policies and procedures for adopting a green supply chain management process and in turn achieve customer and supplier relationship management.

1.5 Research Aim and Objectives

This research aims to investigate the role of Technological-Organizational-Environmental (TOE) dimensions and their effect on the firm practices and supply chain (SC) practices to achieve the green supply chain (GSC) adoption within the context of barriers and drivers of GSC adoption.

Four research objectives are constructed to fill the literature gap and achieve the research aim:

1. To critically review the previous research studies on green supply chain management accreditations, drivers, barriers and TOE dimensions.
2. To develop conceptual model illustrating the relationship between TOE dimensions, supply chain practice, drivers, barriers and GSC Adoption
3. To demonstrate the applicability of the conceptual model through conducting empirical analysis on the industrial sector of the MENA region.
4. To provide conclusions with applied model upon which recommendations for GSC adoption will be proposed.

1.6 Research Methodology

The meaning of methodology in the social science field is gathering and collecting information concerned to real world (Strauss and Corbin, 198). Bryman and Bell (2007) show the importance of research questions to put and drive the data collection and research design.

According to Davies (2007), the development of knowledge can be regarded as a definition of research philosophy. Every researcher develops knowledge while conducting the research. A researcher should understand the philosophical issues of the research before conducting research on a particular field. Davies (2007) classified two major reasons for understanding philosophical issues of the research regarding research methodology. The first one explained by Davies (2007) is that the researcher may clarify the methods he is adopting for conducting the research, which will help the researcher to gather all the collected data for evaluation of results for the research. The second reason is that the researcher will be able to deal with various and several methodologies of the research, such as avoiding inappropriate work by the knowledge of research.

According to Wilson (2010), in positivism approach general rules and regulations are developed along with systematic techniques of scientific methods. Positivism approach begins with the idea and observation of the research. For this research, the research positivism approach was used by the researcher; by using this approach, the researcher has analyzed the aims and objectives of the research in order to create a logical way of explaining objectives of the research. The positivism approach stands upon a quantitative study. According to Wilson (2010), realism is the combination of positivist and interpretivist approaches. In this approach, human characteristics and society are not essential. A realism approach was used for carrying out the research as it helps the researcher to define the problem of the research in a clear way (Maxwell, 2012).

The research approach has been defined as the technique that the researcher followed in order to establish his/her research project (Kothari, 2004). There are three research approaches or methods, which are qualitative, quantitative and mixed approaches. The qualitative approach is claimed to be inductive, while the quantitative approach is claimed to be deductive (Williams, 2007). Both approaches differ in the fact that the qualitative research is understanding and interpreting the phenomenon or the problem without depending on numbers, while the quantitative research is dealing with numbers or numerical data (Creswell, 2013).

It is a method of research that observes, understands and interprets the phenomena without depending on numbers. Therefore, from the word qualitative, it is clear that it deals with qualities rather than quantities. The data used are qualitative, which means not characterized by numbers, but on free form or unstructured data such as texts, experiments, questionnaires or surveys, data are collected through open-ended questions in a form of words. It involves five designs: ethnography study, case study, grounded theory study, phenomenological study and content analysis (Williams, 2007).

Quantitative research, from its word, deals with quantities and numbers. The data are usually collected through structured questions (Mayer, 2015). It is a conclusive method of research, which means its aim is to test a specific hypothesis with relevant numbers and statistics, come up with exact relationships and provide numerical facts. Therefore, quantitative research is objective, which means it does not depend on whoever computes the data; the results do not change, so it gives reliable conclusion (Mayer, 2015). It usually deals with a large sample and analyzes it. From this, it becomes clear that quantitative research begins with presenting the research problem and uses theories to formulate these problems in the form of hypotheses (deductive). There are three categories of quantitative research: experimental, causal and descriptive research (Williams, 2007).

The third approach is the mixed approach, which is an approach that combines both qualitative and quantitative research. There is also a lot of research in recent times that relied on the mixed approach (Sousa et al., 2007). The research design depends on the structure of the search query, and this is to ensure the quality and accuracy of the data collected in order to address the research problems, as well as the ability of the data to respond to the research questions without ambiguity. Moreover, the research designs as the logical structure of the enquiry should be distinguished from the methods used to collect the data (Rwegoshora, 2016).

For this research, the researcher has used the quantitative approach through a questionnaire survey to collect data from employees of the industrial sector represented in the academic and non-academic staff in universities. The objective of following both types of qualitative and quantitative approaches is to be able to explore challenges facing experts and to test if they perceive the same problems or have different visions. The following sub sections will describe the data collection methods that used questionnaires.

It was stated that one of the critical activities for a research is the construction and development of the questionnaire. The quality of the questionnaire entails the efficiency of the research (Acharya, 2010). As the collection of data is far from the purpose of the study and the real situation of the research community, these data are not appropriate and have results and recommendations that are useless. A poor questionnaire, poor sample coverage, and poor survey administration result in less correct data, both questionnaires and interviews were distributed on experts and professional industrial MENA regions, and the researcher chose the MENA regions because of the weakness in capabilities and weakness in applying supply chain, in addition to its faced many problems because it did not apply green supply chain adoption.

1.7 Thesis Outline

This research is divided into nine sections, presented as follows:

Chapter 1: Introduction

This chapter provides an overview of the research topic and research background, as well as the research gap of the study. Among them, it presents the research problem and its nature, the origins of the study, a summary of the development of the research methodology and the research plan.

Chapter 2: Theories and Green Supply Chain

This chapter explains the need for and the importance of this research and discusses the previous studies, including the research gap in developing the supply chain management process, developing supply chain management, and barriers and drivers of green supply chain management practices.

Chapter 3: The Adoption of Green Supply Chain Management Practice

This chapter explains the need for and the importance of this research and discusses the previous studies, including the research gap in developing the supply chain management adoption.

Chapter 4: Model Development

This chapter explains TOE dimensions presented as factors affecting GSCM adoption and theoretical framework (Model Development).

Chapter 5: Research Methodology

This chapter presents the research philosophy as positivism, research approach as quantitative, and research design as deductive and data collection.

Chapter 6: Model Modification

This chapter presents the model modifications the researcher supposed and describes the qualitative analysis of the data that were collected through the interviews method for collecting information from potential experts in the industrial sector represented in the heads of departments.

Chapter 7: Model Testing

Moreover, data analysis techniques (Descriptive Analysis, Correlation Analysis, and Regression Analysis) used in this study will be presented. In addition, it examines the research results and discusses them, which in turn increases the understanding of their meaning and importance. This chapter also illustrates the hypotheses developed for the relationship between Customer Relationship, Supplier Relationship, Supplier Selection, Internal Collaboration, Top Management Support, Green Supply Chain Management, Coercive Pressure, Normative Pressure, Mimetic Pressure, Market Pressure, Green purchasing, Barrier for GSCM, and Drivers for GSCM. These variables and relationships are revealed and derived from literature (Chapter Two) and then modified in model modification of chapter three.

Chapter 8: Model Validation

This chapter discusses the focus groups for model validation.

Chapter 9: Conclusion and Recommendation

This chapter discusses and summarizes the overall aim and objectives of the research, giving a conclusion for the relationship between research variables and what was proved from the objectives and hypotheses. As a result, the recommendations emerge for a new GSCM strategy and practices based on results and findings obtained using the statistical analysis. This chapter also provides some limitations for the research listed according to what was found. Moreover, this chapter revisits the previous studies to compare between their results and the current research results.

Chapter Two: Theories and Green Supply Chain

2.1 Overview

In the past decades, the convergence of environmental issues and organizational efficiency has started to draw attention. For certain developing countries, greening the supply chain has been a corporate imperative. However, most of them are also late adopters when it applies to the Middle Eastern countries. Green supply chain is a term integrating green sourcing, manufacturing products, resource management, sustainable distribution, marketing and reverse logistics. The current chapter addresses the management of the supply chain network and its background and development to provide a green supply chain management network. Furthermore, another section is structured to illustrate how to implement and manage an integrated green supply chain. Additionally, a section for the green supply chain in the manufacturing sector is discussed, as it is the subject of current research, with some implementations and practices for the industrial sector.

Afterwards, the research moves towards a new section that illustrates the implementation of the green supply chain management in the developing countries, with exhibiting examples from different developing countries that range in its level of development as China, Jordan, Thailand and Malaysia to illustrate to what extent the green concept is prevailing in such countries. Moreover, the implementation of green supply chain management in the developing countries of the Middle East is discussed to clarify the way through which the organizations in this region deal with the green strategy, supporting this clarification with examples from developing countries as Kingdom of Saudi Arabia in different fields as manufacturing in Dubai and hoteling in Riyadh.

Furthermore, after tackling the implementation of the green supply chain management, the research introduces the section in which all the major enablers of the green supply chain management are illustrated, whether internal or external, with respect to various studies and previous research, which had expressed these drivers. Similarly, all the paramount barriers that are facing the implementation of green supply chain management highlight what may hinder the ability of different organization to consider the environmental issue. Then, the framework of green supply chain management in the industrial sector will be adopted depending on these previous sections. Figure 2-1 illustrates a diagram for the input-output of this chapter.

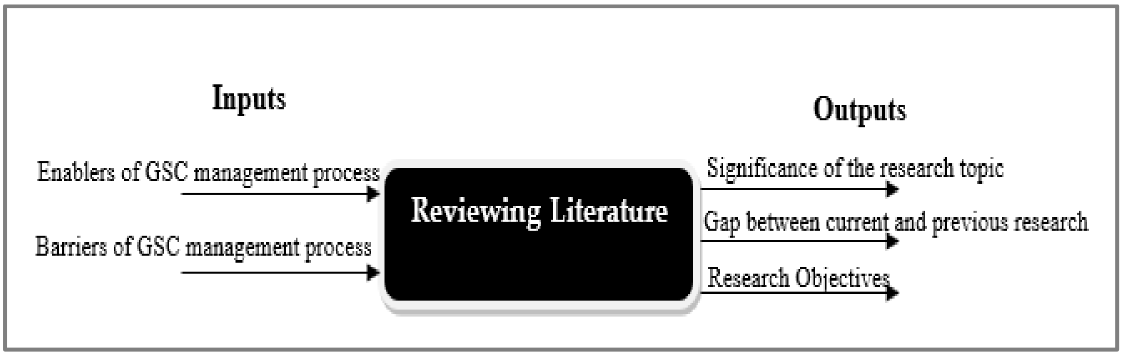

Figure 2- 1: Literature Input-Output Diagram

In addition, Figure 2-2 illustrates the chapter outline to achieve the outputs expected from this chapter, using the input given from previous studies.

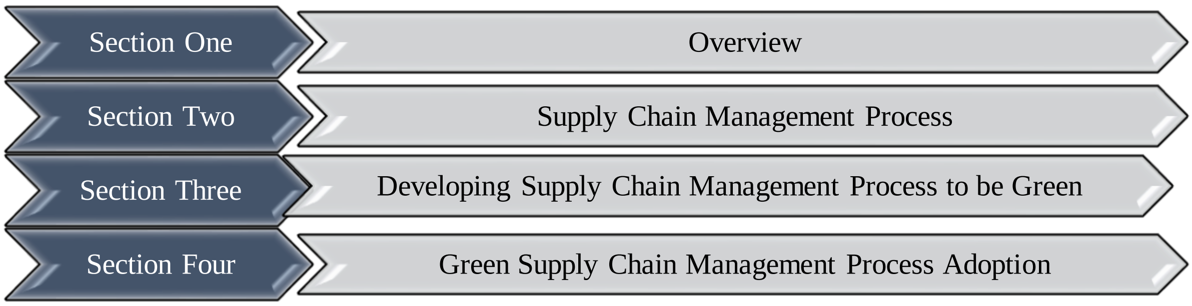

Figure 2- 2: Chapter Two Outline

2.2 Supply Chain Management Processes

Supply Chain Management Process can be defined as all activities related to the processing, extraction and manufacturing of goods from raw materials, till the final consumer, as well as related flows of information. Resources and information in the supply chain move in both directions, up and down. SCM is known as a business process in this description. The "ecosystem" philosophy and environmental issues have been gradually incorporated into the concept of SCM as follows: the expression “supply chain” is used to identify the manufacturer, distributor and customer network. It also involves transport between manufacturers and customers, as well as the final customer. The environmental impacts of product development, manufacture, processing, transport and use, and the treatment of product waste are considered (Wieland, 2021).

Supply chain management (SCM) involves the integration and collaboration of business processes and alignment of strategies across the supply chain to please the supply chain's final customers (Green et al., 2012). Transforming from supply chain management (SCM) to Sustainable Supply Chain Management SSCM involves integrating environmentally and financially viable practices into the complete supply chain lifecycle, from product design and development, to material selection, (including raw material extraction or agricultural production), manufacturing, packaging, transportation, warehousing, distribution, consumption, return and disposal. SSCM generates a significant pressure on organizations to modify their existing supply chains to meet sustainability needs as it provides better working conditions, fair compensation, equal human rights and cultural diversity (Schrettle et al., 2014; Rajak and Vinodh, 2015). Consequently, organizations advocate SSCM to guarantee “long-term benefits and competitiveness” by accounting environmentally and socially responsible activities in the supply chain (Zhu and Sarkis, 2006; Ahi and Searcy 2013; Ansari and Kant, 2017).

SSCM is identified as the construction of coordinated supply chains through the volitional integration of environmental, economic and social considerations with key inter-organizational business systems to efficiently and effectively manage the material, information and capital flows associated with the production, procurement and distribution of services and goods in order to fulfill the short and long-term organization’s efficiency by meeting stakeholder expectations to improve productivity and competitiveness resilience (Ahi and Searcy, 2013).

For organizations to distinguish themselves from their competitors, they adopt SSCM and hence have a competitive advantage in the market. A definite level of commitment towards sustainability practices has been developed by many organizations to make their supply chains sustainable. Sustainable development is addressed by producing environmentally friendly products and adopting cleaner production methods. On the other hand, sustainability theory guides organizations to integrate several practices, such as returning of product to producer at the end-of-life, eco-friendly handling of returns, dispersing environmentally-friendly strategies at each level of the supply chain (Rostamzadeh et al., 2015).

On the same path and meaning of green supply chain, some researchers have defined it as sustainably supply chain management process. A selected number of definitions of SSCM have been illustrated in Table 2-1.

Table 2- 1: Review of Sustainable Supply Chain Management Process Definitions

Definition Source	Definition
Lensson et al., 2006	A way by which firms direct their social responsibilities across dislocated production procedures spanning geographical as well as organizational boundaries.
Carter and Rogers, 2008	Applying transparent strategic integration in order to enhance long-term individual company's economic performance and its supply chain, additionally attaining the organization's economic, social and environmental goals as well in the systemic coordination of key inter-organizational business procedures.
Seuring and Muller, 2008	Management of resources, knowledge and capital flows involving coordination between companies in the supply chain, taking into account the objectives of all three areas of sustainable development- economic, environmental and social factors- arising from consumer and stakeholder demands.
Seuring, 2008	The incorporation of sustainable development and Supply chain management, economic and social issues must be discussed in the supply chain, thus avoiding related problems, but also looking at more sustainable products and processes.
Ciliberti et al., 2008	Supply chains where sustainability’s three dimensions, namely the economic, environmental, and social ones, are considered.
Font et al., 2008	Embedding sustainability to the processes of supply chain management, considering environmental, social and economic impacts of business activities.
Pagell and Wu, 2009	A set of managerial actions that make the supply chain more sustainable, targeting creating a truly sustainable chain.
Badurdeen et al., 2009	Participation of the planning and management of sourcing, procurement, conversion and logistics activities involved during pre-manufacturing, manufacturing, in addition to the use and post-use stages in the life cycle in closed-loop through multiple life-cycles with seamless information sharing about all product life-cycle stages between companies by clearly taking into consideration the social and environmental consequences to accomplish a shared vision.
Haake and Seuring, 2009	A group of supply chain management policies held, actions taken and relationships created due to worries about the natural environment and social issues with regard to the design,

Definition Source	Definition
	acquisition, production and distribution, in addition to the use, reuse and disposal of the firm’s goods and services.
Wolf, 2011	The level of cooperation of a manufacturer with its supply chain partners and collaborative management intra- and inter-organization processes for sustainability.
Closs et al., 2011	Reflection of the firm’s capability to plan for, mitigate, detect, respond to and recover from probable global risks. Risks involving substantial marketing and supply chain considerations comprise product development, channel selection, market decisions, sourcing, manufacturing complexity, in addition to transportation, government and industry regulation, resource availability, talent management, alternative energy platforms and security.
Wittstruck and Teuteberg, 2011	Expanding the conventional idea of Supply Chain Management by including social/ethical and environmental aspects.
Suggested definition by the Researcher	It is a proper management of related environmental, social and economic impacts in constructing and maintaining effective and efficient global supply chains.

Similarly, a sustainable supply chain management process has been developed by researchers to be called ‘green’ supply chain management process. The idea of sustainable supply chain management is very similar to green supply chain management; GSCM's scope depends on the investigator's goal. GSCM's meaning and context in the literature ranged from green purchases to integrated green supply chains that move from manufacturer to distributor to customer. GSCM is described as incorporating environmental awareness into supply chain management, including designing products, procurement and choice of resources, production processes, final goods distribution to consumers and end-of-life management of the commodity after its life span (Srivastava, 2007).

Adding the “green” aspect to supply-chain management requires addressing the impact and interactions between supply-chain management and the environment. Since going ‘green’ maintains the sustainability of the resources and the environment generally, another term for “sustainable” is “green”. Therefore, sustainable supply chain management (SSCM) can also be called green supply chain management. In the 21st century, improvements in the business environment have helped develop supply chain networks. Technological developments, specifically the significant reduction in communication costs, have resulted in changes in coordination among supply chain members. Continued industrialization and ever-increasing consumerism have created an atmosphere in which mankind's industrial activities have begun to have an unfavorable effect on the environment that could prove self-destructive to the former. Longer ago, developed countries showed little regard for environmental issues in their pursuit of economic growth and progress to their existing economic status. However nowadays, some of their businesses, states and even customers are becoming more mindful of environmental protection and emission reduction.

Industries in developing countries, on the other hand, are not so responsive to the cause of environmental conservation, as they are in a competition for faster economic growth, and due to massive technological advancement in their economies are booming. This has created a scenario in which they will most probably emerge in the near future as the global top polluters; therefore, there is a larger need for developing countries to pay higher attention to environmental issues and GSCM activities (Soda et al., 2016). Any action being taken by a party in the supply chain has the potential to produce negative social or ecological effects and the need for environmental initiatives throughout the entire supply chain. Through greater awareness of environmental problems, responsibility for environmental sustainability and policies to reduce the environmental consequences of their products and services are rising on companies (Barve, 2011).

The outgrowth of supply chain management process was advocated to have green supply chains, which are taken into account as clean supply chains with minimal or zero waste, and then it is called green. Recently, GSCM has been more focused on the environment and its impact on organizational performance. GSCM importance has resulted from growing social pressure, product life cycle, supply chain risks and the increasing use of environment. For manufactures, GSCM can be seen as a quite advanced management practice towards improving environmental performance (Vijayvargy and Agarwal, 2013). Environmentally friendly measures should be introduced and implemented in industrial supply chains to guarantee that there is no environmental damage, along with the materialization of economic growth. The increasing awareness of environmental issues has contributed to the adoption of GSCM, which has gained global popularity and acceptance in a short span of time, though of relatively new origin. Nowadays, there are more concerns about the world's environmental issues, such as global climate change, the use of toxic substances, and the decline in resources that are not replenished. Increasing attention is given to the development of supply chains' environmental management strategies. The government has launched initiatives aimed at promoting this concern, which is GSCM practices (Bhattacharjee, 2015).

Nonetheless, the "Green" approach is not the central part of the core strategies of the organization as they have not yet well defined or properly paved the road to the green supply chain. Though this environmental concern has been recognized for businesses very significantly, the adoption of the "Green" model of supply chain management has only been implemented recently. Throughout this age of globalization, companies, through greater internationalization and worldwide competition, are confronting quick changes in the business environment and working atmosphere. Organizations allocate their best efforts and distributing resources in the best possible way to stay effective and efficient. Economic growth raises energy and resource consumption rates, which in turn leads to environmental problems and resource degradation issues.

In such a scenario, economic and environmental performance is becoming increasingly important for organizations facing competitive, regulatory and society pressures. To face these pressures, industries these days are gradually focused on environmentally conscious supply chain, commonly known as the green supply chain (Soda et al., 2016). Green Supply Chain Management (GSCM) encompasses conventional supply chain management techniques that incorporate environmental requirements or issues into the purchasing decision of companies and long-term supplier relations. Green Supply Chain Management demands that the green concept be integrated through each and every process of the service or product in a supply chain (Bhattacharjee, 2015).

Green Supply Chain Management (GSCM) is a strategy aimed at optimizing material and information flows across the value chain as a whole. The key aspect while making managerial decisions is a greater emphasis on ecological and sociological parts. In order to remain competitive and profitable, businesses should reconsider how they expect to do business in the future. In managerial decisions, keeping sustainability a priority is far more important than struggling with risk and instability. Sustainability provides opportunities for businesses that save costs, improve efficiency and attract new customers and suppliers. It also provides the opportunity for achieving a competitive advantage and generating profits. This influences all aspects of a business but is particularly true for intense emissions and waste supply chains (Kumar et al., 2012).

Green Supply Chain Management (GSCM) is characterized as a system of supply chain management policies, decisions made and relationships formed in response to environmental concerns regarding the design, procurement, manufacture, delivery, use, reuse and disposal of the company's goods and services (Zsidisin and Siferd, 2001; Diabat and Govindan, 2011). As per Srivastava (2007), GSCM could be described as integrating environmental consciousness into supply chain management, involving product design, component sourcing and choice, production process, distribution to consumers of the final product and end-of-life management of the product upon its useful life. It is Supplier and Customer Relationship Management with manufacturers and consumers to provide greater value to the supply chain as a whole at a lower cost (Kumar et al., 2012).

In the literature, green design has been widely used to describe products manufactured with certain environmental considerations. It is the systematic recognition of environmental and health-related design problems during the entire product life cycle during current production and process creation. Table 2-2 illustrates the evolution of the concept of green supply chain management process and the definition of GSCM according to various researchers.

Table 2- 2: Definitions of Green Supply Chain Management Process

Definition Source	Definition
Handfield et al. (1997)	Applying the principles of environmental management to all the activities across the customer order cycle, comprising design, procurement, manufacturing and assembly, in addition to packaging, logistics and distribution.
Zhu et al. (2005)	A new model that is important for enterprises to attain profit and market share objectives by reducing their environmental risks and influences while raising their ecological efficiency.

Definition Source	Definition
Hervani et al. (2005)	Green Manufacturing/Materials Management, Green Purchasing, Green Distribution/Marketing and Reverse Logistics
Sheu et al. (2005)	Mixture of both the product manufacturing supply chain and used-product reverse logistics chain.
Srivastava (2007)	Combining the environmental thinking into supply-chain management, comprising product design, material sourcing and selection, manufacturing processes, in addition to delivery of the final product to the consumers as well as end-of-life management of the product after its useful life.
H'Mida and Lakhal (2007)	Exercising monitoring as well as enhancing environmental performance in the supply chain throughout a product's life cycle.
Lakhal et al. (2007)	Olympic green supply chain, by the five-circled flag of the Olympics, is regarded as zero emissions, zero waste in activities, in addition to zero waste of resources, zero use of toxic substances, zero waste in product life cycle, as well as green inputs and green outputs.
Srivastava (2008)	Combination of sound environmental management choices with the decision-making process for the adaption of resources into serviceable products.
Lee and Klassen (2008)	A buying organization's plans and activities that incorporate environmental concerns into supply chain management to be able to enhance the environmental performance of suppliers and customers.
Albino et al. (2009)	A strategic method used to spread the environmental measures to the entire supply chain.
Chung and Wee (2011)	Incorporation of environment concerns into supply chain management, comprising product design, material sourcing and selection, in addition to manufacturing processes, delivery of the final product to the consumers, and end-of-life management of the greening products.
Gavronski et al. (2011)	The complex of mechanisms applied at the corporate and plant level to evaluate or enhance the environmental performance of a supplier base.
Lau (2011)	Adding environmental thinking into supply chain management closed loop.

Definition Source	Definition
Guiffrida et al. (2011)	Decreasing virgin raw materials and energy usage as well as reducing the generation of waste and increasing the options of product recovery. Usually “Greening” denotes the forward supply chain functions like purchasing, production and warehousing and inventory control, in addition to materials management, distribution, shipping, and transport logistics.
Wu and Pagell (2011)	The environmental aspect of sustainability in a supply chain context.
The Suggested Definition by Researcher	It is defined as the process of using environmentally friendly inputs and transforming these inputs into outputs that can be reclaimed and re-used at the end of their life cycle, thus creating a sustainable supply chain.

Sustainability is becoming a continuous necessity for the future. Most businesses are still trying to be accountable for the environment. Increased consumer awareness and regulations would place additional demands on businesses to accelerate green initiatives and supply chain efficiencies, so green strategies need to be an essential part of the primary strategies of the company (Srivastava, 2007). The researcher tried to define GSCM as the process of using environmentally friendly inputs and transforming these inputs into outputs that can be reclaimed and re-used at the end of their life cycle, thus creating a sustainable supply chain cause. As the public becomes more aware of environmental issues and global warming, consumers will be asking more questions about the products they are purchasing. Companies will have to expect questions about how green their manufacturing processes and supply chain are, their carbon footprint and how they recycle.

2.3 Developing Supply Chain Management to be Green

GSCM has been significant in growing environmental awareness during the last few years. Many organizations have responded to green issues by applying green values to their businesses, such as using environmentally friendly raw materials, decreasing the use of petroleum fuel, as well as using recycled materials for wrapping, and recycled electronic waste. Because of strategic driving forces and stress from multiple stakeholders, businesses are adopting green supply chain management (GSCM) activities to spread suppliers' environmental sustainability targets (Laari et al., 2017).

In this section, the importance of GSCM is presented, and its practices are explored with a focus on the main barriers and drivers for such practices.

2.3.1 Importance of Green Supply Chain Management to Industry

The integration of the supply chain is an attempt to elevate the interconnections within each element of the chain by promoting better decision-making and attempting to make all parts of the chain interact more efficiently by developing supply chain visibility and identifying bottlenecks. It can therefore be anticipated that incorporation within a supply chain will have a positive impact on collaborative activities related to environmental concerns (Abdullah et al., 2014).

Cucciella et al. (2012) implemented a natural-resource-based view (NRBV) that proposed that businesses would adopt pollution reduction strategies with casual uncertainty and incorporate product management systems with socially complex characteristics to establish fundamental environmental sustainability competencies. According to NRBV, GSCM can be grouped into intra- and inter-organizational environmental activities; the former represents the forms of casual ambiguous resources, and the latter refers to socially complex resources.

Intra-organizational environmental practices, which represent the forms of casual ambiguous resources, such as sustainable activities within organizations, like total quality management of the environment, waste treatment and environmental management processes are emphasized on energy consumption, material usage, pollution and waste in linkage with in-house techniques. Such activities, which include the acquisition of tacit skills and experiential learning, can be seen as the concrete steps of strategies for emission reduction and are intense in labor and information. They can therefore reflect an organization's casually ambiguous resources. On the opposite, for businesses, the best way to eliminate and avoid emissions is the issue of how to structure internal management processes that facilitate broad employee participation and ongoing training and learning.

At the other side, inter-organizational environmental activities, such as environmental design, life cycle analysis, sustainable delivery and reverse logistics are generally referred to as product management systems that prioritize collaborations between manufacturers and consumers in order to deal with cross-company environmental issues. Such activities provide an interactive forum between supply chain partners and thus build trusting and dedicated social networks that foster information sharing and reciprocity. As a consequence, inter-organizational environmental activities are socially complex and depend on close cooperation between companies and supply chain partners.

These methods also emphasize the importance of taking the right steps to integrate providers and users effectively. Integration of the supply chain reflects co-operation between supply chain partners in intra- and inter-organizational processes. Green Supply Chain Integration GSCI can be characterized, according to Flynn et al. (2010) and Cucciella et al. (2012), as the relationship between a corporation and its supply chain partners to guide inter- and intra-organizational environmental practices.

The supply chain integration dimension revolves around three dimensions: internal integration, external integration and strategic integration. External integration refers to the company's ability to build, develop and maintain cooperative and intimate relationships, exchange information with suppliers and consumers, in addition to their involvement in planning and coordinating supply chain activities, and this means that the main elements for building external integration are cooperation between the company, suppliers and consumers, information sharing, and joint coordination. With regard to company plans, in addition, there were several previous studies that clarified that external integration affected the performance of companies, as external integration improved the performance of companies. Moreover, internal integration refers to the degree to which the company's departments and administrative units operate in a cooperative manner and interact with each other to solve the conflicts that may occur within the company. Furthermore, strategic integration refers to the alignment of the supply chain strategy with the goals of the companies. Effective strategic integration requires the opening of effective communication channels, and the alignment of the long-term strategic direction of the company with the rest of the supply chain partners, to achieve mutual benefits between the company and the sources of supply. The strategic role of the supply chain has evolved over the past years, and companies have realized the importance of aligning the long-term objectives of the company with the objectives of the major suppliers. Forming a flexible supply base helps build and improve relationships among supply chain partners, choose a supplier that has the ability to meet the company's resource requirements, and maintain effective communication with suppliers to form mutual relationships based on trust, commitment and mutual respect (Gimenez et al., 2012; Rogers et al., 2013; Ataseven and Nair, 2017).

Depending on that perception, Zahra and George (2002) built a model for adoption incentives that may compensate for the negative appropriation incentive. The model emphasizes the importance of converting and maximizing realized adoption potential in particular. Gluch et al. (2009) suggested that organizations would incorporate internal management processes to improve realized adoption efficiency, thus cultivating intra-organizational environmental activities that would benefit the company. Internal incorporation mechanisms of the Green Supply Chain and environmental instability comprise social integration processes and organizational learning structures (Gluch et al., 2009; Zhu et al., 2008). The social engagement frameworks accentuate management support and internal communication procedures, which can also motivate staff to improve their commitment in environmental projects (Gluch et al., 2009). Organizational learning programs concentrate on continuous development and learning that will help businesses develop their skills and abilities concerning the environment.

Finally, it can be concluded that businesses are aiming to adopt pollution reduction strategies to establish fundamental environmental sustainability competencies. GSCI can be characterized as the relationship between a corporation and its supply chain partners to guide inter- and intra-organizational environmental practices. Besides, internal incorporation in GSCM literature typically involves promoting and devoting senior and middle managers to GSCM, focusing on cross-functional environmental management, and interdepartmental environmental collaboration. Further incorporation activities involve the application of environmental enforcement and auditing procedures, the gathering and exchange of environmental protection information and the development of environmental management processes (Lee, 2008; Wu et al., 2012; Zhu et al., 2008).

Thus, it could be noted that the integration of the supply chain is an attempt to elevate the interconnections within each element of the chain by promoting better decision-making. Additional procedures involve mandating suppliers to enforce environmental management or gain third-party environmental management certification and picking suppliers based on environmental considerations. As social integration may achieve consensus and promote information sharing, organizational learning structures and frameworks for social inclusion complement each other. The social engagement frameworks accentuate management support and internal communication procedures, which can also motivate staff to improve their commitment in environmental projects.

2.3.2 Towards Integrated Green Supply Chain Management

The supply chain conceptually encompasses the whole cycle from providing the raw materials that contain less hazardous environmental factors to the finished product, every supply chain comprises several different companies, and they are connected by the function of each company in meeting the consumer's desires. There is an influence across the supply chain from the manufacturers, consumers and management to make the production more viable for future collaboration. Some businesses are controlled by their top management, and others are influenced by external factors, such as stakeholder stress or consumer demands, so organizations may suffer from obstacles and drivers to sustainable supply chain management implementation. Each member of the organization is responsible for the sustainable supply chain, and many steps can be taken to ensure that businesses maintain sustainable supply chain management (Mojumder and Singh, 2021).

The product's lifespan is very essential in order to maintain continuous growth because if the change continues to happen and the market atmosphere is unpredictable, the lifespan will shorten and the successful manager will be able to make a lot of money by reusing or selling it in another region. Logistics refers to the process and strategy of supply chain management, which result in a reduction of the environmental footprint of carriage delivery. The main emphasis is on material processing, waste management, packaging and transportation; green logistics will include other areas related to production planning, materials management and physical dispensing. The transportation industry has its own effectiveness; if the cost of transportation was less than expected and distribution center utilized better, the green logistics strategy would be accomplished (Elahi and Franchetti, 2015).

The need for incorporating environmentally sound choices into supply-chain management research and practice is ever-increasing, integrating environmental attentiveness into the inter-organizational practices of SCM together with reverse logistics (Sarkis et al., 2011). GSCM is not sufficiently developed yet. A concise classification is strongly needed to help academicians, researchers as well as practitioners to understand integrated GSCM from a broader perspective (Srivastava, 2007). Academia and industry have an increasing attention to GSCM (Sarkis et al., 2011).

Green and non-green requirements are seen as part of the green supplier selection process in both multinational and conventional businesses, so we have to ask ourselves what the key drivers of green supplier selection are and then test them during the selection process. Both the environmental and company requirements are compiled in a hierarchical tree for the supplier selection process, which includes eight key criteria (cost, distribution, quality, operation, pollution control, strategic partnership, green product management). We can use them for analytic network technique and evaluation of the determinants of the green supplier selection with various criteria decision-making techniques. Thus, it could be argued that the fuzzy setting should be coupled with the evaluation technique of the green supplier selection determinants (Gurel et al., 2015).

There are high levels of environmental awareness and implementation of green practices among the supply chains in developed countries. Nevertheless, when comparing developing and developed countries, it is still vague how these practices are implemented in developing countries and which exactly are the practices that are applied. Major variances in the enactment of particular green supply chain management (GSCM) dimensions were witnessed among firms with ISO 14001 certification (Scur and Barbosa, 2017)

GSCM covers how businesses apply environmental ideas in various phases of the supply chain, comprising of inbound logistics in addition to the manufacturing or internal supply chain, outbound logistics and, in some cases, reverse logistics. This supply chain greening protocol involves manufacturers of goods, service providers as well as retailers, dealers, sales staff, waste handlers and end-users who work together in a coordinated manner to mitigate and eradicate any environmental adverse effects that could arise from their business actions (Elbarky and Elzarka, 2015).

The effects of green supply chain management on performance of social capital are studied. Green supply chain management has the essential role in increasing the environmental and operational performance of the whole supply chain, because it is devoted to aggregation of social capital in the supply chain; it also improved the environmental performance by social capital; furthermore, social capital is considered to be an important element between green supply chain management and supply chain performance. Managers should know how to use and manage their supply chain to improve the environmental and operational efficiency of the whole supply chain. Any relationship strength may differ from one country to another, so we should think of ways to figure out how the governmental influences affect the relationship through green supply chain management, social capital and operational performance (Lee, 2015).

Supply chain collaboration is cooperation among supply chain partners that progressed to achieve reduced cost, better quality, product innovation, risk management and market value growth. In a long-term consequence, it results in green advantages for important business. We must take into account the consistency in the identification of the elements that will decide the degree of cooperation, the greening supply chain and the related partnership and incentives. Collaboration and motivation for the green supply chain may be influenced by government policies and industrial change according to each country's policies. An integrated green supply chain model includes the positives and negatives of cooperation between stakeholders in the supply chain from the extraction of raw materials to the returning to earth.

The organization aims to implement green in network design as a result of customer pressure, market demand and government policies that will grant the preservation of resources. It is not so easy to achieve successful accomplishment in green supply chain business activities, so finally the determined risks will be evaluated as a priority, using the fuzzy AHP (Analytic Hierarchy Process) approach. This analysis helps managers to beat the problem of analyzing the green supply chain risks. Operational category risks are the most important, and they need a higher managerial interest compared with other risk categories in developing the green supply chain economic benefits. Demand risk category is considered to be the last place on the priority list. For classifying category of risks, sensitive analysis has to be conducted to check out the stability of priority ranking (Mangla et al., 2015).

Business activities cause pollution to the environment as a form of carbon monoxide 4 emissions, toxic materials and industrial wastes, so green supply chain management (GSCM) aims to reduce that pollution; it plays a basic role in affecting the influence of environment by any firm involved in supply chain activities. The main concern of supply chain management (SCM) is to provide the right product to the right customer, leading to reducing the supply chain cost, reducing inventory, estimating accuracy and achieving cycle time and fill rates. The collaboration between company and its important supplier is the main element of GSCM to ease socially responsible activities because collaboration is an approach to support the environmental accomplishment by helping firms to develop it. There is a direct relationship between GSCM practices and performance (economics, environmental and social) balanced by environmental collaboration, which is expected to ease the fulfillment of GCSM practices (Chin et al., 2015).

From the previous section, it could be stated that the supply chain conceptually encompasses the whole cycle from providing the raw materials that contain less hazardous environmental factors to the finished product; every supply chain comprises several different companies. In order to raise the environmental concerns, the companies need to be more aware about the products that are almost expired or returned. The product's lifespan is very essential in order to maintain continuous growth because if the change continues to happen and the market atmosphere is unpredictable, then the lifespan will shorten and the successful manager will be able to make a lot of money by reusing or selling it in another region.

2.3.3 Green Supply Chain Practices

It was recognized that the common environmental practices related to GSCM are several companies' symbiosis, in addition to eco-design, life cycle analysis, product stewardship, extended producer responsibility, and environmental management systems (EMS). All of these activities seek to reduce and minimize the adverse impact of organizational processes on the environment. Additionally, the introduction of an environmental management system (EMS), such as ISO 14000, is part of a comprehensive effort to reduce the environmental effects of the supply chain. Companies that have applied ISO 14001 must consider environmental impacts and assess the related impact not only of their internal processes but also of their supply chains (Elbarky and Elzarka, 2015).

One of the key reasons for implementing GSCM in the Chinese manufacturing industry is cost savings to aid in establishing cooperative relationships with suppliers and facilitating a life cycle. Although there is a growing awareness of the environment, there is a poor implementation of GSCM among organizations, and it takes time to turn this knowledge into action in the Chinese manufacturing industry (Ojo et al., 2014). The thirteen pressures and the frequency of drivers for the automobile industry and other sectors have been examined by numerous investigators. Results showed that the pressures and drivers for the automobile industry are among the highest of any other sector. Regulatory compliance is one of the biggest pressures for the automobile sectors. Diabat and Govindan (2011) explained 11 drivers for the execution of GSCM activities. In addition to reducing energy consumption and the reuse and recycling of materials and packaging drivers, the top drivers listed in the research were green design, integrated quality environmental management into the planning and operation phase. While the findings were positive from the perspective of improving an organization's credibility and brand identity, it did not suggest that the secret to implementing GSCM activities is to strive for performance via an Indian case study, using Interpretive Structure Modeling (ISM). The results of the research of Large and Thomsen (2011) show that the level of green supplier assessment and the degree of green collaboration reveal direct influence on environmental performance. While commitment influences assessment directly, the effect of commitment on collaboration is mediated by the capabilities of the purchasing department.

GSCM has identified related studies in the manufacturing field. One of the studies has found that the Indian companies are actively adopting all the things in the sets of internal environmental management and investment recovery activities, but they are not so concerned with green buying, eco design and consumer collaboration with activities of environmental concern. With respect to environmental sustainability, the findings added that more focus needs to be paid to working with second-tier suppliers. In addition, in terms of GSCM performance for Indians and Chinese firms, it was noted that these firms ought to focus on reducing the cost of raw materials and energy usage, as well as waste disposal and waste discharge spending. The study reported that Indian firms ' performance regarding their environment and operations was considered to be moderately important (Vijayvargy and Agarwal, 2013).

Lo (2013) analyzed the company's role in a supply chain in its industry influencing the company's attitude towards green strategies using empirical data analysis. For the high-tech sector, twelve companies were selected. This category of business is classified into three groups that are Supplier Relationship Management, midstream (transportation, trading, storing), and Customer Relationship Management (raw material source, original product manufacturer / original equipment maker, and brand firm). It was argued that the supply chain's status is related to the challenges faced by the company when implementing green practices. There is also a greater competitive risk when the firm is close to the Supplier Relationship Management. There are risks of higher competition as the company is nearer to the Customer Relationship Management. In fact, the internal and external driving forces of enterprises in endorsing green activities are consistent with the types of issues facing businesses in the supply chain.

The internal driving force of a company is positively linked with the volatility of demand it encounters, but negative with the challenges of competition and supply. Additionally, a positive correlation exists with the external driving force of the company and the competition and supply risks it encounters, and a negative relationship with the fluctuations of production. In addition, it discusses the connection between corporate willingness to support green activities and their place in the supply chain (Lo, 2013). Finally, it can be concluded that industrial ecology, industrial symbiosis, eco-design, life cycle analysis, product stewardship, extended producer responsibility, and environmental management systems are considered GSC practices. Moreover, the level of green supplier assessment and the degree of green collaboration show a direct impact on environmental performance.

2.3.4 Drivers of GSCM Practices

It is widely noticed that many countries, especially the developing countries, are hardly giving attention to the environmental side of the manufacturing and do not highly consider the aspect of sustainability in the steps of their supply chain management; therefore, this section will be illustrating the different drivers of the green supply chain management. These drivers of green supply chain management are mainly tackling the environmental issues and how the resources can be utilized efficiently through each and every step of the supply chain to obtain extra advantages over those obtained from the traditional supply chain management. Furthermore, the drivers of green supply chain management refer to the main factors that derive the different manufacturing industries to minimize the wastes and harmful emissions that are combined with different steps of their supply chain management (Kazancoglu et al., 2021).

Many types of harmful pollutions occur because of the activities that are associated with the massive economic development; therefore, in order to reduce the danger of such critical environmental conditions, several environmental legislations and policies have been adopted by governments to enforce manufacturers and businesses to obey these environmental-oriented procedures. The drivers of green supply chain management can be divided into six categories: external factors, internal factors, competition, suppliers, marketing and customers. Firstly, the internal factor refers to the drivers that are initiated by the organization itself and adopted by the founders, top management and employees as well. These drivers are represented in the organizational desire to cut the costs by using materials that are environment-friendly to reduce the cost of their products or services; on the other hand, the desire to involve and motivate employees as the increasing awareness of the organization's environmental concerns will improve the employee's productivity in adopting the green supply chain management practices (Dhull and Narwal, 2016).

Moreover, it is suggested that the customers tend to pay higher prices for the goods and services that depend on materials with a lower amount of emissions, which drives the organization to adopt policies that help in adopting the green supply chain management. Nevertheless, the investor who carries out his ethical responsibility towards the environmental issue also represents an internal driver for the adoption of green supply chain management. On the other hand, the external driver refers to the governmental legislations and policies, along with the governmental subsidies and support. In other words, governments enact regulations that must be followed by different organizations to maintain the environmental situation; in addition to this, governments may provide the organizations with technical or financial assistance to help them to reduce their amounts of wastes (Dhull and Narwal, 2016).

Regarding the competition category, it is considered to be a major motive for the adoption of green supply chain management as many businesses tend to adopt the environment-friendly practices to gain a competitive advantage over the other competitors by reducing their emissions, improving their performance and gaining good reputation in front of their society as they are concerned with the environmental issue as their concern with generating profits. Also, suppliers are considered to be a main motive as the organization would be forced to adopt environment-friendly techniques if the suppliers adopt the same techniques to be able to operate and stay in the market. The fifth category refers to the power of marketing in enhancing the implementation of green supply chain management. By announcing that the organization is adopting green supply management practices, the organization will be gaining publicity and good image; in other words, green supply chain management can be used in advertising and marketing the products and services (Dhull and Narwal, 2016).

The last driver refers to the role of the customers in implementing the green supply chain management; the customer's awareness and knowledge of the environmental critical need for greening the supply chain will create severe pressure over the organizations and suppliers and will enforce them to adopt the environment-friendly techniques, materials and strategies; in other words, the customer is the main formulator of the standards of the products and services; therefore, the organizations have no other choice rather than meeting the desires of the customers; otherwise, the customers may be rejecting these products and services (Dhull and Narwal, 2016).

Similarly, Balasubramanian (2014) has stated that the regulations and legislations are considered to be the main drivers of green supply chain management and play a major role in adopting it; this role relies on the authority which is in the government's hands, not only over enacting the laws and regulations, but also the governments enjoy a broader influence over the public perceptions and formulate the customers' awareness as well as the perceptions of the business partners. This integrated pressure over the organizations can turn the whole steps of supply chain management from being conventional and giving no attention to the environmental elements to be "green" supply chain management that implies greater attention to environmental concerns. On the other hand, the prevailing desire of the organization to reduce its costs may be also formulating an important driver to the adoption of green supply chain management, which is considered to be a brand-new technique through which the company can obtain more efficient performance, lower costs and higher revenues.

In addition to this, the public image of the organization can be improved, which enhances its relationships with the customers, the stakeholders, the business partners and the society as a whole. Furthermore, the organization can be motivated by another driver, which is the most efficient utilization of the resources as the organization, by adopting green supply chain management, can get additional benefits by decreasing the consumption of energy, reducing the wasted materials and even selling the used materials or recycling them. Also, it has been stated that the internal environment management is considered to be a fundamental pillar for the implementation of green supply chain management. It mainly refers to the total commitment of the whole organization to the environmental mission as a part of triggering sustainability, in other words, the organization's belief in the importance of green supply chain management not only for its benefit and its existence in the business but also for the entire community (Balasubramanian, 2014).

Furthermore, (Dashore and Sohani, 2013) stated that green supply chain management is gaining a wide attention nowadays as it represents one of the best solutions and strategies to respond to the critical environmental level that is experienced all over the globe, because of the increasing demand for new products and services in great amounts that push different manufactures to respond by greater production and manufacturing. This trend definitely implies greater amounts of wastes and emissions, which have a harsh negative influence over the various environmental aspects, whether air, water solid, etc. The green supply chain management is motivated by an essential driver that should be satisfied: the certification of standard quality as ISO 14001. This certification specifies the international standards of quality that should be provided in a product. Therefore, this certification increases the organization's tendency towards improving the quality of its outcomes and maintains these standards to be able to get involved in the international markets and gain wider ground for its products.

Adopting the green supply chain management forms a significant path to meet the standards of such certification, as the organization by doing so will be formulating a new framework or a plan that takes into its consideration the integration between each installment of the supply chain to create an accumulated green supply chain, which starts by the design of the product or the service itself, its production, its delivery, the customer usage till the potential utilization of it as scrap or material for recycling. In other words, the certification of standard quality as driver is related to the integration of total management of environmental quality that provides the opportunity for new innovations in order to create new methodologies. This is created by the process of production or in the operational processes, through which the organization can reduce the amount of its emissions. Also, it is used to reduce the organizational usage of energy. Consequently, the financial resources of the organization will be exploited in a more efficient manner (Dashore and Sohani, 2013).

Sandeep et al (2013) stated that the drivers of green supply chain management are classified into three clusters, namely dependent drivers, independent drivers and linkages drivers; in each cluster of those lies a number of drivers that motivate the adoption and implementation of green supply chain management. Firstly, the cluster of dependent drivers implies significant dependence power yet weak driving powers. This cluster includes several drivers, which are illustrated as follows: the system of economic recycling, this enabler refers to the organizational ability to reduce its wastes by adopting a reasonable disposal to products to achieve the objective of environment protection by receiving assistance of logistics companies. Another dependent enabler is the programs of environmental management, which refer to the efforts of different organizations to spread the awareness towards the environmental issues by conducting seminars or even building the marketing strategies to be based on the idea of environmental protection.

Relative advantage is also a dependent enabler as the organization will be motivated by the desire of obtaining more benefits as the green products were reported to be more beneficial than its non-green similarities, and they also would be demanded more if all the parties included in the supply chain are aware of the benefits of greening the management of supply chains; in other words, the aware customers are an indispensable actor in implementing the green supply chain management. Furthermore, the usage of green packed materials motivates the greening strategy which is also integrated with spreading the community’s awareness towards the tendency to green all the steps of supply chains and induce further adoption of it; from this point comes another main motive, which is the green distribution, which refers to greening the choices of transportation through which the products are delivered to the customers by using environment-friendly methods as the natural gas vehicles or the electrical vehicles (Sandeep et al., 2013).

The second cluster is the linkage drivers, which enjoys strong powers when it comes to the dependence and driving as well. This cluster includes the systematic planning that enables the green management by formulating efficient plans by suggesting proper ways to manage the organizational resources to have an environment-friendly outcome. The last cluster is the independent drivers, which have, unlike the dependent drivers, weak powers of dependence and strong power of driving; this cluster includes the following drivers: the sufficiency of the financial resources that are required to improve the skills of the organization's employee to be able to implement the procedures of greening management of supply chains and to increase the possibility of acquiring the needed techniques (Sandeep et al., 2013).

The commitment of top managers to the implementation of green supply chain management is an essential enabler and reflects the extent to which the organization really wants to apply the green strategy. The sufficient organizational IT resources are considered to be a main enabler to handle and recognize the flows of the materials to realize green supply chain management (Sandeep et al., 2013). Shibin et al (2016) stated that the drivers of green supply chain management include the flexible manufacturing, which refers to acquiring a flexible system that can respond efficiently to the successive fluctuations in the market demand; furthermore, the operating and producing systems of the organization have to be ready to understand the changes in the customers' requirements and be able to go with their tendency to consume more green products and services. The ongoing improvement is also considered to be an enabler to adopt the green concept as the organization that used to go with the new techniques and flows will be willing to adopt the green supply chain management. Another important enabler is the outsourcing of logistics: the organization that depends on third parties in accomplishing missions such as transportation will be able to give more attention to the market competition and will be reducing the costs of logistics.

Furthermore, the drivers of the green supply chain management had been categorized according to their driving and dependency power to illustrate the relevance between the variables; in his context, it had been stated that the most important drivers of the green concept are designed as follows: the external pressure is considered to be a significant driver for adopting the green strategy as it refers to the authority held by some external agencies that may induce the organizations to implement more green techniques in their business; these agencies are not limited to the governments; however, these agencies may be also the organizations that are concerned with the human rights, trade unions, NGOs, communities and civil society. All these entities have great pressuring powers over the different manufactures and organizations to convert their regular supply chain management into a green one; therefore, they have a vital role to act regarding this issue (Kumar and Rahman, 2016).

These non-governmental organizations can provide further assistance to the manufacturers and business in their tendencies in adopting green supply chain management, which forms another enabler to the green strategy; this assistance is represented in providing consultancy and training labors to improve their skills to understand the green vision of the organization that enhances the organizational practices to be environmentally sustainable business by depending on such qualified and skilled employees (Kumar and Rahman, 2016).

Realizing and resolving the problems of the supply chain partners is considered a big step in implementing the green concept; therefore, auditing and monitoring the supply chain partners have a major role in their development; by doing so, the organization will be able to construct a code of conduct for the adopted green behavior, which induces all the business parties to be committed to these environmental-friendly and sustainable practices. In other words, there would be joint efforts from all the actors within the organization towards the full implementation of the green concept and setting goals within the environmental framework. Furthermore, these goals will be even achieved in a more efficient way because of the mutual trust and commitment among the supply chain partners, which would be achieved through the continuous auditing and information sharing and provide these partners with reasonable solutions for their shortages (Kumar and Rahman, 2016).

It had been stated that the green supply chain management was proved to have to be an important strategy for various types of businesses to lower their levels of environmental risks and improve their capacity to conduct environmentally efficient operations. This can be realized by depending on the activities of sharing knowledge, which may take the forms of workshops or seminars to improve the efforts exerted in the environmental issue. The management of materials is considered also to be an essential enabler for the green concept; this enabler refers to using the reusable packaging systems instead on the one-use systems. The reusable systems play a vital role in reducing the wastes on one hand, and on the other hand, it can protect the product from shipping damages (Singh and Trivedi, 2016).

In other words, adopting the systems of reusable packaging is beneficial for the organization, the customers and the environment as well by reducing the consumption of time, materials and the environmental potentialities. This increasing concentration on the manufacturing and operational processes in addition to the saved financial resources will increase the organization’s capacity to green the management of supply chain (Singh and Trivedi, 2016). By reducing these harmful materials and wastes, the organization can acquire a positive frame for its business in the perceptions of suppliers, employees and customers; in this context, the organization can depend further on the reverse logistics and recycling wastes to be compatible with the green flow; this all is relying under the environmental dimension of the organizational performance to implement the green supply chain management. On the other hand, there is the economic dimension for adopting the green strategy, which refers to reducing the costs by efficiently utilizing the available resources and reducing the amount of wasted materials, besides having aware and skilled employees and laborers, which definitely leads to an increasing profitability and maintaining a long run business (Singh and Trivedi, 2016).

The drivers of adopting green supply chain management have a wide range, as it ranges from reacting drivers or drivers to proactive drivers. It has been stated that businesses are not exposed to the same level of pressure from the external stakeholders as the pressure they face from their customers; therefore, the environmental proactive practices are often created via higher relations and links in the supply chain. Businesses and manufacturers have to innovate and implement an integrated concept regarding the environmental issue; this concept would be pushed by the integrated pressure from the regulative authority, the customers and the community as a whole (Mathiyazhagan and Haq, 2013).

Moreover, the institutional theory about the green supply chain management suggested that the organizational activities that support the green vision of environment and sustainability as well are depending on three main types of drivers, namely the pressure from the regulatory entities, the normative drivers concerned with the environmental aspects and eventually the pressure faced by the businesses because of the market competitors and the consumers as well; however, the strength of these pressures and drivers is not the same, in other words, not all the organizations are facing the same level of intensive pressure or claims to adopt the green supply chain strategy, the large organizations and businesses are often facing a greater amount of pressure and motivators to adopt the green concept as they have a huge effect on the society when it comes to the consumer products, awareness and the social responsibility (Zhao et al., 2017).

Green supply chain management has developed as an important organizational philosophy to diminish environmental risks. A model of the drivers that affects the application of green supply chain management has been developed using an Interpretive Structural Modeling (ISM) framework, as interpretive structural modelling (ISM) is a well-established methodology for identifying relationships among specific items that define a problem or an issue. This approach has been increasingly used by various researchers to represent the interrelationships among various elements related to the issue. The defined drivers (GSCM) focused on literature from the GSM and consultations with industry professionals. Legislation and environmental legislation, the stresses of rivals, fulfilling the demands of the global market, requiring a high degree of environmental adoption among their imported goods and growing knowledge of green goods among consumers are the key factors driving companies to introduce GSCM (Zhu and Geng, 2013).

Interpretive Structural Modeling (ISM) has its own challenge; it cannot clarify the peculiar connection between a model's designs. Full structural interpretive modeling (Debey and Ali 2014) is proposed as an extension of the structural conceptual modeling that was used to examine connectivity and transitive connections across flexible green supply chain management enables and barriers. The model's first stage is flexible and the green product design enabler's then secondly strategic outsourcing. Awkward contact between suppliers and risk-averse viewpoint of supply chain managers define the paradigm as the riskiest obstacles, followed by bad consumers, lack of skilled supply chain practitioners and financial barriers, all communicating with one another (Shibin et al., 2016).

There are also Green Supply Chain drivers, some of which are knowledge exchange, strategic preparation to adopt sustainable supply chain activities, customer interest for sustainable practices, collaborative partnerships, indicators to measure sustainability advantages in a supply chain, regulatory structure, support for supply chain partners, top management engagement, recognition of sustainable supply chain activities and availability of funds (Diabat and Govindan, 2011). In addition, some other drivers are described as leadership participation, organizational structure, communication with NGOs, contact with other stakeholders, supplier selection strategy, supplier relationship management, supplier performance assessment, policy laws and external support variables, committed department ensuring financial, ethical and environmental considerations, organizational concerns, cost-reduction approaches by periodic cost analysis, main supply chain performance measures, health and safety system items across the supply chain.

Green supply chain management drivers represent the factors that push the manufacturing sector in their supply chain management to decrease the consumption of materials, such as consumers, pricing, suppliers and the economy and economic growth. The ecosystem still suffers from issues such as air pollution, water pollution, wastes etc. The government interferes in mitigating these adverse influences, and environmental policies are affected not only by government oversight but also by employers, trade unions, workers and citizens of the neighborhood. Green supply chain management drivers and barriers have been grouped into six alternative torrents (internal, external, consumer, competition, market and suppliers) (Dhull and Narwal, 2016).

Soft management variables tend to have been proven important to an effective environmental management program. Such primary success variables are not specifically related to an environmental management system (EMS) and the literature has been scarce in empirical research considering the inclusion of an EMS ' human elements. Despite some differences in the classification of human factors in the current research, the essential human factors of every EMS fall into six major groups. After reviewing current literature, the existing research claims that preparation; communication; management support; employee accountability; incentives and acknowledgement and employee engagement should therefore be present in any company that wishes to obtain best results from its EMS (Jabbour et al., 2008; Kaur, 2011)

Moreover, as discussed before, supplier management (Klassen and Vachon, 2003; Vachon and Klassen, 2006; Wee and Quazi, 2005) is also believed to be an important success variable for Green Supply Chain activities' performance. In a different context, green supply chain management process was defined as government policy, competitors, customers, pressure from investors, influence of NGOs, top management commitment, employee involvement, culture, alignment of company strategy with purchasing, company SSCM strategy, firms' competitiveness, reputational and environmental risk, EMS adoption, quality improvement.

Top management support IT, signaling, provision of information and interfaces, adoption of standards, strategy commitment, risk and stress from competitors, mutual learning, price strategy, closed ecological cycles, SC optimization, inventory management, forecast accuracy, lifecycle management, supplier management, flexible and cleaner technology, delivery performance, usage of effective systems and tools, environmental management system, green innovation, environmental product design, environmental activity capability, eco-friendly transportation, efficient handling and storage, reverse logistics, green and back packaging, collaboration with partners, employee practices, outsourcing, stakeholders' rights monitoring and maintenance. According to Murphy (2012), management can be a source of motivation and support to subordinates. This is the duty of management to display strong commitment to raising the environmental effects of the operations of the company. They will display dedication to organizational strategy and quality improvement. Management support and engagement have been frequently illustrated in effective environmental management studies and arguments (Wee and Quazi, 2005).

Baker et al. (1994) stated that people must seek instructions from management. Wherever this business goes is determined by whatever management does, besides which way they are pushing and how hard they are pushing. The emphasis on motivating and empowering workers is embodied in interaction that produces human energy and stimulates the human mind. Without it, the implementation of some new program or proposal will be much compromised. It is the responsibility of the manager to build a positive emotional connection for all workers to environmental problems by encouraging behavior that is rewarded when looking for an opportunity as opposed to finding a problem reduction technique (Sharma, 2000). Most scholars often address support for management as an important element in the organizational culture (Fernandez et al., 2003; Govindarajulu and Daily, 2004).

A number of drivers are observed from literature, such as stability of jobs, health and safety concerns, economic wellbeing of the population, implementation of safety standards, and introduction of green procurement, implementation of green activities, eco-design, government regulations, hazard management, consumer satisfaction, environmental costs, economic input for infrastructural growth, and development of product features. Trust among Focal Company and Direct Supplier, trust among Direct Supplier and sub-supplier, Focal Company Purchasing Power, Direct Supplier Purchasing Power, Engaged Long-term Partnership between Direct Supplier and Supplier, Focal Company Supply Know-how, Direct Supplier Release Willingness, Direct Supplier Involvement, Perceived Value of Direct Supplier, Perceived Value of Direct Supplier. These drivers are classified and defined in details in Table 2-3.

Employee accountability can be seen as companies adopting sustainability programs to improve their employee knowledge and promote awareness through activities related to the environment. Chinander (2001) indicates that the key problem is to establish and maintain a clear view of what the management feels they keep subordinates accountable for and what the subordinates feel they are responsible for. Hanna et al. (2000) points out in the case of industrial companies that the role of operations management is being responsible for the decisions included in operating and enhancing the processes that produce polluting by-products. Enhancing such procedures is an ongoing responsibility of operation workers, although they may not have been kept historically accountable for enhancing environmental efficiency. As illustrated previously, every member of staff will be responsible for the environment.

It is here that it begins to be understood that the ability of the management is not adequate by itself. A vision of a worker in the environmental field is also essential. This means fostering harmony and social relationships where all participants of the business know what role they are playing and how to carry it out (Fernandez et al., 2003).

Training is described as the implementation of a suitable environmental education and awareness training program that offers each worker the tools and understanding necessary to operate themselves in an environmentally friendly way and make environmentally responsible decisions within the organization. Training is considered to be a major element in improving organizational success, as it also has a beneficial impact on individuals and organizations' level of competence. Training helps to close the distance between what is happening and what is going to happen, in other terms, between actual job performance levels and required goals or expectations (Armstrong, 1991). Govindarajulu and Daily (2004) highlight the fact that the performance of environmental management systems needs adequate training for workers. However, while Cook and Seith (1993) claim that environmental training is the single most significant component of a company's enforcement strategy, many companies ignore the need to determine whether the environmental training initiative has generated the necessary awareness and changed the attitude that was intended and needed (Perron et al., 2006). Many researchers have discovered that environmental preparation makes workers more aware of the need for environmental protection, enhances their capacity to respond to change and generates a positive attitude towards environmental concerns (Murphy, 2012).

There must be a communication flow of knowledge and information between management and workplace (Daily and Huang, 2001). Findings of the activity rates among members of a group have shown that this behavior is mediated by the structuring of communication channels. Ramus (2002) describes environmental communication as using a cooperative style of management of the environment, including a cooperative, non-hierarchical approach to promoting employee contact. With regard to source elimination, Kitazawa and Sarkis (2000) emphasize the importance of open communication that, together with cross-functional integration, can guarantee the most efficient and effective use of institutional resources. In manufacturing companies, the use of cross-functional teams to tackle environmental concerns is gradually being taken up. ISO 14001 focuses heavily on non-compliance, corrective and preventive action, EMS audit and management evaluations. Given the impact of feedback on individual and corporate results, Chinander (2001) stressed that many environmental strategies fail to stress the value of environmental feedback. To achieve the program's goals, workers would need to be maintained-to-date and briefed about the success of their initiatives (Murphy, 2012).

There is some controversy in the literature about the efficacy of financial benefits, such as bonuses. A study by Harvey and Denton (1999) showed financial benefits were hardly linked to environmental efficiency. Some scholars say, in comparison, that compensation schemes can inspire and encourage workers to be environmentally conscious (Laabs, 1992; Patton and Daley, 1998). Moser and Wodzicki (2007) found that benefits are essential to reinforcing behavior, believing high reward interdependence would provide an opportunity for community members to cooperate. These results indicate that strong interdependence of bonuses can also serve as a motivation for cooperative activity and sharing of information. Rewards should also be related to results in a manner that the employee recognizes and finds fair (Lawler, 1986).

Rewards are also addressed in both intrinsic and extrinsic terms. Intrinsic applies to those characteristics associated with the job itself: if it is enjoyable and encourages the employee to improve his / her skills, if it encourages the employee to be self-directive, and whether the worker can see the effects of the work (Kalleberg, 1977). Extrinsic incentives, by comparison, are a measure of things that are beyond the mission itself. This would include salaries, insurance and workplace safety.

Ben Brik et al. (2013) researched GSC drivers in the developing economy classifying GSC drivers into external and internal drivers; the findings revealed that the two external drivers substantially linked to supply chain greening come from outside the country where the companies operate: export country laws and pressure. The study argued that export country regulations have an effect on GSC activities because emerging-country companies face strict environmental standards and safety standards, especially when exporting to key markets, such as the United States and the European Union. Officials on major international markets also set out specific environmental standards that businesses must follow to enter the market. Such barriers to reaching major international markets are pushing businesses to boost their environmental achievement and update their supply chain network.

Although Dubai's economy's internationalization offers businesses with incentives to export their goods and services globally, they are also forced to green their supply chain to reach international markets and improve their global competitiveness. The study also concluded that for two purposes, stresses from MNCs (Multinational companies) headquarters are driving greening of the supply chain. First, in line with the MNC's general environmental policy, some MNCs encourage their subsidiaries to support GSC activities. Second, MNC subsidiaries benefit from the financial and technological support provided by their headquarters to successfully manage and execute the green supply chain.

External drivers are described as external forces that can cause a business to take GSC management into account and implement it. Existing research generally refers to regulatory structure, consumer demand, and competitive dynamics as the driving forces for GSC management implementation despite the fact that several external factors drive a company to follow a GSC management approach. Regulations are the most widely discussed drivers for greening the supply chain (Beamon, 1999; Green et al., 1996; Hall, 2006; Min & Galle, 2001; Walton et al., 1998).

Ben Brik et al. (2013) listed regulations that are aligned with GSC to local government regulations and the implementation of export country regulations. In general, the leaders of businesses believe that compliance with environmental legislation imposes additional costs on the company, which may erode or improve its competitiveness (Christainsen and Haveman, 1981; Conrad and Morrison, 1989; Darnall, 2006). Lo et al. cited insufficient compliance ability as a key reason why businesses in emerging and developed countries struggle to comply with environmental regulations. Nonetheless, it is suggested that in developing and emerging countries in the early stage of supply chain greening acceptance, firm leaders may use compliance to the regulations to gain credibility from political actors by marking that they are committed to the agenda of regulators or to enhancing interactions and cooperation with regulatory bodies. This can lead to increased trust between them, in addition to more benefits such as access to vital institutional resources that make it easier for them to do business (Darnall, 2006).

Walker et al. (2008) grouped internal supply chain drivers greening performance factors into strategic variables relating to top management team ethical principles and engagement, and organizational drivers concerned with greening the supply chain's economic advantages. We are talking about those two drivers. Leadership has been discussed in many GSC related studies, as Companies are operated by individuals with varying levels of dedication to environmental concerns and with specific skills that eventually decide the degree to which GSC management is implemented by the members of an organization (Vachon and Klassen, 2006). A wide body of literature demonstrates that the engagement and encouragement of the top management team and a community that promotes environmentally sustainable activities are essential to green supply chain management (Nakamura et al., 2001; Porter and Linde, 1995; Weaver et al., 1999; Zhu et al., 2005). Managers may be dedicated to greening the supply chain because of the moral obligation of "doing what's right" with less economic performance consideration (Donaldson and Davis, 1991). Zhu et al. (2005) stated that "without this initial upper-management dedication, most (green supply chain) projects are bound to fail, far less to be genuinely implemented."

Organizations' economic considerations are the business case, for a green supply chain is also motivated by the assumption that greening the supply chain could result in a sustainable comparative advantage (Walker et al., 2008). Being early movers in the supply chain greening in developing and emerging economies supplies companies with valuable knowledge-based resources and tacit skills that improve the company's operational efficiency and thus boost their competitive position (Handfield et al., 2002; Hart and Ahuja, 1996; Khanna and Damon, 1999; Russo and Fouts, 1997). Additionally, greening the supply chain will boost the company's reputation and confer external credibility (Darnall, 2006).

However, a study by Ben Brik et al., (2013) noticed that GSC activities are not substantially correlated with local government laws, rivals, and customers. Customers do not put heavy pressure on companies in developing countries due to lack of knowledge of environmental concerns and inaccessibility of reliable information on the environmental practices of companies (Rettab et al., 2009). The government regulations driver is also not, as planned, significantly correlated with greening the supply chain. This finding gives credence to regulatory outlook advocates who claim regulations are not highly successful in emerging economies. Most developing economies, as described earlier, have no structured regulations and appear to be less stringent and monitoring is not strict at present (Mellahi, 2007). Campbell (2007) observed that when it comes to the implementation of socially responsible policies, "it is not just the existence of legislation per se that matters but also the state's ability to track and implement corporate conduct when appropriate.”

It can be summarized that green supply chain management is gaining wide attention nowadays as it represents one of the best solutions and strategies to respond to the critical environmental. The drivers of green supply chain management are numerous. However, from the drivers mentioned above, they can be divided into six categories: external factors, internal factors, competition, suppliers, marketing and customers. Table 2-3 illustrates how the literature reviewed filled the Drivers of GSCM practices in the research. The drivers in the table below are considered the most common ones, specifically in the developing countries and MENA regions. Therefore, the researcher gathered the drivers discussed in previous studies for developing countries as well as the MENA region, which had been proved to be significantly effective in adopting GSCM practices.

Table 2- 3: Summary of the most Drivers of GSCM practices

Drivers / Definition	Author	Year
Internal Factor		
It refers to the drivers that are initiated by the organization itself and adopted by the founders, top management and employees as well. The desire to involve and motivate employees as the increasing awareness of the organization’s environmental concerns will improve the employee’s productivity in adopting the green supply chain management practices.	Dhull and Narwal	2016
Governmental Legislations and Policies		
Governments enact regulations that must be followed by different organizations to maintain the environmental situation; in addition to this, governments may provide the organizations with technical or financial assistance to help them to reduce their amounts of wastes.	Dhull and Narwal	2016
Competition Category		
It is considered to be a major motive for the adoption of green supply chain management as many businesses tend to adopt the environment-friendly practices to gain a competitive advantage	Dhull and	2016

Drivers	Definition	Author	Year
	over the other competitors by reducing their emissions, improving their performance and gaining a good reputation in front of their society as they are concerned with the environmental issue as their concern with generating profits.	Narwal	
Power of Marketing			
	It is enhancing the implementation of green supply chain management, by announcing that the organization is adopting green supply management practices, the organization will be gaining publicity and good image; in other words, green supply chain management can be used in advertising and marketing the products and services.	Dhull and Narwal	2016
Role of Customers			
	Customer's awareness and knowledge of the environmental critical need for greening the supply chain will create severe pressure over the organizations and suppliers and will enforce them to adopt the environment-friendly techniques, materials and strategies; in other words, the customer is the main formulator of the standards of the products and services; therefore, the organizations have no other choice rather than meeting the desires of the customers; otherwise, the customers may be rejecting these products and services.	Dhull and Narwal	2016

2.3.5 Barriers of GSCM Practices

The world has been facing severe environmental concern since the industrial revolution after the World War Two. Manufacturing organizations frequently upgrade their supply chain processes to a green supply chain system for different operational synergies, but they certainly do not implement such advanced systems due to barriers that are responsible for internal and external environments. Studying GSCM has increased and grown over the past decade in terms of publications. Subsequently, firms have shown great interest in the theory of GSCM.

The importance of GSCM has been discussed by many researchers. They also compared the application of the green supply chain between organizations extensively. There are, however, different barriers to GSCM adoption that can be external or internal to the organization. Industries may recognize GSCM's importance, but it may not be practical to put it into practice most of the time. While searching the way for Green practices, the firms may face different problems. There may be different barriers or obstacles, such as absence of government legislation, infrastructure, organizational factors, high costs, etc.

The factors that discourage the successful application of GSCM activities are known as "barriers." There are a variety of obstacles to the implementation of GSCM. Applying GSCM activities effectively necessitates proper knowledge and understanding of these barriers. Lots of researchers were very concerned with GSCM and barriers that may hinder its implementations. They were discussed in various research papers; environmental issues have been discussed by lots of researchers such as; (Dashore and Sohani, 2013; Balasubramanian, 2012; Singh et al., 2012; Bhateja et al., 2012; Koho et al., 2011; Luthra et al., 2011; Quesada et al., 2012; Chiou et al., 2011).

Balasubramanian (2012) assessed the barriers to the adoption and application of GSCM in the field of construction of the United Arab Emirates. A total number of 32 obstacles to GSCM adoption were extracted from extensive review of literature and interviews with academics and industry experts. These obstacles were lack of GSCM practices in firm vision, absence of GSCM activities in business project, lack of support from top management to GSCM implementation, lack of commitment and leadership from middle and senior executives, unawareness and lack of information among supply chain stakeholders in GSCM and lack of experience among stakeholders in GSCM implementation.

Other obstacles mentioned in this research are feeling that it is too complex to apply GSCM among stakeholders, lack of long term vision oriented in firms, absence of ethical standards and corporate social responsibility, high employee attrition rate and absence of green architects, consultants, green developers, contractors in the region, which means shortage of resources, in addition to the absence of cooperation within the supply chain stakeholders, absence of information sharing and communication between supply chain stakeholders, lack of IT infrastructure systems like environmental regulating system in firms, lack of innovative technology in construction and manufacturing, and lack of technology for recycling and waste management.

In addition, other obstacles are the lack of GSCM training, lack of internal company sustainability audits, resistance and reluctance among stakeholders to reform, shortage of external sustainability audits of suppliers and contractors, absence of sustainability certifications such as IS0 14001, absence of government awards and incentives for GSCM adoption, lack of preferential treatment and long term contracts for GSCM implementation from government, high initial investment in GSCM adoption, slow Return On Investments (ROI) after GSCM adoption and low profit margins.

Also, high competition in the field of construction, market instability because of project delay, project on hold or cancellation, international crisis and economic downturn, lack of public awareness on sustainability issues, and absence of customer demands for sustainable green projects, absence of skilled professionals in sustainability and GSCM in the region. All these were obstacles determined by Balasubramanian (2012) in his research study.

Muduli and Barve (2012) had explored in their study the challenges of GSCM activities in Indian mining sector. A number of 11 relevant obstacles have been recognized from literature and discussions with experts from academia and industry. These identified barriers are poor quality of human resource, inadequate pressure from various societies, poor legislation, lack of direct incentives, limited financial resources, technical barriers, absence of management commitment, absence of employee commitment, resistance to change and adoption, poor environmental awareness and inappropriate approach to implementation.

Ojo et al. (2014) examined the barriers to implementing green supply chain management in the construction sector. Major obstacles facing GSCM in Lagos, Nigeria were stated: public awareness, absence of knowledge and awareness about environmental influences, in addition to poor commitment by top management and absence of government legal enforcement; while resources are insufficient, the company's vision and purpose neglect sustainable practices, in addition to the lack of a demand for recyclable products.

Moreover, the lack of knowledge exchange between construction companies and suppliers and the lack of demand were also identified as barriers. Environmental concerns in construction companies have become more important; thus, construction companies must focus on energy and resources to make the supply chain environmentally sound. To obtain an environmentally friendly supply chain in building, barriers at GSCM must be removed.

Luthra et al. (2014) examined the obstacles to the application of the GSCM in the field of auto mobile from an Indian view. Eleven barriers were recognized in the study: market competition and uncertainty, cost implications, lack of implementing green practices, customers' unawareness and suppliers' hesitation to shift towards GSCM have been acknowledged as dependent variables. In case of absence of government support systems, absence of commitment of top management and absence of applying IT have been recognized as driver variables.

Moreover, resistance to Technology Advancement Adoption and absence of Encouragement from the Organization and Poor Quality of Human capital have been recognized as the linkage variables. There was no barrier recognized as autonomous factor. Competitive markets and instability, absence of green practices application, cost implication and customers' unawareness have been recognized as top-level obstacles and absence of support system from the government as most essential bottom level obstacle. If these obstacles were avoided, this could probably assist and enhance the application of GSCM in Indian automobile field.

Bhattacharjee (2015) explained the reason of the adoption of green concept in business practices at its early age. He mentioned some barriers: applying green marketing is still very costly. GSCM requires a great deal of money to be spent on programs of R&D; consumers may not believe in the benefits and advantages of the green strategies of the organization. Therefore, the organizations must ensure that they can persuade the consumers of their green initiatives by introducing eco-labeling schemes, which offer their support to environmentally less harmless goods and have been very familiar in European Japan.

Also, the profits would initially be very small as renewable and recyclable goods and green technologies are more costly; therefore, GSCM may be successful but in the long term only. Moreover, customers may not agree to pay a higher cost for green products that will impact the organization's profitability; also, organizations that practice GSCM may need to work hard to persuade the investors and stakeholders, although there may be many times that some simply may not believe and cooperate.

Buzuku and Kässi (2019) aim to identify the obstacles that hinder the application of eco-design activities in the Finnish pulp and paper field. A list of barriers was defined in this study: absence of coordination from academic experts for adoption of eco-design process initiatives, absence of organizational support for commercialization of cleaner production technology, difficult external institutional environment, difficulty in regulating and controlling suppliers' environmental practices, absence of customer awareness on eco-design practices, absence of coordination on eco-design investment, and absence of workers' engagement in eco-design initiatives and absence of encouragement from the top management for training initiatives on eco-design practices.

Moreover, uncertainty and instability in product demand and absence of opportunities for capital investment for green activities, absence of coordination between customers on eco-design activities, and lack of both buyer and customer knowledge on eco-design initiatives were considered obstacles. A survey was then developed to assess these obstacles. Interviews were conducted with executives in the eco-design application in organizations of Finnish pulp and paper. Respondents were CEOs, vice presidents, corporate social responsibility managers and managers of eco-design. The obstacle that was mentioned by the experts for having the most influence is instability in goods demand. On the other hand, the obstacles that are perceived of having the least influence on eco-design application were lack of coordination from academic experts for applying eco-design process initiatives and lack of encouragement from top management for training initiatives on eco-design activities.

As it is seen, lots of researchers have run some practical observations in many different countries and have identified some barriers of GSCM. Dhull and Narwal (2016) tried to classify these obstacles identified by prior studies into categories. Driving and dependence power analysis (DDPA) is used to identify and classify the critical obstacles. Obstacles are classified into internal barriers, external barriers, customers, competition, society, suppliers and industry specific barriers discussed in the following lines. GSCM's internal barriers are the obstacles that prohibit GSCM practices from being implemented and that exist within the company itself. Failure to understand to incorporate green purchasing, ineffective business structure and cost reduction at the expense of the ecosystem are known as GSCM's internal barriers. Min and Galle (2001) found that cost consideration is the most serious barrier to taking into account environmental aspects in the procurement process.

Internal barriers are highly costly, meaning that the cost of investment in GSCM is very high such as eco design, green manufacturing etc. GSCM practices are very difficult to understand and complex to implement. Lack of understanding to incorporate green purchasing means that the firms are deficient in getting the term of green purchasing due to lack of knowledge and understanding. Organizational structure is inappropriate so that most of firms could not implement the GSCM due to inefficient organizational structure. Cost reduction comes at the expense of the environment, which means industries have pressure of decreasing the prices at the expense of environment for their survival. No management commitment is a great hindrance in implementing the GSCM. Absence of adaptation of advancement in technology or manufactures is difficult to change. Most of the small and medium enterprises are reluctant to adapt technological advancement. They also lack training, which is the main barrier in GSCM application in different industries. No or low return from the investment identified to be a major obstacle in applying the GSCM.

On the other hand, external barriers like slack government regulation have been seen as significant barriers to GSCM, particularly when businesses are positive and creative in their regulatory compliance approach. While Dashore and Sohani (2013) observed that hampering the introduction of GSCM is due to the inability to exchange information on trade and lack of skilled human resources. External barriers are the cost of eco-friendly packaging, which is the cost of applying green packaging materials, which is actually very high, absence of technology infrastructure, absence of technological innovation and absence of skilled human capital.

GSCM could not be efficiently applied till the industries would have the skilled capital. Weak supplier commitment is also an internal barrier, where manufacturers are not committed to providing environmentally friendly goods and services. The industries are also unwilling to exchange information about their trade with each other. Lack of state support as state regulation may demotivate innovation from being adopted. An important hurdle to achieving efficient GSCM is the absence of IT execution. In addition, in many enterprises, ethical values and social responsibility are most lacking.

Barriers from Customers; customers have a very essential role in the implementation and resistance of GSCM practices; Production of economic products at the expense of the environment, which causes the industry not to adopt GSCM practices. In implementing GSCM, absence of demand and awareness poses a major issue. Customers' pressure for lower prices and the demand of cheaper items in the market at the expense of the environment, absence of demand of customers and public awareness to understand the benefits and advantages of green products are barriers to implement GSCM from the customers' side.

Barriers of Competition; because of very high market instability and competition on the international market, holding costs lower and introducing GSCM simultaneously are very challenging for the industries. That is why competition plays a vital role in implementing and not implementing GSCM procedures. Competition and uncertainty in the market are very high due to international competitiveness and changing requirements of customers. Also, pressure for reducing price with competitors is a barrier since it is very complex for suppliers to maintain the prices low and apply GSCM meanwhile as GSCM activities are very expensive and costly like green manufacturing, green design, green packing etc.

Barriers from society are those in which lack of awareness in society for environmentally friendly goods and services serve as obstacles to the implementation of activities of environmental awareness. Lack of knowledge in society, according to Min and Galle (2001), means consumers are still unaware of green goods and their benefits and advantages to the society. While industry specific barriers are those in which research shows that various industries have unique obstacles to the introduction of green practices. Different sectors have various obstacles and challenges to the adoption of GSCM activities.

Barriers from suppliers are those in which lack of suppliers' understanding and knowledge serve as obstacles to adopting GSCM activities. Poor supplier commitment, willingness to move to GSCM (hesitating to exchange information), absence of comprehension among supply chain participants, etc. are supplier-related barriers. Suppliers do not give guarantee to adopt GSCM means are not included in the design process and technologies, which influences the chain performance overall. In addition, suppliers lack the information and skills they need to resist going green. Also, absence of comprehension about the GSCM among the groups of shareholders and suppliers is considered a disadvantage for implementing GSCM.

Narimissa et al. (2020) identify key barriers to implement and improve sustainable supply chain management (SSCM) in the Iranian oil and gas companies. A questionnaire was developed and distributed among SSCM experts to identify the SSCM barriers. Respondents contributed to the study by offering these barriers: cost of implementation sustainability in the supply chain, banking problems and lack of available financial resources, administrative bureaucracy, rules complexity, and working methods, limitation of integrity among supply chain partners, lack of a proper no transparency of the actual goods price, stagnation of capital and accumulation of goods in warehouses and old equipment and machinery.

Research shows that different industries have different obstacles to adopting green practices. Helpful and important strategic implications from the findings of this research can be obtained. The first important point is to work towards cost reduction in the adoption of green production technologies and practices. It is critical that manufacturing processes are handled efficiently and cost-effectively to ensure that total costs are low. This could also be strengthened via such flexible management practices through the application manufacturing philosophies. It will make it possible and easier to achieve high performance with minimal costs.

Moreover, expanding access to financing and attracting investment in the development and green technologies would reduce the insufficient funding barrier. In addition, senior management in companies must find ways to increase understanding of the potential economic advantages of adopting sustainable manufacturing practices in partnership with institutions of higher learning and consultancy organizations. In the manufacturing sector, awareness of the principles of sustainability and their advantages should be shared (Mutingi et al., 2017).

When taking into account the above hurdles, it can be inferred that the company has not yet determined the road to sustainable supply chains. For businesses, the techniques and strategies for building sustainable supply chains seem to be elusive. Moreover, in many cases the techniques seem to be partially known, not mature enough or not accessible or attainable. There is therefore a lack of motivation or lack of comprehension on the part of business managers to go green or to choose and adopt the correct green technique for their supply chain so that they can make their company competitive in this globalized business era.

Numerous studies confirmed the slow adoption of GSCM in SMEs (Mudgal et al., 2010; Sarkis et al., 2011; Perron, 2005; Shipeng and Linna, 2011; Kannan et al., 2008). Carter and Rogers (2008) mentioned that the failure of organizations in the implementation of environmental initiatives is because of internal factors, like sunk costs, improper communication structures, in addition to internal politics and institutional norms. From the important barriers to implementing GSCM practices in industries are the internal and external hurdles to implementing environmental initiatives in SMEs.

Similarly, Luken and Stares (2005) found significant road blocks among small and medium enterprise suppliers to provide green material. Then, Porter and Kramer (2006) mentioned that sometimes green products customers might switch over to other normal products, resulting in a negative motivation for new firms to engage in GSCM practices. Later, in 2010 Thun and Muller investigated the status quo of GSCM implementation in the German automotive industry from a practitioner's point of view. Other aspects were also examined comprising driving forces, time of implementation, relevance of intended goals, in addition to their specific realization and adoption of eco-programs with suppliers/customers, as well as internal and external barriers. Moreover, it was pointed out by Zhu et al. (2010) that lack of external cooperation and diffusion are proven obstacles to GSCM's operational performance. Indian SMEs have witnessed large changes despite that there are many barriers against GSCM. In addition to that, Indian SME's have already started manufacturing and supplying products to multinational companies (MNC) (Diabat and Govindan, 2011).

It is important for businesses to develop and upgrade themselves when adapting GSCM, according to new trends and technologies (Mudgal et al., 2010). First, in the technology obstacle category is the lack of new technologies, materials and processes' barrier rates. Considering that small and medium-sized enterprises lack new technological tools, they are typically slow to respond to the challenges they face in enhancing environmental performance (Massoud et al., 2010; Hitchens et al., 2003; Zhu and Geng, 2013). In many countries, the lack of sufficient educational programs at schools and colleges, and the lack of research and development to promote green supply chain were identified as major obstacles (Khan et al., 2009). Lack of effective environmental measures comes at the second rank. Guiffrida et al. (2011) confirmed from their results that conventional cost accounting methods lack flexibility to consider qualitative environmental measures and other obstacles. Complexity of design to reuse/recycle the product barrier comes third. Lack of human resources is considered to be barriers to GSCM. SMEs are known for lacking human resources in quantity and in technical knowledge to pursue environmental management (Hillary, 2004). It is clear that the lack of human resource barrier is followed by the lack of technical expertise barrier. It was reported that small and medium-sized enterprises lack environmental expertise, and fear of failure was given low priority (Perron, 2005). It was stated by Calleja et al. (2004) that there were fears that environmental standards would be lowered and worries also about overlapping and contradictory legislation due to the simplification of administrative and legislative burdens for SMEs.

There are five obstacles to the barrier of information. First comes the challenge of the professional's shortage of Green System experience. The survey findings show that business leaders are less open to green systems. The barrier of understanding of the "out - of-responsibility" zone is also a barrier. Industries do not wish to take responsibility for environmental problems and upgrade them (Shen and Tam, 2002).The third obstacle is also the Lack of Environmental Awareness. Mudgal et al. (2010) shows that the standard of readiness is inadequate, and this is due to the poor degree of implementation of environmental management systems. It is a result of ignorance and poor knowledge of the benefits, which is an essential obstacle in sequence. Therefore, disbelief about the economic advantages of environmental policies is regarded as another major technical obstacle. It is a barrier of thought and mindset from inside (Perron, 2005). Lastly, lack of knowledge about the obstacle of reverse logistics has low priority. Reducing waste and raising profitability proved to be a major challenge. A major obstacle of reverse logistics found in the supply chain of the Indian automobile industry is low understanding of the benefits of reverse logistics (Ravi et al., 2005; Mudgal et al., 2010).

Considering the environmental actions, the most significant constraint to the implementation of the GSCM is the lack of financial support (Zhang et al., 2009). Financial constraints are a major barrier in this barrier category. Lack of finances can get in the way of applying GSCM. It is revealed that industries are incapable of satisfying their economic needs and therefore do not spend much for applying GSCM

(Hussain, 2011). Based on its weight, the next barrier is the non-availability of bank loans to promote green products/processes. Also, high dangerous waste disposal cost barrier ranks third compared to developed countries. The effect of the collection and treatment costs and prices to dispose of hazardous materials is considered a significant financial barrier to environmental technology improvement (Mudgal et al., 2010). High investments and less Return-on-Investments barrier are viewed as the lowest priority in the financial category. It is considered less effective than the financial constraint's barrier. Govindan et al. (2015) concluded that industries are ready to introduce environmental management systems but without risking profits, only if they can do so without violating profits Framework Development of Green Supply Chain Management Process.

Complexity to measure/monitor environmental practice of suppliers, which is described as metrics misalignment thought to be a primary source of inefficiency and disruption in supply chain interactions is considered the most essential barrier. Due to lack of direction and legislation on environmental management, industries do not know what they should measure and how to measure (Sarkis et al. 2010). Mathiyazhagan et al. (2013) found that monitoring/measuring suppliers' environmental performance is a difficult process. Next is the lack of government support to adopt environment friendly policies barrier, which is described as Government regulations that are not strong enough to force industries to adopt environmentally friendly policies (AlKhidir and Zailani; 2009; Zhu et al., 2012). Massoud et al. (2010) have stated that to acquire an environmental certificate, there is a significant barrier, which is the lack of government support and incentive. The final barrier in this category is the difficulty of preserving environmental suppliers. It was stated by Calleja et al. (2004) that in situations of technology privacy, outsourcing new knowledge by the means of collaboration with suppliers is challenging. The problems in maintaining environmental supplier's barrier weight and rank demonstrates that industries have been forced to focus on new technology trends that help the environment.

In general, involvement and support of management is important in the implementation of any system, especially in a topic like GSCM implementation (Mudgal et al., 2010). GSCM had not progressed alone. Many corporate and industrial environmental philosophies and practices are linked to and support Green supply chain management (Sarkis, 2012). Walker et al. (2008) and Mudgal et al. (2010) stated that the first barrier is the lack of corporate social responsibility barrier. Thus, corporate environmental awareness is the most vital factor to adopt GSCM. The second priority is the lack of training courses/consultancy and institutions to train, monitor and mentor industry specific progress barrier. It was stated that there is poor involvement of enterprise professionals in environmental seminars, training courses, and mentorship programs. Third place following the barrier is the lack of customer awareness and pressure about GSCM barriers. For companies to take part in environmental management, the consumer's environmental consciousness is a significant driving force (Chen et al. 2006). EIP's (Environmental performance index) structure and composition often causes problems in information dissemination and communication, and this limitation is mainly linked to imperfect /incomplete information (Tudor et al., 2007).

Restrictive firm policies towards product/process stewardship is another obstacle, which is described as lack of importance, attached to product and process stewardship and management's inattention detrimental to GSCM (Hong et al., 2009). It also guarantees that product handling and usage is secure during their lifespan (Mudgal et al., 2010). Another obstacle is low engagement of suppliers and unwillingness to share information. Poor supplier engagement is suppliers' unwillingness to exchange environmental-related information with industry. This is because of the fear of having an impact on the final product. Industries' inability to share information on the management of the green supply chain is often triggered by fear of revealing inherent weaknesses or providing other companies a competitive advantage (Walker et al., 2008; AlKhidir and Zailani, 2009).

GSC introduction faces several hurdles. The top barriers to the implementation of industrial ecology principle as part of implementing GSC were listed. Capital investment was identified as the top obstacle; thereafter, lack of sufficient knowledge, lack of additional access to technological resources, shortage of skilled personnel, current legislation, and company policies. It has been found that most SMEs assume that a financial burden would be introduced as a result of introducing good environmental practices and as this burden cannot be passed on to consumers, it is thus seen as an obstacle to implementation.

Nine obstacles have been listed for implementing green practices in SMEs, such as opposition to reform, fear of failure, poor knowledge of environmental laws as well as human resource obstacles, environmental impact of an organization's activities, financial barriers, lack of new technology, resources or lack of professional expertise. Time and financial resources were seen as the most restricting elements for GSC implementation. In addition, it was agreed that the scale of the organization and the lack of experience in dealing with environmental problems or information tools are two key drivers for applying GSC. It has also been recognized that businesses that are more likely to engage in GSC programs are big corporations with more capital (Elbarky and Elzarka, 2015).

Ojo et al (2014) examined the obstacles in enforcing management of the green supply chain in the construction sector. Great obstacles have been identified for GSCM in Lagos, Nigeria: public awareness, lack of knowledge about environmental consequences, in addition to poor commitment by top management and lack of legal enforcement by the government, while lack of resources, lack of sustainable practices in the organization’s vision and mission, in addition to lack of market for recyclable materials, lack of information sharing between construction firms and suppliers and lack of demand were also identified as barriers. Environmental concerns have become more important in construction companies; thus, construction companies need to focus on energy and resources to make the supply chain sound for the environment. To obtain an environmentally sustainable supply chain in building construction, obstacles in GSCM need to be avoided. Lack of public / consumer awareness is described as the sense of consumer awareness: if the customer requires green products, the business needs to change technology and organization for creative green products (Luthra et al, 2011). A survey conducted in the U.S.A reveals that 70 % of customers said they are influenced by reputation while shopping while 80 percent said they are willing to pay more for environmentally friendly goods. Therefore, these findings indicate that lack of knowledge is seen as a major obstacle to the introduction of GSCM in construction companies.

It is mentioned in the study that lack of knowledge about environmental impacts is an extreme barrier. As knowledge is power, in addition to that it is informative. In circumstances where the environmental effects of constructions are unknown, precautions will not be taken against it. For the sake of success of any strategic program, top management commitment is a necessity (Zhu & Sarkis, 2006). Top management commitment is crucial for environmental practices like GSCM; it has the capability to impact, support actual formation and application of green initiatives across the organizations (Sarkis, 2009) and also offer support for GSCM in the strategic and action plans for fruitful implementation (Ravi et al., 2005). Consequently, the results that show that poor commitment by top management is a key barrier in GSCM implementation in Nigerian Construction firm are supported.

Since government sets the environmental regulations for industry, adopting innovation can be either encouraged or discouraged by the government (Scupola, 2003). There are some factors that may discourage smaller firms, like time consuming regulatory requirements and fees or levies. Furthermore, tax systems that alter incentives could discourage industry to apply GSCM (Luthra et al, 2011). Government institutions are seen as barriers to the development in the environmental management. Institutional processes for implementing GSCM are going on but very limited institutional processes for the implementation of the GSCM (Luthra et al., 2011). A major barrier is the government encouraging old practices (Alkhdir and Zalani, 2009). Thus, the results that show that the absence of the government legal enforcement is a barrier in GSCM implementation in construction firm are highly supported. Lack of resources was identified by Walker et al. (2008) as an internal barrier.

The preliminary investment requirement for green methodologies is expensive (Luthra, 2011). Engaging in environmental management involves cost, which constitutes a vital barrier in GSCM implementation. IT enablement, technology advancement adoption hiring good quality employees, motivating and training of employees towards GSCM will require high initial investments. Lack of resources is a major barrier. Sustainability practices could be termed as green practices, the word green is sometimes used interchangeably with sustainability. The clearness of green practices associated with knowledge, organizational and quality of human resources is related to the innovative green practices. Innovative green practices include recycling of materials in addition to hazardous solid waste disposal and energy reusing. High levels of investment are required in order to apply the GSCM (Ojo et al., 2014).

There are five important performance metrics acknowledged by the Supply Chain Council. These performance metrics are responsiveness, reliability, in addition to, flexibility, cost, and asset. Also, the necessity of having diverse industrial settings examined in the context of global supply chain design was concluded. It was mentioned that in the model-based SCD (Supply Chain Design), a number of industries have been explored, such as apparel, automotive, electronics, in addition to fiber and textile; on the other hand, other industries have not been examined like air-craft, heavy machinery as well as services.

Concerning the topic of integrated supply chain design models, Vidal and Goetschalckx (1997) and Goetschalckx et al. (2002) conducted other review papers with an emphasis on globalization. A review of integrated supply chain design models is proposed by Shen (2007). Three types of integrated decision-making models were targeted mainly by Shen (2007): first, location-routing models; second, inventory-routing models and finally location-inventory models.

Employing some modeling tools like General Algebraic Modeling System (GAMS), Lingo or a mathematical programming language (AMPL), in addition to linear or non-linear programming solvers allows solving complicated and usually large size SCND models. Most of the work concentrates on specific applications, while generic sustainable SCND is addressed only in a small number of papers. Social factors are rarely considered in studies. On the other hand, economic and environmental factors are largely focused on. It was observed that SSCM research streams targets topics, such as business partner development, stakeholder involvement, in addition to enhanced communication, innovation, technological integration, long-term relationship development with other supply chain actors and learning. Moreover, an integrated theoretical map of SSCM (Sustainable Supply Chain Management) was proposed, which suggests that effective utilization of resources and binding social and environmental challenges within business capabilities leads to competitive advantage. A modeling based SSCM research enhances the interorganizational perspective of SCM. Also, social issues must be integrated in the modeling, and to develop a realistic uncertain model, a stochastic approach should be applied.

Various definitions were published on GSCM and SSCM. Therefore, the needed reference point for research was provided. The further state that GSCM is an integral part of sustainable supply chain that simply focuses on the environmental aspects of supply chain. A study targeting examining the barriers to the implementation of the GSCM in auto mobile industry from an Indian perspective showed that there are eleven barriers to implement GSCM: Market Competition and Uncertainty, Cost Implications, Lack of Implementing Green Practices, Unawareness of Customers and Supplier Reluctance to Change Towards GSCM have been acknowledged as dependent variables; Lack of Government Support Systems, Lack of Top Management Commitment and Lack of IT Implementation have been identified as driver variables. Resistance to Technology Advancement Adoption and Lack of Organization Encouragement and Poor Quality of Human Resources have been recognized as the linkage variables. There was no barrier recognized as autonomous variable. Market Competition and Uncertainty, Lack of Implementing Green Practices in addition to Cost Implication, Unawareness of Customers have been identified as top-level barriers and Lack of Government Support Systems as most important bottom level barrier. If these barriers were removed, this would help in implementing GSCM in Indian automobile industry.

Mining and mineral industries need to give more serious attention to environmental management practices, which is very clear viewing the results of AHP and its relevant detailed discussions. Their present position needs environmental performance as a one-way option. But more detailed analysis is required to identify the important pressures forcing the adoption of GSCM practices by managers, which is extremely important for the industry as a whole. This study is needed to motivate managers to reach next levels of environmental practices.

From the available references, it is clear that we miss research studies that rank pressures upon Indian related industry. Therefore, focus on the most essential pressures will help to respond better. Categorized into four major categories, fifteen pressures were considered. The main one is the NGOs (Non- government organization) pressure on the industry to motivate adopting GSCM practices, where both NGOs and governmental organizations seriously care for environmental awareness.

In addition, AHP results show that the external source category has the upper hand over the other four, where recommendations like the following are essential to successfully exert the pressure needed:

i) Monitoring strictly through government regulations

ii) Giving more government incentives to pioneers within the industry.

Where identifying the pressures needed through this study will ease the adoption of GSCM by managers at the department's level, which helps to force them to reach it in the Indian context and improve their traditional SCM within.

However, further research is needed to increase the number of pressure categories for different sectors, as this study was limited to North India mining and mineral industry (Mathiyazhagan et al., 2015).

In a nutshell, it is concluded that firms have shown a great interest in the theory of GSCM; however, barriers to GSCM adoption can be external or internal to the organization. Customers' pressure for lower prices, lack of knowledge in society, absence of adaptation of advancement in technology or manufactures hesitation to change and failure to understand to incorporate green purchasing are the main barriers that researchers agreed on.

Table 2-4 could illustrate how the literature reviewed filled the barriers of GSCM practices in the research.

Table 2- 4: Summary of the most Barriers of GSCM practices

Author	Year	Country	Sector	Barriers
Balasubramanian	2012	the United Arab Emirates (UAE)	the construction sector	Lack of GSCM practices in firm vision, Absence of GSCM activities in business project, lack of support from top management to GSCM implementation, lack of commitment and leadership from middle and senior executives, unawareness and lack of information among supply chain stakeholders in GSCM and lack of experience among stakeholders in GSCM

Author	Year	Country	Sector	Barriers
				implementation.
Muduli and Barve	2012	India	Health Care Waste Sector	Poor quality of human resource, Inadequate pressure from various societies, Poor legislation, Lack of direct incentives, limited financial resources, Technical barriers, absence of management commitment, absence of employee commitment, Resistance to change and adoption, Poor environmental awareness, and Inappropriate approach to implementation.
Ojo et al.,	2014	South Africa and Nigeria	Construction industries	Public awareness, absence of knowledge and awareness about environmental influences in addition to, poor commitment by top management and absence of government legal enforcement, while insufficient resources, the company's vision and purpose neglect sustainable practices in addition to the lack of a demand for recyclable products.
Luthra et al.,	2014	India	Automobile Industry	Market Competition and Uncertainty, Cost Implications, Lack of Implementing Green Practices, Customers Unawareness and Suppliers hesitation.
Buzuku and Kässi	2019	Finland	Pulp and Paper Industry	Absence of coordination from academic experts for adoption of eco-design process initiatives, absence of organizational support for commercialization of cleaner production technology, difficult external institutional environment, difficulty in regulating and controlling suppliers' environmental practices, absence of customer awareness on eco-design practices, absence of coordination on eco-design investment, and absence of workers' engagement in eco-design initiatives and absence of encouragement from the top

Author	Year	Country	Sector	Barriers
				management for training initiatives on eco-design practices.

Table 2-5 shows the summary of drivers and barriers across different industrial sectors and across different countries. In addition, the table shows the barriers in the Middle East: lack of GSCM practices in firm vision, absence of GSCM activities in business project, lack of support from top management to GSCM implementation, lack of commitment and leadership from middle and senior executives, unawareness and lack of information among supply chain stakeholders in GSCM and lack of experience among stakeholders in GSCM implementation. Moreover, the drivers in Middle East were Competitive capabilities, Sustainable Manufacturing Practices, Environmental Regulations, Environmental Pressures, Technology Infrastructure, Technology Competence, Management Support and Employees' engagement.

However, the barriers that developed countries faced were too high disposable cost for hazardous wastes, high cost for producing ESER products, high cost for using environmental packaging, too high cost (eco-design etc.), no commitment from senior managers, low ESER awareness of workers, no clear statement for responsibilities among different departments, lack of collection and analysis for data of material/energy flow, lack of capabilities to solve internal ESER issues, lack of R&D capability on ESER, lack of internal technological resources and lack of internal expertise on environmental issues. The drivers in developed countries were national environmental regulations (such as waste emission, cleaner production etc.), national resource saving and conservation regulations, regional environmental regulations (such as waste emissions, cleaner production etc.), regional resource saving and conservation regulations, export, environmental requirements from domestic customers, environmental awareness of Chinese consumers' (customers'), the close follow of news media to our industry, public environmental awareness (community, NGO etc.), green strategy of same product producers, green strategy of substitute product producers and industrial professional group activities.

Table 2- 5: Summary of Drivers and Barriers across Different Industrial Sectors and across Different Countries.

Country	Sector	Year	Barriers	Drivers	References
United Arab Emirates (UAE)	construction sector	2012	lack of GSCM practices in firm vision, absence of GSCM activities in business project, lack of support from top management to GSCM implementation, lack of commitment and leadership from middle and senior executives, unawareness and lack of information among supply chain stakeholders in GSCM and lack of experience between stakeholders in GSCM implementation.	Regulations and legislation Prevailing desire of the organization to reduce its costs.	Balasubramanian, 2012
	automotive, fast moving consumer goods, and chemicals sector	2016	Inadequate customer focus, Poor cooperation and improper communication among suppliers, Poor environmental awareness, Poor technology management, Risk-averse attitude, Poor government support, Financial barriers and Lack of expert supply chain professionals	Financial stability, Flexible and green product design, Organization culture, Strategic supplier collaboration, Flexible manufacturing, Continuous improvement, Enabling technologies and information, Logistics optimization, Strategic outsourcing and Corporate commitment	Shibin et al., 2016
India	Health Care Waste Sector	2012	Poor quality of human resource, inadequate pressure from various societies, poor legislation, lack of direct incentives, limited financial resources, technical barriers, absence of management commitment, absence of employee commitment, resistance to change and adoption, poor environmental awareness, and inappropriate approach to implementation.		Muduli and Barve, 2012
Nigeria	construction industry	2014	public awareness, absence of knowledge and awareness about environmental influences in addition to, poor commitment by top management and absence of government legal enforcement, while		Ojo et al., 2014

Country	Sector	Year	Barriers	Drivers	References
			insufficient resources, the company's vision and purpose neglect sustainable practices in addition to the lack of a demand for recyclable products..		
India	automobile industry	2011	Lack of IT Implementation, Resistance to Technology Advancement Adoption, Lack of Organization Encouragement, Lack of Quality of Human Resources, Market Competition and Uncertainty, Lack of Government Support Policies, Lack of Implementing Green Practices, Lack of Top Management Commitment, Cost Implications, Supplier Reluctance to change towards GSCM, Unawareness of customers		Luthra et al., 2011
Finland	Pulp and Paper Industry	2019	absence of coordination from academic experts for adoption of eco-design process initiatives, absence of organizational support for commercialization of cleaner production technology, difficult external institutional environment, difficulty in regulating and controlling suppliers' environmental practices, absence of customer awareness on eco-design practices, absence of coordination on eco-design investment, and absence of workers' engagement in eco-design initiatives.	Government Legislation, Management's idea, One or few employees pushed the idea, Marketing department saw better brand image, Company's environmental profile and reputation / image, Pressure from stakeholders, Proactivity to avoid potentially bad publicity, Local community and consultants and Costumer's demands	Buzuku and Kässi, 2019

2.4 Conclusion

This chapter was designed to identify the supply chain management process, as well as to show how it could be developed to be a green process. In this way, the importance of having green supply chain process had been identified and the need to have integrated process had been presented. In addition, the drivers and barriers of green supply chain management process were identified. The next chapter will investigate the adoption of the green supply chain management in the developed and developing countries. Also, the adoption of the green supply chain management process will be discussed in the MENA region to be able to identify the drivers and barriers of green supply chain process in the region concerned with this research.

Chapter Three: Adoption of Green Supply Chain

3.1 GSCM Adoption

Over the last decades, many major producers and manufacturers have adopted more comprehensive ways to manage their supply chain in order to improve their practices, which led to various environmental implications. This adapted way refers directly to the green concept within the management of supply chain. Organizations implement this green concept by integrating the internal activities of environmental management with the external factors that are mainly related to the interaction with the market mechanism, suppliers and competitors and the customers indeed. The implementation of the green supply chain management involves mainly the practices of reducing the emissions that result of the processes of manufacturing, in addition to the practices that have positive influence on the energy usage, besides the full utilization of the resources that are included in production in order to achieve the best output out of them with the minimum amount of wastes that causes harm to the environment on the one hand and on the other hand causes an extra burden over the organizational resources and capabilities (Chowdhury et al., 2016).

The adoption of green supply chain management in the industrial sector became essential to improve the organizational performance and achieve the planned objectives. Furthermore, there are various approaches to adopt and implement the green supply chain management in the industrial sector; many studies focused over the adoption of the green strategy across several organizations by testing the relationships between the green activities of purchasing, logistics and energy consumption to identify the mechanism through which these variables can operate together to diminish the environmental impact. Other studies pointed out that managerial innovation is a must to implement the green management of supply chain successfully as those managers are considered to be responsible for the organizational performance; in addition, the green concept is usually adopted across several organizations, which implies that the needed resources have to be huge and need the involvement of the top managers to be successfully utilized to achieve the aims of the green concept (Ogunlela, 2018).

Green supply chain management is considered to be an effective strategy to enhance the sustainability in different industrial sectors by implementing a cycle of successive green practices. Such activities come in different ways, applying "green" structures to conventional phases of the traditional supply chain, such as green design, green operations, green manufacturing, reverse logistics as well as waste management. Organizations are not totally free to choose whether to adopt or neglect the green concept; there is a kind of pressure or forcing over the organization to adopt the green supply chain management because of the competitive environment among different competitors within a business. In other words, ignoring the environmental issues is not affordable anymore by any organization. It is not only the harsh competition that pushes organizations towards the adoption of the green concept, but also the increasing accountability by governments on one hand and on the other hand there is a strong public mandate that have pushed the green strategy on the top of the planning strategies of different manufacturers (Luthra et al., 2013).

Organizations take serious steps towards the implementation of the green concept in order to align with other competitors on one hand and to meet the customers' expectations on the other hand. Therefore, it has been suggested that the environmental strategies of the organization have to be aligned with its supply chain to improve the organizational performance. To adopt the green supply chain management, organizations change the strategic way of planning in order to identify the organizational goals for the long run and specify the most efficient plan to achieve these goals and manage them. In other words, it figures out the future set of actions to implement the green strategy. Moreover, the environmental issue has a significant impact on all the dimensions of the supply chain from the employed management method, the product design, the purchasing of raw materials, the process of manufacturing, marketing, the consumption of energy and the logistics of the organization (Chowdhury et al., 2016).

Changing the design of the product can perform an important role in reducing the wastes and accordingly the cost of recycling; by paying attention to design the product in a sensitive manner to the environmental issue, organization will be able to come closer or even achieve its aim in eliminating hazardous environmental effect. In the stage of designing, the strategy of the three Rs should be taken into consideration; this strategy refers to reduce, reuse and recycle. By applying this strategy, the organization will be designing the product in an appropriate way that makes the maximum possible extraction of benefits from the product, which implies generating the least number of emissions or wastes (Chowdhury et al., 2016). Greening the purchase of raw materials that are required for the production means the items that have the properties that satisfy the environmental requirements, such as reusability, recyclability and of course avoiding the usage of hazardous materials. Before the growing concerns about the environmental issue, purchasing strategy was mainly concerned with the prices of the materials and their quality, with paying no attention to their influence on the environment (Luthra et al., 2016).

Green manufacturing process refers to the implementation of the practices that are socially and environmentally responsible to prevent the negative impact of the manufacturing activities on the one hand and on the other hand to achieve all the possible economic benefits, as the organization's capability to attain profits increases by the adoption of the green management of the supply chain because the green concept improves the position of the manufacturer among the other global competitors and enhances the efficiency of its processes as a whole. Green management practices drive the organization to acquire integrated sources of information to enhance its organizational and environmental performance. The implementation of green management improves the image of the organization, increases the organizational efficiency and helps the organization to achieve better level of social commitment (Luthra et al., 2016).

Green practices in the process of marketing are the practices by which the organization promotes its products with great highlighting over the environmental features. The activities of green marketing work on meeting the customers' desires with the least harmful effect on the nature and environment, which definitely improves the corporate image in general and the image of the product in particular. These good images can increase the organizational competitiveness and profitability. Eventually, the green practices of logistics refer to the integration of all the practices that are necessary to direct the product throughout the supply chain, taking into consideration the objective of distributing this product in an environment-friendly way. The efficient distribution system helps the organization to save its resources as well as to build better relationships with the customers, which increases the organizational profitability. The activities of green logistics would have a significant role in reducing the environmental effects on the one hand and on the other hand improving or maintaining the quality and saving energy (Luthra et al., 2016).

3.1.1 Supplier Relationship Management

Yu et al. (2014) stated that GSCM with suppliers is defined as a joint environmental effort between a local company and its suppliers to implement environmental and ecological management activities. It focuses on the inbound or Supplier Relationship Management portion of the supply chain of an item and of an institution. For insight on the use of ecologically and environmentally sustainable methods in terms of purchasing processes and resource handling procedures, companies will consider their suppliers. Institutions are gradually dealing with the environmental performance of their suppliers to ensure that the materials and forms they are using are naturally well disposed and are produced through environmentally friendly procedures. With respect to the Chinese automotive sector, global vehicle manufacturers (such as Ford, General Motors (GM) and Toyota) have obliged their Chinese suppliers to obtain the accreditation ISO 14001.

Suppliers are known as the main accomplices in supply chains, because they can be in a position to support the companies' natural practices and help boost the supply chain's environmental efficiency. According to Yu et al. (2014) GSCM assumes an indispensable role in the choice of a green supplier. It is seen that providers can assist with giving significant thoughts utilized in the acknowledgment of environmental projects. Kumar and Chandrakar (2012) consider that Supplier Relationship Management variables incorporate such inbound logistics (materials management) activities as green purchasing and vendor management. For instance, things incorporate giving provider’s structure determinations fusing natural necessities for acquired things, participation with providers for ecological targets, green purchasing and vendor management. Researching the determinants of External GSCM relationship factors in the US, Min and Galle (2001) found that organizational size (number of workers), regulatory pressures, source reduction policies and high environmental costs played a significant role in the adoption of green purchasing practices.

3.1.2 Customer Relationship Management

Yu et al. (2014) argued that GSCM with customers is defined as a natural partnership between a local business and its customers that aims to meet the environmental requirements of the customers. It focuses on the supply chain's Customer Relationship Management side. Past studies have identified numerous open doors for producers to make concerted efforts with their customers for the environment. For the successful use of GSCM activities, building close and long-term working entities with Customer Relationship Management is important. Chinese research has shown that consumer pressure is an important force of Chinese projects to enhance their environmental image and activities. In addition, knowing the needs of the end user is part of GSCM, as it serves as an integral angle of appreciation and value development. Given the increasing environmental demands of consumers, it is important for businesses to cooperate with green packaging consumers on the environment, achieve ecological goals as a whole and establish joint environmental planning (Vachon and Klassen, 2008; Zhu et al., 2010).

Customer Relationship Management can be defined as approaching the customer by adopting a database to build a long-term and profitable relationship at the same time, and this means that the management conducts regular evaluations of its customers to renew the database of its knowledge of its customers and its various aspects, towards building a long-term relationship and by achieving customer loyalty to the organization and through the progress of goods and services. It is a set of organizational, technical and human means to manage a new type of relationship with customers, whose primary goal is to link a special and personal relationship with each client (Bhat and Darzi, 2016).

The Customer Relationship Management aims to achieve the following (Lubis et al., 2021);

- Achieving an effective and interactive balance between the organization's functions and its production and service directives and between achieving customer satisfaction and needs in order to achieve profit.
- Continuous communication with the client and determining the activities of the organization of value to him.

- Using customer information to continuously improve performance and learn from past processes to achieve success and avoid failure.
- Achieving the best integration of service marketing activities.
- Maximizing customer value.

3.1.3 Adoption of GSCM in Developed Countries and Emerging Markets

Emerging economy represents a country's growth of economy because of quick growth of industrialization and expanded business with different nations. Developing countries with emerging market economy have become a hub for international business; because of low assembling cost, numerous monster organizations have moved their manufacturing plants in such nations. Accordingly, those nations appreciate cross fringe exchange and reclassified worldwide guidelines and regulations. Such countries are encountering a compelling role in world economy. Be that as it may, not at all like developed nations where the market is developed, many emerging market economies are unstable and are dependent upon uncertainty (Audretsch et al., 2021). In addition, emerging economies have absence of environmental awareness, and, henceforth, are slacking to embrace green practices in the supply chain. Subsequently, emerging markets represent a higher danger to nature and the environment (Mani et al., 2018), be that as it may, adoption of GSCMP can correct the threat (Moktadir et al., 2018; Pandit et al., 2018).

Bangladesh, as an emerging economy, is not an exception, rather presenting higher risk to nature because of absence of sustainable practices. In the country, textile industry plays the key role in the financial headway and economic advancement as it contributes fundamentally to send out income and makes generous employment, including women employment (Cheng et al., 2018). In addition, in view of cheap labor, quality product and accessibility of modernized transportation framework, numerous popular design retailers have concentrated their assembling tasks in Bangladesh (Huq et al., 2016). Albeit as of now the industry has the absence of environment concerns, it has tremendous scope for implementing sustainability practices, including minimization of waste generation and energy utilization, resource preservation, reuse and recycling, and along these lines the possibility to adopt reasonable strategic policies and sustainable practices (Islam et al., 2018). So as to use this potentiality, Bangladeshi textile industry needs to identify and break down the boundaries and barriers of GSCMP.

Boundaries to green supply chain management in emerging economy that GSCM has not yet been promoted in emerging economy like Bangladesh (Ali et al., 2018). The textile business is a significant labor-based, export-oriented sector in Bangladesh (Ahmad et al., 2018). Numerous foreign investors are pulled in to ventures and investments and projects in Bangladesh because of cheap labor force and minimal cost of production. For instance, Berg et al. (2011) reports that 80 % of European and American brands are intending to move their plants from China to Bangladesh because of low cost of production. The contribution of this industry to the Bangladesh economy is additionally expanding step by step and day by day (Bangladesh Economic Review, 2018). However, Tumpa et al. (2019) consider that this development and growth may not continue in the long run if the makers of the business do not adopt green practices. This is on the grounds that purchasers of the developed countries are progressively getting mindful and aware about the environment and stringent environment requirements before making a contract with the suppliers of emerging nations.

A portion of these purchasers are even willing to pay more and move their production plants from low-cost countries to similarly higher cost countries to guarantee that they keep up manageable and sustainable practices in sourcing. The present situation is not satisfying for the Bangladeshi textile makers as they do not have the sustainable practices in their supply chain; this proposes a study to discover which variables impede the adoption of GSCMP in the textile business of Bangladesh. Through a comprehensive literature review, the accompanying subsections recognize the common barriers experienced in GSCMP adoption. The boundaries were arranged from the points of view of government rules and guidelines, portrayals of green materials, business organization, market demand, and absence of standards and the progression of raw materials.

Finally, it could be recognized that emerging economies such as Bangladesh have absence of environmental awareness, and, henceforth, are slacking to embrace green practices in the supply chain. Subsequently, emerging markets represent a higher danger to nature and the environment; be that as it may, adoption of GSCMP can correct the threat. Green supply chain management has not yet been strengthened in the emerging economy due to the barriers of green supply chain management. The boundaries were arranged from the points of view of government rules and guidelines, portrayals of green materials, business organization, market demand, and absence of standards and the progression of raw materials.

3.1.4 Adoption of GSCM in Developing Countries and Emerging Markets

Generally speaking, GSCM is thought to reflect the environmentally friendly picture of goods, procedures, structures, technology and business behavior. In developing countries, many organizations have implemented green approaches to minimize the negative influences on the environment rather than following a proactive approach to decrease waste or pollution sources. Such environmental approaches embraced remain conventional "command-and-control" solutions or "end-of - the-pipe" (Anbumozhi and Kanada, 2005).

Discussing GSCM in developing countries is not abundant since literature has given little concern to non-developed countries. The GSCM notion is relatively new in the South East Asian area and is likely to be implemented by only a few companies. Nevertheless, as Rao (2002) reported in his research on the green supply chain in the South-East Asian area (Indonesia, Philippines, Singapore, Malaysia and Thailand), GSCM practices began to take place. Thereby, results from such research in the Asian region can be beneficial for production in developing countries to develop the suitable GSCM procedures and help alleviate environmental issues.

Recent literature has shown that some researchers have begun to examine the enhancement of GSCM in the East Asian region, e.g. China, which is known as a major productive country with complicated GSCM problems. Zhu et al. (2011) examined whether or not various Chinese producer groups differ from the environmental modernization viewpoint in their degree of adopting green supply chain management. The analysis also investigated the Chinese manufacturer's knowledge of compliance with GSCM application compared to local and international environmental enhancing energy savings and pollution reduction orientation.

Liu et al. (2012) in China explored the interaction between the rate of GSCM and the independent variables listed: external pressure (pressure of environmental regulations, importance of domestic client's environmental expectation, importance of competitors' green strategies, pressure of complaints from neighboring communities, pressure of foreign customer's environmental expectation and degree of support from company's top managers) and internal forces (education level of the employees and frequency of internal environmental training). The study revealed that the environmental management capacities of a corporation will be highly boosted to increase its participation in GSCM activities through regular internal training of workers.

The China study reviewed by (Li, 2011) analyzed the rate of implementation of GSCM procedures in China, and the quality metric of GSCM was investigated. The results showed that GSCM aligned closely with other advanced management practices and helped improve environmental efficiency. Zhu et al. (2008) analyzed GSCM in four Chinese industries (power generation, petroleum/ chemical, electrical / electronics and automotive). It was observed that the implementation of GSCM activities is not uniform throughout the four sectors in various industrial contexts.

Environmental concerns have also expanded researchers' interest in investigating the adoption and application of GSCM activities in other developing countries, such as Malaysia, India, and Thailand. In Thailand, an example of a developing country, a study was performed by Ninlawan et al. (2010) examined current green initiatives in computer parts manufacturers and also calculated GSCM scale. An in-depth interview was developed to investigate green manufacturing, green procurement, green distribution, and reverse logistics. Then, suggestions were given for the successful implementation of GSCM in the electronics industry in Thailand, such as establishing rules for the disposal of electronic waste and considering additional investment in recycling, promoting teamwork and preparing skilled labor to handle reverse logistics, promoting eco-design and controlling hazardous materials.

Eltayeb et al. (2010) investigated the key motivators to GSC initiatives, which were regulations, expected business gains, customer requirements and social responsibility. Also, they examined the relationship between GSC practices and the outcomes and observed that eco-design has a positive influence on the four types of outcomes (environmental, cost reductions, economic and intangible outcomes) in Malaysia.

In Jordan, as an example of a developing country, Abdellatif and Graham (2019) explored the adoption of GSCM practices. The findings suggest that Jordanian manufacturers express interest and dedication in environmental protection despite the lack of government regulations by implementing a range of GSCM procedures that show a proactive approach. The implementation of GSCM initiatives begins in Jordan at the internal level, such as sustainable production, waste management and recycling and using clean energy. Subsequently, on the manufacturer and customer side, GSCM activities are implemented, such as green supplier choice, supplier tracking and assessment, green supplier collaboration continuous customer interaction, and green distribution and transportation.

When studying the effect of GSCM on green and economic performance in a developing country, the links among leadership, institutional pressure, internal green practices, external green collaboration and green and economic performance in GSCM network in Pakistan were empirically investigated. In addition, the study further tested the firm's economic performance with external green collaboration, internal green practices and firm's green performance, respectively. The study results strengthen and enhance empirical work on the integration of internal green practices and external green collaboration in the network of GSCM and on the application of institutional theory in the fields of SCM (Talib et al., 2011; Kauppi, 2013; Ahmad et al., 2018). By examining certified production companies based in Karachi and by evaluating the hypotheses proposed, outcomes show that there are significant influences of leadership and institutional pressures on firm's green practices. Moreover, all constructs of GSCM practices have a significant influence on firm's green and economic performance. Only one insignificant relationship has been found between external green collaboration and green efficiency, consistent with the findings of past studies (Laari et al., 2016) and (Zhu et al., 2013). It was also claimed that ecological and economic performance of companies has been enhanced through the implementation of green processes.

The activities and performance of the green supply chain management were addressed in a study by (Vijayvargy et al., 2017), which depicted that Indian organizations conducted out 21 practices. Medium-sized companies have implemented GSCM activities at comparable rates relative to large organizations. There have been three exceptions that accept current environmental management programs, funding from mid-level and top management, and environmental supplier evaluation; it has been shown that IEM (Internal Environmental Management) practice has a major role to play in reducing environmental impacts and improving a company's competitiveness and efficiency; the study reports that Indian companies have paid little attention toward implementation of GP (General Practitioner) activities.

In this research, it was found that GP lags for all sizes of organizations. To disseminate correct GP procedures, this includes input from government and professional industry associations. The Indian government can encourage GP activities by either setting up GSCM awareness campuses across the country to inform companies about how important GP activities are or by designing and approving rules and regulations. Institutions will also focus on choosing the best supplier and provider training on environmental concerns through good cooperation with suppliers. GP approaches can include provider EP (Environmental performance) evaluation and mentoring to assist suppliers boost their GSCM performance (Rao and Holt, 2005). Tachizawa et al. (2015) claim that monitoring alone has no direct impact on efficiency while operating with suppliers, while joint projects with suppliers have a major impact on EP.

In large companies, GSCM is enforced more recognizably than in small companies. Large companies are also considered a diffusion tool to assist in the implementation of GSCM in partnerships with other countries. For example, 80 % of manufacturing in India is a partnership between small and medium-sized companies and large companies. GSCM activities can then be moved by means of appropriate supply chain arrangements on sustainable standards from large organizations. Greening the supply chain would go a long way in encouraging sustainable production by prioritizing the environmental issues. Green policies should also be practiced in SMEs (Carter and Carter, 1998).

Thus, it could be stated that GSCM is thought to reflect the environmentally friendly picture of goods, procedures, structures, and technology and business behavior. In developing countries, many organizations have implemented green approaches to minimize the negative influences on the environment rather than following a proactive approach to decrease waste or pollution sources. All constructs of GSCM practices have significant influence on firm's green and economic performance. Only one insignificant relationship has been found between external green collaboration and green efficiency.

3.1.5 Adoption of GSCM in the Middle East Countries

Despite the increasing attention that is focused on the green concept of the supply chain management, little attention is directed to the green concept in developing regions as the Middle East. Therefore, this section is concerned with illustrating the current situation of the green concept in countries of the Middle East. Dubai, United Arab Emirates is considered as good case to study as it is considered to be a very fast-growing economy and has a great capability to attract multinational investments into the Middle East region. Dubai has transformed within the last decades from depending on the nomadic ways of economy to the modern ways that are based on services. Accordingly, seeking the fast-growing economic development has a considerable impact over the environmental issue in Dubai. In other words, setting the economic development as the top priority of Dubai may push the attention towards the environment-unfriendly projects and away from the environmental concerns (Ben Brik et al., 2013).

Moreover, in contrast to developed western countries, in which the social concerns over the environmental influences are considered really high, which push the different organizations, manufacturers and companies to adopt the green concept and take into its account the effect of its processes over the nature and environment and work on reducing these negative impacts, these social concerns over the environmental issues are low in the Middle East as a whole and consequently in Dubai. The reason behind such difference among regions may be laid in the level of customers' awareness and education about the environmental degradation and its consequences, which lowers the weight of the green activities. It has been suggested that the lack of customers' pressure over the organizations leads to peripheral adoption or even totally neglecting the adoption of the green management of supply chains (Ben Brik et al., 2013).

By investigating the green concept and its implementation in Dubai, it has been suggested that the pressure of the customers, competitors or even the governmental regulations have no significant association with the green management of supply chains. Further, the customers' pressure is not strong enough in the developing regions as the Middle East because of the lack of their information about the environmental issues as mentioned before. Also, the governmental regulation does not have a significant impact over the process of greening the supply chain, which supports the opinions that believe that the regulative bodies are not totally effective in the developing regions as the Middle East. Furthermore, officials in such developing regions tend to focus more on the economic development with no sufficient attention to the environmental aspects. Consequently, it has been stated that the organizations in Dubai are not capable of greening their supply chain (Ben Brik et al., 2013).

This is because changing the supply chain from being conventional to adopt and implement the green concept within it is not a single-dimension process; however, the managers of these organizations have to consider the managerial and technical issues that are related to the implementation of the green concept. This indicates that the managerial commitment to the environmental issue is a key factor in implementing the green supply chain management in the Middle East (Ben Brik et al., 2013).

In the Kingdom of Saudi Arabia, which is another example of the countries in the Middle East, it has been stated that the government has saved no efforts to deal positively with the environmental issue; different organizations, such as hotels in Riyadh for example started to focus on the implementation of the green practices. The importance of engaging the governmental and public awareness and participation has been clearly noticed in the Saudi case. Furthermore, it has been stated that 97.2% adoption and implementation of the most basic green practices among the participating hotels in Riyadh. These most basic practices consist of reuse and recycling and saving energy; in spite of this, only one hotel in Riyadh has the green certificate, which means that it is totally adopting the green management of the supply chain. This means that these hotels have readiness to adopt the green strategy;

however, they miss the awareness and information of how to implement the green strategy (Alhelal, 2015).

Since the Middle East is the field of this study, this section discusses recent studies performed in the Middle East. One of the latest research studies on the Middle East is the one carried out by (Younis et al., 2016), exploring the introduction of green supply chain management (GSCM) activities and their impact on corporate performance (CP). The research tests in specific the implications of applying a collection of GSCM activities to the various dimensions of the CP. This research is regarded as the first Middle East study to produce a research model to assess the relationship between four main GSCM activities and four CP dimensions. The four main GSCM activities are eco-design, green procurement, environmental cooperation and reverse logistics, while the four dimensions of CP are organizational efficiency, environmental efficiency, economic performance and social performance, while monitoring three main variables (business size, business age and certification of environmental management systems).

Survey questionnaires were performed, analyzing data gathered from 117 manufacturing companies in the UAE. It was concluded that the GSCM activities have a different impact on the CP dimensions. Although the four GSCM activities had no impact on environmental efficiency, it was found that green procurement and environmental cooperation had a major effect on operational efficiency. It was found that only green procurement plays a role in improving economic efficiency, whereas only reverse logistics activities have been found to have a positive effect on the company's social efficiency (Younis et al., 2016).

Kim and Min (2011) studied the effects to investigate whether certain countries achieve logistics efficiency at the expense of undermining the performance of the environment. The green logistics performance index (GLPI) is developed for the purpose of merging both the environmental performance index (EPI) and the LPI (Logistics Performance Index), a hybrid index. These data are secondary data collected by the World Economic Forum and the World Bank. In order to understand the different degrees of the relationship between the LPI, the EPI, the GLPI and the national income level, simple regression analyzes were performed. It has been found that successful logistics practices have an effect on carbon footprints (for example greenhouse gas emissions).

In order to raise their levels of income, some countries were noticed to have no difficulty in rising environmental detraction. Accordingly, GLPI is seen as a strong measure of the green logistics performance of a country, showing the impact of the country's competitiveness in logistics on its environment. Furthermore, an examination on the impact of green supply chain management (GSCM) on environmental performance (EP) and export performance was conducted for Jordan, which is a developing country. Furthermore, the mediating role of EP in the interaction between GSCM and the performance of exports is analyzed. Data were gathered via a survey from 221 production companies in Jordan. The businesses were selected from various industries to guarantee diversity. Hypotheses were examined, and the findings indicated that both EP and export performance are influenced positively and significantly by GSCM. EP has been shown to affect export performance positively and significantly. In addition, it was also observed that the relation between GSCM and export performance is affected positively and significantly by EP. The study is regarded as one of the first to examine GSCM's impact on export efficiency, especially in a developing country. This research contributes to current literature by shedding light on how EP mediates the GSCM-export performance relationship. GSCM is an under searched area in Jordan. The research findings are supposed to encourage manufacturing companies in Jordan to implement GSCM to obtain economic advantages by raising their exports through developing the EP (Al-Ghwayeen and Abdallah, 2018).

Finally, it could be stated that with the increasing attention that is focused on the green concept of the supply chain management, little attention is directed to the green concept in developing regions as the Middle East. Therefore, this section is concerned with illustrating the current situation of the green concept in countries of the Middle East. Dubai, United Arab Emirates is considered to be a good case to study as it is considered to be a very fast-growing economy and has a great capability to attract multinational investments into the Middle East region.

Chapter Four: Model Development

4.1 TOE Dimensions

It is one of the models developed for technology adoption, which consists of three main dimensions: Technology, Organization and Environment. The following subsections discuss each of these dimensions in details.

4.1.1 Technological Dimensions

YuSheng and Ibrahim (2019) said that technological variables have frequently been considered in the literature on technical innovation. Be that as it may, their impacts on environment management practice adoption are barely broken down. Several technological factors have been discussed on their influences on technical innovation, including relative advantage, compatibility, complexity, trainability, observability, ease of use, perceived usefulness, information intensity and uncertainty, but most research studies focus mainly on relative advantage, compatibility, and complexity in light of the fact that these three factors have reliably been seen as progressively significant in affecting adoption behavior of technological innovation than the other factors (Tornatzky & Klein, 1982).

Relative Advantage: Lin and Ho (2011) said that Relative advantage is how much an innovation is seen to be more worthwhile than its substitute thought. The apparent advantages can be estimated in monetary or social terms, for example performance, satisfaction, reputation and convenience. Organizations are bound to adopt an innovation and technology that can give better performance and higher economic gains than other technologies. Relative advantage is positively identified with the adoption of innovation (Rogers, 2003). Potential organizational advantages of green practices incorporate diminished energy and natural resource consumption, reduced waste and pollutant emission, improved environmental and financial performance, and greater responsiveness to social environmental expectation. Lin and Ho (2011) recommend in a study of the Spanish mash and paper industry that economic and financial points of interest are significant technological attributes that impact the adoption of clean technologies. The net advantages that the green practice offers will fill in as inspirations for organizations to adopt the practices.

Compatibility: As per Lin and Ho (2011), how the latest invention fits in with the organizational information and expertise that a company currently has is a major factor influencing technological innovation. Compatibility is how much an innovation is viewed as steady with the institutions' present qualities and values, experiences and requirements (Rogers, 2003). In order to minimize possible resistance against the introduction of a new technology, an institution would be forced to embrace the new technology, which is increasingly fine for the present operating awareness of the company. Compatibility also refers to implementation of green Practices. When a few green activities complement the modern technologies and procedures of companies, implementing green practices is not a single event but can be defined as a process of accumulation and incorporation of information. Green activities within an institution can be disseminated all the more efficiently as the activities are increasingly perfect for the current technologies and procedures of the company. Fitting between past experiences and current behavior will result in greater current efficiency (Etzion and Awad, 2007).

In an examination of Ontario's chemical industry, it was found that it helps the concept that innovations that are in addition to the current technology, such as abatement equipment, are well on the manner to spreading sooner than technologies that are becoming increasingly difficult to join the manufacturing process. Complexity: Lin and Ho (2011) said that an organization is adept at advancing technical innovation when information is shared effectively inside the organization. Productive information sharing can prompt innovative capabilities in terms of higher order learning and, consequently, improve organizational performance including environmental management effectiveness. Complexity is how complex an invention is to grasp and exploit. It will widen the trouble in information and knowledge transfer and propagation of innovation (Rogers, 2003), which is generally theorized as being negatively linked to acceptance of innovation. Etzion and Awad (2007) believed that a highly multifaceted technology includes much knowledge that is inferred that needs arduous efforts to learn and diffuse. The difficulty of understanding and exchanging tacit technical information and expertise makes the complex technology moderately difficult to implement. Green practices incorporate implicit as well as explicit awareness. The implicit awareness may be inalienable in identifying pollution wellsprings, responding rapidly to unintentional spills, and proposing preventive solutions. This promotes the multifaceted complexity of green practices, making it difficult to understand and disseminate green practices within the company.

4.1.2 Organizational Dimensions

Kimberly and Evanisko (1981), Etzion and Awad (2007) said that a variation of organizational characteristic variables, such as quality of human resources, top management’s leadership skills, organizational support, organizational culture, and organizational size have been discussed on their influences on technical innovation and environmental strategy (González and Guillen, 2008). In general, adequate organizational resources and qualified organizational learning capabilities are two relevant organizational characteristics to advance technical innovation as well as environmental performance and environment management practices adoption (YuSheng and Ibrahim, 2019). Thus, most studies focus mainly on the organizational support, quality of human resources, and company size because they are organizational resource-related variables that have reliably been seen as progressively significant in affecting the technical innovation and environmental management (Lin and Ho, 2011).

Organizational support: the degree to which a company uses a particular product and technology or system to help employees can affect technological innovation. Giving motives and incentives for innovation and ensuring that financial and technical resources are available for innovation has positive impacts on the implementation of technical innovations (Jeyaraj et al., 2006; Lee and Von Tunzelmann, 2005). Organizational support is important for enhancing environmental management on the grounds that the tools required to implement green practices will be available all the more efficiently and the employee will be motivated to conduct green behavior. Many green practices require that the different departments and divisions collaborate during adoption. Green practices are usually welcomed and sponsored from the top management in order to ensure successful implementation. Top management's focus is on procuring resources and skillfully allocating them with the goal that the company can implement green procedures to achieve a competitive advantage for the environment.

Quality of human resources: Lin and Ho (2011) stated that cap technological advances must be implemented by professional members with experienced learning and creative skills. Adopting green practices is somewhat a confused procedure requiring cross-disciplinary coordination and huge changes in the current activity process. It is escalated in HR and relies upon the improvement and preparing of implied abilities through the employees' inclusion. Workers with capable learning abilities will be effortlessly associated with training programs that can propel green practice adoption. Likewise, organizations will have higher innovative capabilities due to employees' improved innovative and learning capacities. How much an organization is open to new thoughts will impact its penchant to adopt new technologies. An organization with higher innovative capacity will be bound to effectively execute an advanced environmental strategy.

Company size: Lin and Ho (2011) examined the effect of company size on technological progress, and environmental practices have generally been investigated in the literature (Del Brìo and Junquera, 2003; Etzion and Awad, 2007; Gonzalez-Benito and Gonzalez-Benito, 2006). In general, large companies can embrace technologies and green initiatives more quickly and easily than small ones as they have ample resources and stable structures. Conversely, small businesses that experience the negative impacts of the shortage of budgetary assets and experts, which present challenges in implementing green activities. In addition, large corporations are frequently mandated to carry out environmental initiatives, as they have a more prominent environmental impact on society and attract greater pressure from stakeholders (Gonzalez-Benito and Gonzalez-Benito, 2006).

4.1.3 Environmental Dimensions

Etzion and Awad (2007) said that the environment is wherein an organization directs its business. There are various environmental variables, such as customer pressure, regulatory pressure, environmental uncertainty, environmental munificence, governmental support, competition, regulatory pressure and network relations. Aragón et al. (2008) considered that variables such as customer pressure, regulatory pressure, government support and environmental uncertainty are consistently regarded as primary environmental factors influencing technical innovation and environmental strategy.

Customer and Regulatory pressure: Lin and Ho (2011) reveal that stakeholders are people or groups that influence an organization's practices and are likewise influenced by the organization's practices. They play a significant role in organizational environment and are broadly engaged with research on environmental issues. Stakeholder pressure is viewed as the most unmistakable factor affecting an organization's environmental strategy. Etzion and Awad (2007) said that, according to the stakeholder theory, organizations do activities to satisfy their primary partners. Among different gatherings of stakeholders, customers and regulators are ostensibly seen as organizations' most significant stakeholders, and there is a positive relationship between firms' environmental activities and customer and regulatory pressure (e.g., Lee, 2008).

Governmental Support: Lin and Ho (2011) said that technical innovation depends somewhat on the availability of external resources. Researches have recommended that governmental support is an applicable and relevant environmental factor affecting technical innovation. Rothenberg and Zyglidopoulos (2007) said that the governments can propel technical innovation through empowering strategies, for example giving budgetary motivating force, technical resources, pilot projects, and training programs. Additionally, the availability of external resources will affect the adoption of green practices. Availability of resources in the business environment expands how much an organization takes part in environmental management. Through offering government endowments or tax incentives for renewable energy projects, lending banks at lower rates for environmentally sustainable technology, and reducing insurance premiums for reducing environmental risks, the government will enhance benevolence (Aragón and Sharma, 2003). In a survey of Korean small and medium-sized businesses, Lee (2008) also suggests that government investment in green initiatives have a positive impact on the ability of the organization to engage in the green supply chain.

Environmental Uncertainty: Lin and Ho (2011) stated that environmental instability was seen as the most significant environmental aspect affecting a firm's decision-making process. This alludes to the frequent and unpredictable changes experienced by the executives in consumer tastes, technical growth and competitive behavior. In general, directors dealing with volatile market conditions would be more cautious and use more creative methodologies than executives in less violent environments. Under a high degree of environmental instability, companies will try to collect and process data over and over again and rapidly to resolve environmental changes, and in turn will compensate for further innovation initiatives and increase the pace/ rate of technological innovation in order to retain a competitive advantage. As adopting green practices can be viewed as a technical innovation process that can improve an organization's environmental performance, green practice adoption is expected to be positively related to the environmental uncertainty. Lin and Ho (2011) said additionally that some analysts likewise recommend that organizations are bound to adopt environmental innovations to create the ability to improve environmental performance in uncertain environments.

Finally, it could be noted that technological factors have been discussed on their influences on technical innovation, including relative advantage, compatibility, complexity, trainability, observability, ease of use, perceived usefulness, information intensity, and uncertainty but most research studies focus mainly on relative advantage, compatibility, and complexity in light of the fact that these three factors have reliably been seen as progressively significant in affecting adoption behavior of technological innovation than the other factors. In general, adequate organizational resources and qualified organizational learning capabilities are two relevant organizational characteristics to advance technical innovation as well as environmental performance and environment management practices adoption.

There are various environmental variables, such as customer pressure, regulatory pressure, environmental uncertainty, environmental munificence, governmental support, competition, regulatory pressure and network relations. Customer pressure, regulatory pressure, government support and environmental uncertainty are consistently regarded as primary environmental factors influencing technical innovation and environmental strategy.

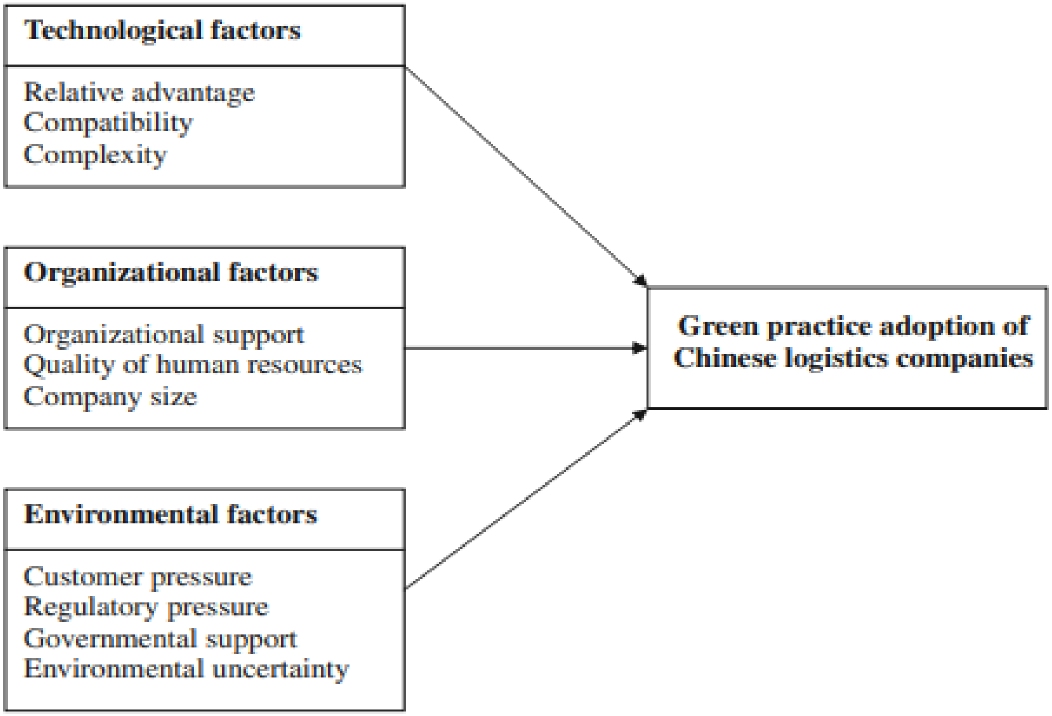

Figure 4- 1: Green Supply Chain Adoption Model

Source: Lin and Ho (2011)

In addition, Table 4-1 shows the TOE dimensions and how they could affect the GSCM process and the hypotheses related to measuring the effect of TOE dimensions on GSCM adoption.

Table 4- 1: TOE Dimensions and GSCM Adoption

Dimension	**GSCM Adoption**	**Previous Studies**	**Hypothesis of Current Research**
Relative Advantage	Technological Adoption	Zhang et al. (2017); Yang et al. (2015); Cao and Mu (2011); Kim and Chai (2017)	Third Hypothesis
Compatibility	Technological Adoption	Zhang et al. (2017); Yang et al. (2015); Cao and Mu (2011); Kim and Chai (2017)	Third Hypothesis
Complexity	Technological Adoption	Zhang et al. (2017); Yang et al. (2015); Cao and Mu (2011); Kim and Chai (2017)	Third Hypothesis
Organizational Support	Organizational	Sandberg and Abrahamsson (2010); Singh (2013); Kumar	Second

Dimension	GSCM Adoption	Previous Studies	Hypothesis of Current Research
	Adoption	et al. (2015)	Hypothesis
Human Resources Quality	Organizational Adoption	Sandberg and Abrahamsson (2010); Singh (2013); Kumar et al. (2015)	Second Hypothesis
Company Size	Organizational Adoption	Sandberg and Abrahamsson (2010); Singh (2013); Kumar et al. (2015)	Second Hypothesis
Customer Pressure	Environmental Adoption	Hwang et al. (2016); Chou et al. (2012); Zhang et al. (2017); Gimenez et al. (2012); Chou et al. (2012); Balasubramanian (2012); Dashore and Sohani (2013)	First Hypothesis
Regulatory Pressure	Environmental Adoption	Hwang et al. (2016); Chou et al. (2012); Zhang et al. (2017); Gimenez et al. (2012); Chou et al. (2012); Balasubramanian (2012); Dashore and Sohani (2013)	First Hypothesis
Governmental Support	Environmental Adoption	Hwang et al. (2016); Chou et al. (2012); Zhang et al. (2017); Gimenez et al. (2012); Chou et al. (2012); Balasubramanian (2012); Dashore and Sohani (2013)	First Hypothesis
Environmental Uncertainty	Environmental Adoption	Hwang et al. (2016); Chou et al. (2012); Zhang et al. (2017); Gimenez et al. (2012); Chou et al. (2012); Balasubramanian (2012); Dashore and Sohani (2013)	First Hypothesis

4.2 Theoretical Framework

This section presents technology acceptance model (TAM), theory of acceptance and use of technology (UTAUT) and innovation diffusion theory (IDT).

4.2.1 Technology Acceptance Model (TAM)

The theory of Technology Acceptance Model (TAM) was created by Davis 1989 (Venkatesh and Davis, 2000). Rauschnabel and Ro (2016) said that the technology acceptance model (TAM) is generally referred to and expanded structure with its underlying foundations in data frameworks to clarify the intensions and behaviors of potential users concerning the acknowledgment of specific technologies. The model is one of the most persuasive augmentations of the theory of reasoned action (TRA). Ali et al. (2018) said that it utilizes two developments of "perceived usefulness" and 'perceived-ease-of-use'. The first can be characterized as how much an individual thinks utilizing a specific framework would improve his/her job performance. The latter one is "perceived ease of use" (PEOU), which is how much an individual accepts that utilizing a specific framework would be liberated from exertion and effort.

Rauschnabel and Ro (2016) said also that TAM theorizes that technology is perceived as being more useful when consumers perceive the technology as easy to use. Finally, the goal to utilize an item is conjectured to anticipate the real utilization of a framework. Due to the power and the adaptability of TAM, numerous studies have expanded and effectively applied the model in a few contexts. Rauschnabel and Ro (2016) said that one of the criticisms of TAM's noticeable quality in the literature is its annihilation of other literature and hypothesis, theories streams. TAM has been criticized as being abused by researchers to the detriment of other possibly supportive models and factors that could be consolidated into technology acceptance framework. Adopting a more extensive all-encompassing strategy, (Venkatesh et al., 2007) coordinated discoveries from different theories and models (e.g., TRA, theory of planned behaviour, TAM, innovation diffusion theory, social cognitive theory, and others) in their unified theory of acceptance and use of technology (UTAUT).

As indicated by Rauschnabel and Ro (2016), similar to TAM, UTAUT covers the usefulness of a technology (here referred to as 'performance expectancy') and the ease of use (here referred to as 'effort expectancy'). UTAUT additionally incorporates social influence (e.g., norms, image) and facilitating conditions. "Facilitating conditions are characterized as how much an individual accepts that a hierarchical and technical infrastructure exists to help utilization of the system" (Venkatesh et al., 2003). According to UTAUT, facilitating conditions ought to be legitimately directly related to the actual behaviour of adopters and not to behavioural intentions. TAM3 (Venkatesh and Bala, 2008) proposes an extra expansion of TAM1, TAM2, and UTAUT. The complex model comprises of 17 constructs, including different mediating and moderating relationships. Briefly, TAM3 incorporates individual differences, system characteristics, social influences, and facilitating conditions as antecedents of the exogenous variables of the original TAM model.

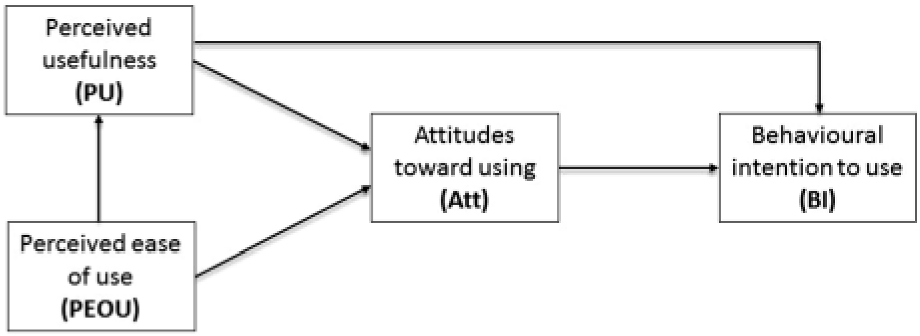

Figure 4- 2: Technology Acceptance Model

Source: Ma et al. (2017)

4.2.2 Theory of Acceptance and Use of Technology (UTAUT)

Ali et al (2018) explained the behavioural attitudes of consumers towards an information system or technology and its consequent actions in terms of use. Dwivedi et al. (2019)'s model aims to explain how the use of technology is affected by individual differences by introducing moderated variables, so UTAUT suggested four moderators (i.e. gender, age, experience and voluntariness) to further improve the model's predictive ability. UTAUT has been commonly used since its origin in clarifying individuals' implementation of technologies. Although it has been evaluated in various ways and contexts, it suggests that UTAUT used has delineated (explicitly or implicitly) those constraints — this advises that there might be an opportunity to systematically rethink UTAUT's proposed relationships. The mediators proposed in the first UTAUT model could be re-examined, to begin with. Often earlier studies did not apply the full UTAUT model, as found in (Venkatesh et al., 2003).

A comparative perception was made by (Venkatesh et al., 2012), who noticed that most studies utilized just a subset of the model and that mediators were commonly dropped. Among the studies that included moderators, few studies (e.g., Bandyopadhyay and Barnes, 2012; Bhattarai et al. 2010; Venkatesh et al. 2011) displayed indistinguishable four moderators proposed by the first original UTAUT model. A potential cause behind why earlier studies might not have used moderators is on the grounds that there may not be any variety in the moderators for the adoption and use context. For example, the adoption and utilization of a particular IS/IT (Information system/ Information Technology) might have been commanded by the organization with the end goal that all people should adopt the technology—these outcomes in a circumstance wherein voluntariness as a moderator may not be promptly relevant. Second, the relationships proposed in the first original UTAUT model might be rethought for completeness. In figuring the UTAUT model, Venkatesh et al. (2003) contended that one would expect facilitating conditions to predict behavioural intention only if effort expectancy was excluded from the model.

It was a takeoff from earlier technology adoption research that specifically showed the relationship between conditions facilitation and behavioral intent. Earlier research (Yeow and Loo, 2009; Duyck et al. 2010; Foon and Fah, 2011) indicated that the intensification of behavioral effect conditions should be promoted even in view of the planned effort. Finally, the first original UTAUT model should be reconsidered from the viewpoint of certain frameworks that could clarify the implementation and use of individual behaviour. As Dwivedi et al. (2019) said, the four exogenous constructs in the UTAUT model should in any case be treated as technical attributes (i.e. performance expectations and effort expectations) and contextual factors (i.e. enabling conditions and social influence) while they could be perceived as beliefs held by people with regard to technology and background. Given the evidence that these four structures describe a large proportion of variation in behaviors of adoption and use, a crucial factor lacking from the UTAUT model is human behavioral participation —i.e., individual characteristics that define the user's disposition can influence the understanding of their behaviors. Prior literature highlights many human characteristics including attitude, self-efficacy of the machine and personal creativity (e.g., Carter and Schaupp 2008; Chong 2013; Venkatesh et al. 2011).

Ali et al. (2018) uncover different constructs of the new model alongside their definitions as below:

1. Performance Expectancy (PE) is considered to be a level of the person's desire from a cloud-based e-government service. This includes less exertion for terms of time and cash while utilizing a specific e-government service. This likewise incorporates successful communication with the government agencies as a result of its accessibility whenever anyplace.
2. Effort Expectancy (EE) is considered to be as easy as the users are required, when using e-government services offered by the government. Effort Expectancy has nothing to do with cash, but the ease of use and learning of e-government services.
3. Social Influence (SI) is associated with the person in his or her circle who gets influenced by others and has positive or contrary impact on using cloud-based services. In many viewpoints, social influence is an important factor for young people and is seen as an effective construct.
4. Facilitating Conditions (FC), it demonstrates that the government and individuals have all the resources and use e-government services based on the cloud. This is a significant aspect that directly influences actions regarding the use of technology. Conditions for facilitation are determined by the assumption that individuals have the option of needing money, as well as knowledge and essential support for the use of e-government services.

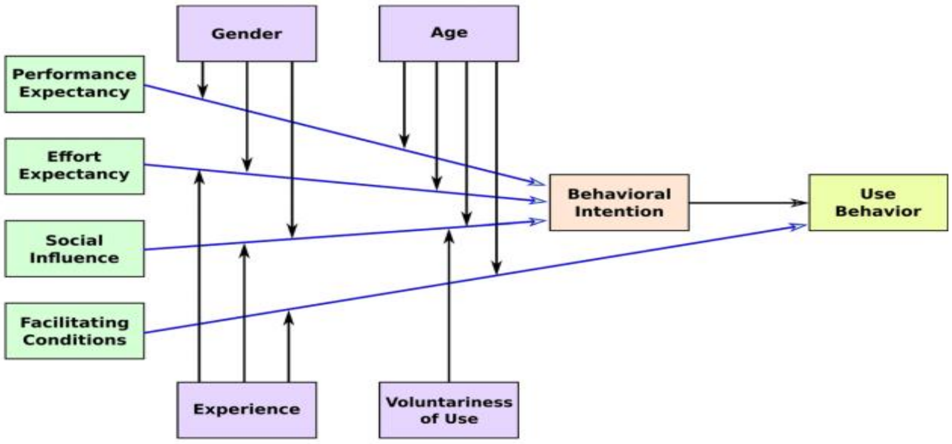

Figure 4- 3: New Model

Source: Ali et al. (2018)

4.2.3 Innovation Diffusion Theory (IDT)

Lou and Li (2017) stated that the most notable hypothesis about technical innovation is IDT. Research on IDT has been broadly applied in different fields, for example science, human science, communication, agriculture, marketing and innovation, and so forth. An innovation is "a thought, practice, or item that is seen as new by an individual or another unit of adoption" and, diffusion is "the procedure by which an innovation is conveyed through specific channels over time among the individuals of a social system". In this way, the IDT theory contends that "potential users make decisions to receive or dismiss an innovation dependent on beliefs that they form about the innovation. As indicated by Chen et al. (2017) IDT theory attempts to clarify innovation decision procedure, deciding elements of rate of adoption, and various categories of adopters. It helps in foreseeing the probability and rate of adoption of an innovation. IDT was first proposed by Rogers (1962); Rogers divided the innovation decision into five phases: knowledge, persuasion, decision, implementation and confirmation.

1. The Knowledge Stage: it is the initial step of an innovation-decision procedure. The individual comes to know about the being of an innovation. The presence of an innovation gets known to an individual through communication channels. The individual begins to ask questions like “What”, “How and “Why” about the innovation. During this stage, the individual endeavors to decide "what the innovation is and how and why it functions" (Rogers, 2003). The inquiries presented by an individual cause three kinds of knowledge formation:

● Awareness-knowledge: refers to the knowledge of the innovation's presence.

● How-to-knowledge, the other sort of knowledge, contains data about how to utilize an innovation accurately.

● Principles-knowledge: is the last knowledge type. This knowledge incorporates the functioning principles portraying how and why an innovation works (Muflih et al., 2021).

2. The Persuasion Stage: persuasion happens when an individual frames a great or negative demeanor toward the innovation. Anyway, Rogers contends that the positive or negative disposition formation about the innovation may not be straightforwardly engaged with the decision of adoption or rejection of an

innovation. An individual just structures a frame of mind about a thing or thought just when he sees its reality. Along these lines, The Persuasion Stage accurately follows the knowledge stage. Notwithstanding that persuasion stage is increasingly dormant and yet progressively emotional like inclination focused, while knowledge stage is psychological and known. It is in this stage that the uncertainty spinning the utilization of an innovation may increment or abate. A wrong word of mouth or wrong publicity may expand the degrees of uncertainty while a positive feedback from dear companions or friends or relatives will significantly diminish the degrees of uncertainty. Wani and Ali (2015) said there are more reasons that people typically trust information from close circle companions and relatives about an innovation and channel the information originating from outside this circle.

3. The Decision Stage: Wani and Ali (2015), decision happens when an individual (or other basic leadership unit) takes part in practices that lead to a decision to adopt or dismiss the innovation. However, adoption alludes to "full utilization of an innovation as the best course of action accessible, “not to adopt an innovation” (Rogers, 2003). Rogers (1983) says that in the decision stage the individual chooses to adopt or dismiss the innovation. The adoption or dismissal may not be lasting and the individual may later change his/her choice, so Rogers proposed four results of this stage:

• Continued Adoption: an individual finds an innovation great and adopts it for all time.

• Later Adoption: an individual sees the innovation good and intends to adopt it in not-so-distant future. The slack of time might be a result of monetary or other social issues.

• Discontinuance: an individual adopts an innovation but dismisses it a short time later.

• Continued Rejection: an individual rejects the innovation from its beginning and keeps on doing so.

4. The Implementation Stage: Wani and Ali (2015), in this stage the innovation is applied in everyday use or one can say the innovation is put to rehearse. Until the

implementation stage, the innovation decision procedure has been a carefully mental exercise. In any case, implementation includes obvious behaviour change, as the new thought is really put into practice (Rogers, 1983). Implementation stage can end up being a troublesome task for a user. The originality of an innovation and uncertainties winning can hamper the further adoption procedure of an innovation by the person. It is a result of these conditions that the information flow continues uprooting from users to others. Uncertainty about the results of the innovation despite everything can be an obstacle at this stage. Therefore, the implementer may require technical help from change operators and others to diminish the level of uncertainty about the results. In addition, the innovation-decision procedure will end, since "the innovation loses its unmistakable quality as separate identity of the new thought vanishes" (Rogers, 2003).

5. Confirmation Stage: human behavior change is roused to some extent by a condition of inner disequilibrium or discord, an awkward perspective that the individual tries to diminish or take out (Rogers, 1983). As indicated by Rogers, significantly after an adoption decision is made about an innovation, it is human behaviour to look for data about the innovation to feel persuaded or to shred off the innovation. Rogers (2003) contends that even after the decision of adoption is made, it can be switched if the individual is “exposed to conflicting messages about the innovation. Be that as it may, the individual will in general avoid these messages and look for supportive messages that affirm his/her decision (Sahin, 2006). It is in this stage the attitude of an individual towards the innovation shaped in persuasion stage plays an important role whether the individual will constantly adopt or discontinue the adoption. The discontinuance that may occur in this stage can be of two types:

• Replacement Discontinuance: an individual may stop the utilization and adopt a superior choice or innovation available.

• Disenchantment Discontinuance: an individual rejects the innovation since he/she feels unsatisfied about the innovation. The explanation of no satisfaction might be that the innovation does not meet the necessities of the user (Wani and Ali, 2015).

Wani and Ali (2015), Attributes of an Innovation: Attributes of an Innovation: IDT includes five significant innovation characteristics: (1) relative advantage, (2) compatibility, (3) complexity, (4) Trainability, and (5) observability. As per Lou and Li (2017), Relative Advantage is characterized as the degree to which an innovation is considered as being superior to anything the thought it supplanted. This construct is seen as perhaps the best indicator of the predictors of the adoption of an innovation. Compatibility alludes to the degree to which innovation is viewed as being steady with the potential end-users' existing values, prior experiences and necessities. Complexity is the end-user's apparent degree of trouble in getting innovation and their usability. Trainability alludes to the degree to which innovations can be tested on a restricted premise. Observability is the degree to which the after effects of innovations can be noticeable by others. These characteristics are utilized to clarify end-user adoption of new technologies and the decision-making process (Lee et al., 2011).

Wani and Ali (2015) consider that stages of adopting an innovation sets aside some effort and time to spread in a social system; it does not occur out of nowhere. Regardless of whether an individual really adopts or nullifies a specific innovation is a choice landed after a series of reasoning and thought making. Roger and Shoemaker (1971) and Rogers and Beal (1957) had proposed five phases; however, where an innovation goes before an individual brings it into utilization:

- The awareness stage: at this stage an individual finds a good pace being of an innovation.
- The interest stage: at this stage the individual begins to gather explicit information and data about the innovation.
- The evaluation stage: at this stage the individual finds out or fixes the value or worth of an innovation and concludes whether to attempt it or not.
- The trial stage: at this stage an individual brings the innovation into exploratory use or applies it on a smaller scale.
- The adoption stage: at this stage the innovation is taken into nonstop full-scale use and is given an ideal endorsement by all the society individuals.

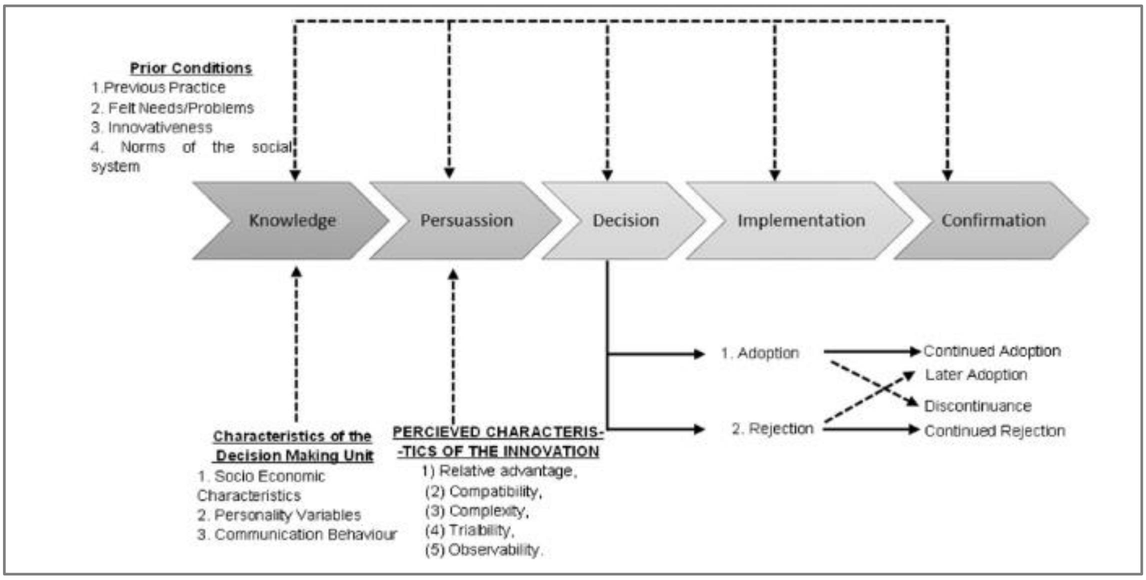

Figure 4- 4: Adoption Stages
Source: Wani and Ali (2015)

Perceived Attributes of Innovation
Relative Advantage
Compatibility
Complexity
Trainability
Observability

Types of Innovation Decision
Optional
Collective
Authoritative

Figure 4- 5: Innovation Theory Framework
Source: Wani and Ali (2015)

Table 4- 2: Models of Technology Acceptance

Model	Dependent variables (DV)	Role of attitude	Additional independent variables affecting DV	Knowledge Gap
Technology Acceptance Model (TAM)	Behaviour	NONE	Perceived usefulness Perceived ease of use	• perceived usefulness • perceived ease of use
Theory of Acceptance and Use of Technology (UTAUT)	Behavioural intention, Behaviour	NONE	Performance expectancy Effort expectancy	• performance expectancy • effort expectancy • social influence • social influence

Model	Dependent variables (DV)	Role of attitude	Additional independent variables affecting DV	Knowledge Gap
			Social influence Facilitating conditions	
Innovation Diffusion Theory (IDT)	Adoption	NONE	Relative advantage Compatibility Complexity Trainability Observability	• Knowledge • Persuasion • Decision • Implementation • Confirmation

Source: Wani and Ali (2015)

4.3 Conceptual Frameworks for Adoption of Green Supply Chain Management Process in the Industrial Sector

To be able to develop the research gap and the current research framework, the frameworks presented in previous studies are reviewed in this section. Figure 4-6 shows the framework of Mathiyazhagan et al. (2013), which presented the structural model, which is generated and illustrated. The relationship between the barriers j and i is viewed by an arrow pointing from i to j. The resultant graph is called a digraph. By removing the transmittivities, the digraph is lastly converted into the ISM (Interpretive Structure Modeling) model.

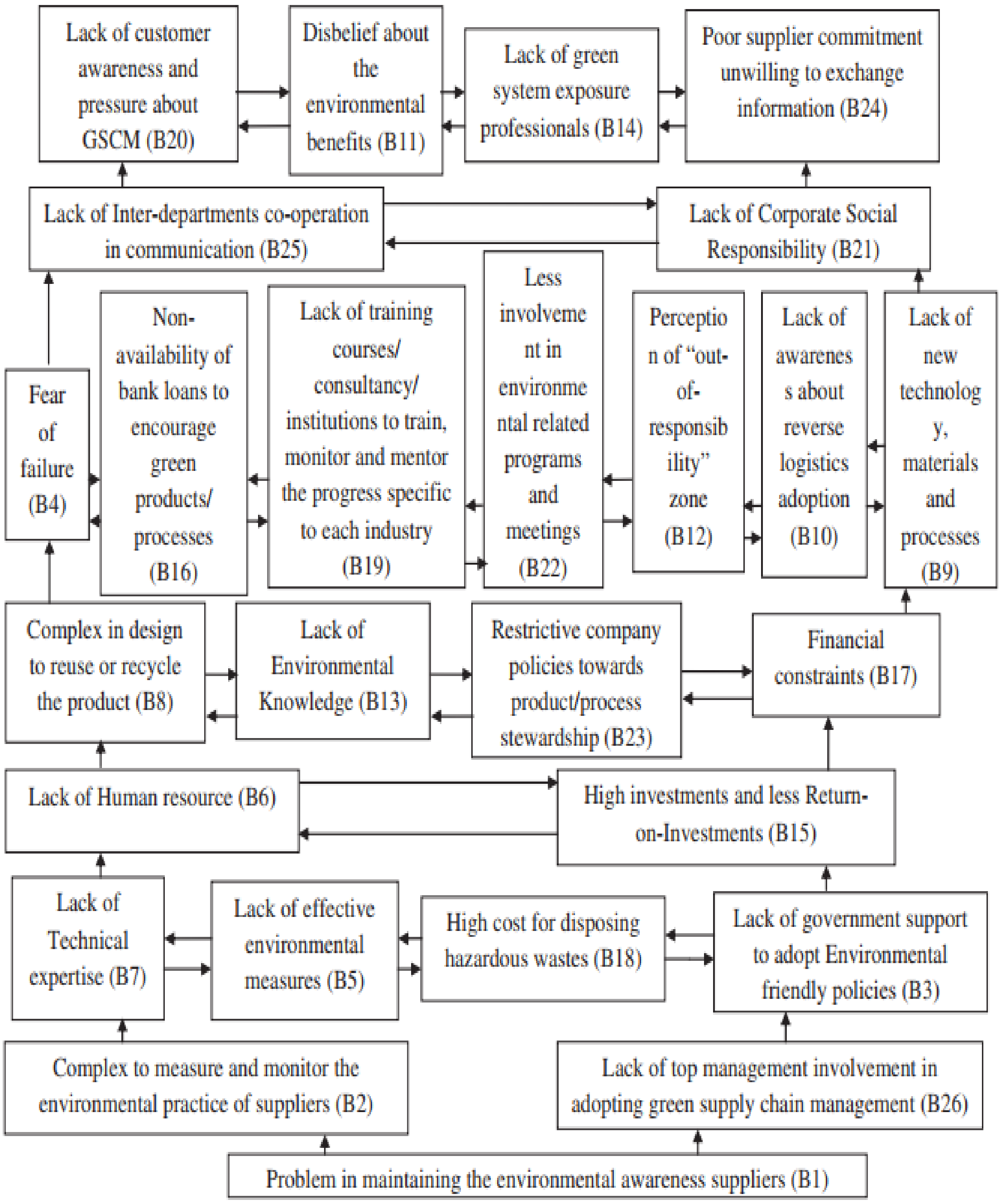

Figure 4- 6: First Theoretical Framework

Source: Mathiyazhagan et al. (2013)

Another framework was developed in the study of Dubey et al. (2015), in which the reachability set entails the element itself and the other elements that it may assist to attain, and the antecedent set includes the element itself and the other elements that may facilitate reaching it. Moreover, the intersection of these sets was deduced for all the variables. The top level in the ISM hierarchy is occupied by the variables for which the reachability and the intersection sets are similar. The top-level participant in the hierarchy does not assist in achieving any other aspect above its own rank. On identification of the top-level element, it is segregated from the other elements. Then, elements are identified in the next level by repeating the same process. This process is continued until the level of each element is found as shown in Figure 4-7. These levels help in building the diagraph and the final model as shown in Figure 4-7 (Dubey et al., 2015).

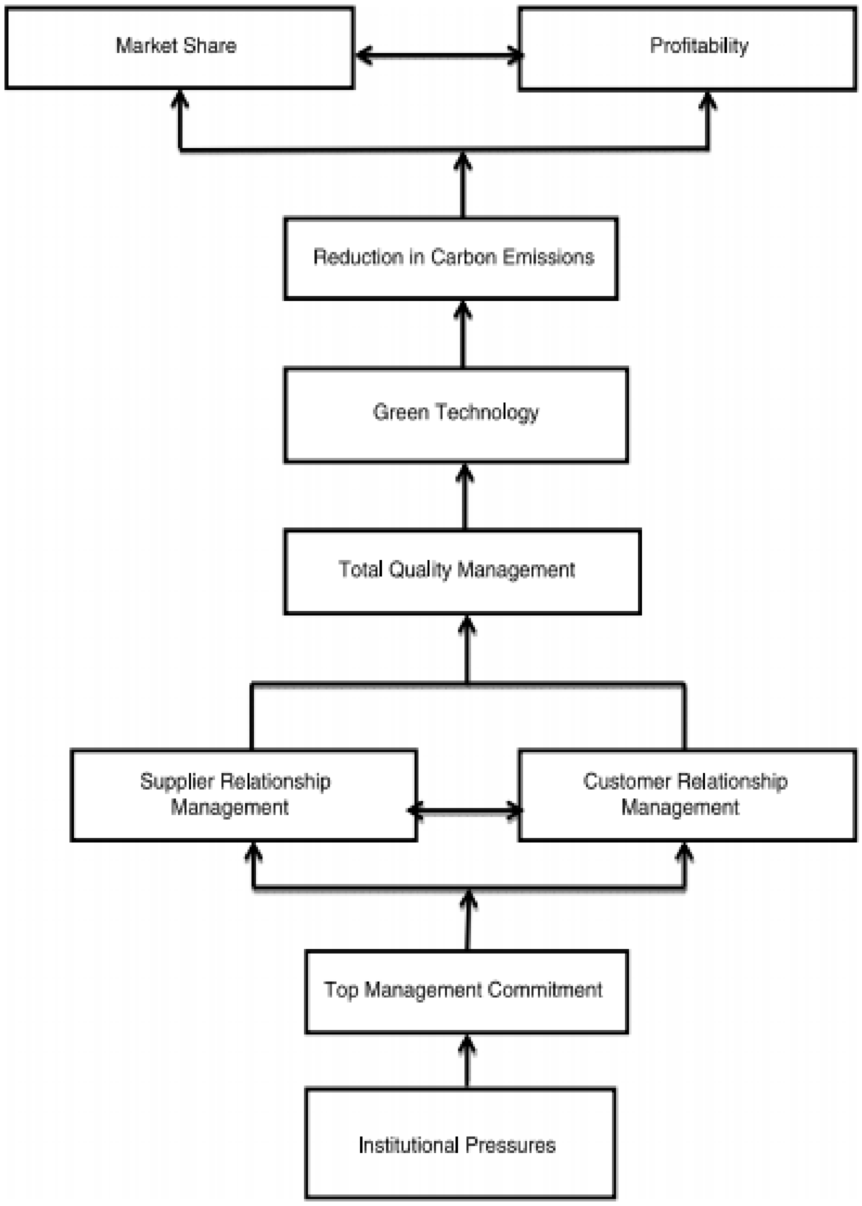

Figure 4- 7: Second Theoretical Framework

Source: Dubey et al. (2015)

After that, the study of Centobelli et al. (2017) to develop another approach for green supply chain adoption in order to identify a taxonomy, including the aims (what), practices (how) and technological tools (how); we propose using the framework shown in Figure 2-10. This framework has been drawn to include both the typology of green initiative (single firm initiatives, supply chain initiatives) and the phase of the service (transport, warehousing, logistics service, management). It is structured according to three levels. The green aims are at the top level. They are supported by green practices (second level) that in turn are supported by technological tools (third level). Both green practices and technological tools are divided into single firm practices (tools) and supply chain practices (tools). Single firm practices (tools) concern practices (tools) used for the specific phases of the service (logistics, warehousing, transport, management). Supply chain practices are divided into sharing practices (tools) and collaboration practices (tools).

At the bottom level, green practices are supported by a set of single-firm technological tools and supply chain technological tools. Single firm technological tools include (as blocks) logistics service technological tools, warehousing technological tools, transport technological tools, and management technological tools, whereas supply chain technological tools are management tools used to share the green practices (e.g. content management systems, environmental apps, syndication systems) or to collaborate with other supply chain partners (e.g. cloud computing, collaborative systems, customer relationship management systems) (Centobelli et al., 2017).

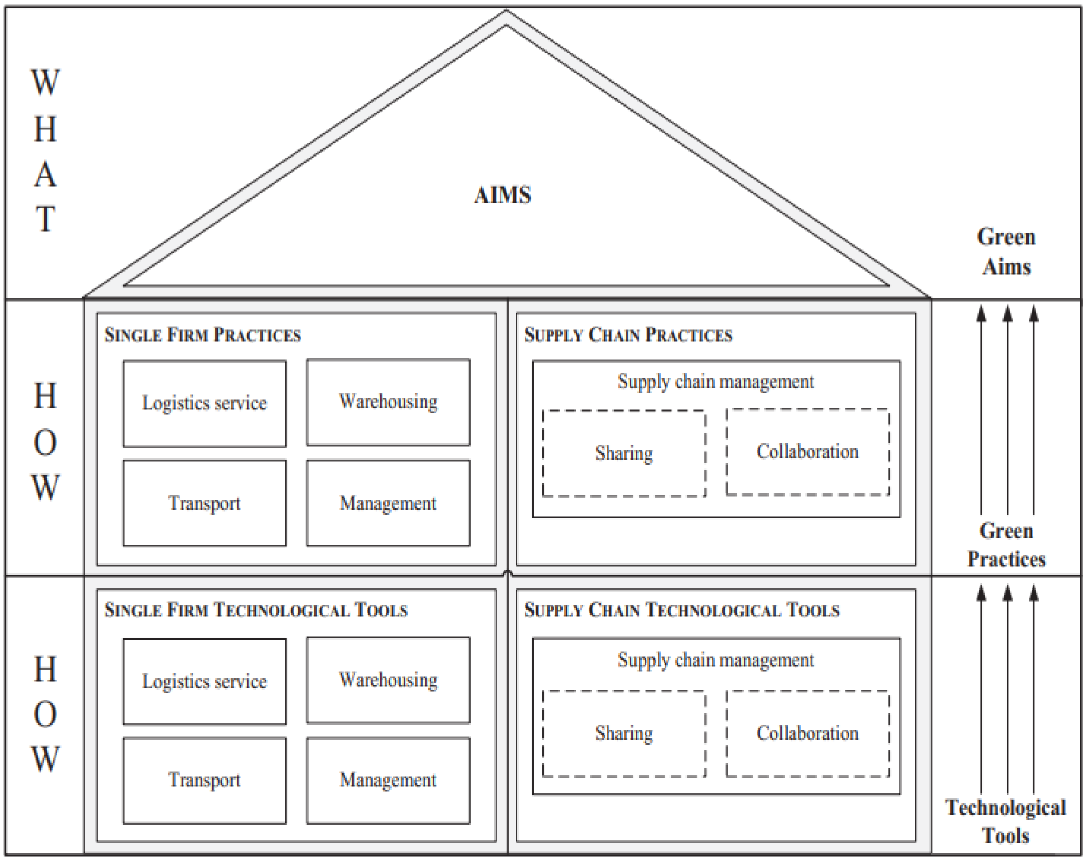

Figure 4- 8: Third Theoretical Framework

Source: Centobelli et al. (2017)

A framework with a two-step approach for the identification of SSCPs (sustainable supply chain processes) and the evaluation of sustainable industries, as given in Figure 4-9, is proposed through this study. In the first step, various SSCPs were identified from the literature using the lenses of stakeholder theory and RBV (Resource-based view). According to the recognized SSCPs, a questionnaire was created in order to conduct a survey for stakeholders to be able to identify the influence of various SSCPs on the 3BL (Triple Bottom Line) performance of supply chains in diverse Indian manufacturing industries. Using this step, the relative impact of various SSCPs in improving the 3BL performance across Indian industries has been identified and ranked. In the following step, a group of decision makers from the stakeholders ranked the selected main Indian industries according to the identified SSCPs practices by using an integrated approach of GDM (Group Decision Making) and Fuzzy-MCDM tools to attain the relative performance of these industries. This will help identify the best performing industry (between the compared) from the SSCP perspective taken into consideration in the study (Padhi et al., 2018)

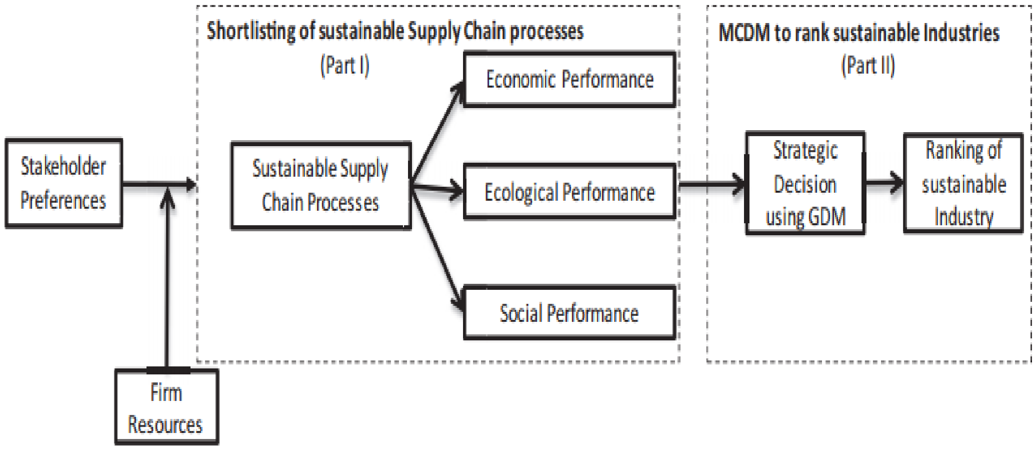

Figure 4- 9: Fourth Theoretical Framework

Source: Padhi et al. (2018)

The hypothesized model linking the relationship between GSCM practices, environmental collaboration and sustainability performance is depicted in Figure 4-10. The GSCM practices are conceptualized to include green procurement, green manufacturing, green distribution and green logistics. The sustainability performance is investigated from the economic, environmental and social perspectives. The model is grounded predominantly within the relational view to clarify idiosyncratic inter-organizational linkages. (Dyer and Singh, 1998) first articulated the relational view theory proposing that established long-term collaborative relationship that are differentiated by strong inter-organizational interactions could make it easier for firms to pursue GSCM practices. In the usual course of events, the relational view offers insight about how a firm makes value-creating linkages with other firms to realize high profit returns. Indisputably, the collaborative supply chain relationships are always dependent on trust, loyalty, a positive sum game, in addition to fairness in negotiations, goal and intent revelation, and commitment (Chin et al., 2015)

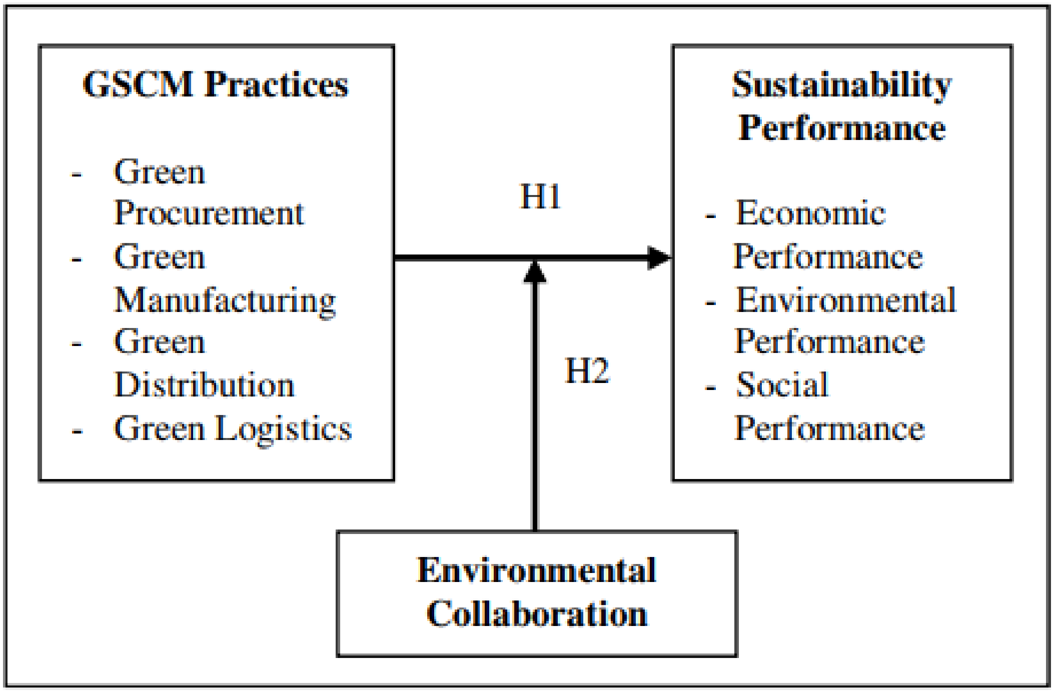

Figure 4- 10: Fifth Theoretical Framework

Source: Chin et al. (2015)

An integrated framework of sustainable supply chain is presented based on the discussion in the previous sub sections. In case the actions of the suppliers of focal firms are questioned on the basis of practices followed, the business and reputation of focal firms are intensely affected. Thus, these firms are more concerned with developing a sustainable supply chain and maintaining relationships with suppliers who follow sustainability practices. This attitude of focal firms has forced supply chain partners to adopt sustainability practices.

A conceptual model for developing a sustainable supply chain is shown in Figure 2-13. The process of sustainability practices adoption across the supply chain or by supply chain partners begins with developing top management commitment towards sustainability (Smith, 2007; Rao and Holt, 2005). This commitment can be developed by creating external pressure from appropriate agencies and awareness of sustainability and its expected benefits (Walker et al, 2008). The expectation of support from various agencies for sustainability adoption helps develop commitment. For example, tax rebate from the government for increasing sustainability performance and expected support from supply chain partners. But, a committed top management is commonly faced with some obstacles when integrating sustainability practices, like re-engineering supply chain processes, cost of adoption, in addition to lack of infrastructure, technological requirements and human capabilities among many others. A buyer firm in a supply chain should first select a supplier based on sustainability standards.

This is equivalent to rewarding the efforts of suppliers for increasing sustainability performance. An evaluation should be conducted to selected suppliers according to their capability and capacity during the relationship selection process. It is stated in relationship marketing literature that relationship development and the attainment of the level of joint development is not all the time successful and economical (Hadjikhani and LaPlaca, 2013; Hutchins and Sutherland, 2008). The process of selecting a partner should be based on the expected outcomes of the relationship and the level of investment needed. Relationship selection should also include other criteria, such as cost, benefits, opportunity and the risk of relationship with each supplier. The performance of the relationship should be evaluated in terms of sustainability (Ashby et al., 2012). The relationship selection process helps companies concentrate on each supplier and their specific needs. Suppliers that demonstrate high performance on sustainability standards should be rewarded with additional order allocations. Poor sustainability performance of a supplier can lead to modification or termination of the buyer-supplier relationship. A number of researchers have also reported that environmental and social sustainability contributes to economic sustainability in the long run. An improved performance of the supply chain will increase the benefits of sustainability adoption. This will reinforce the commitment of buyers and sellers to adopt sustainability. Since sustainability adoption is a continuous and on-going process, it needs continuous support from the supply chain partners.

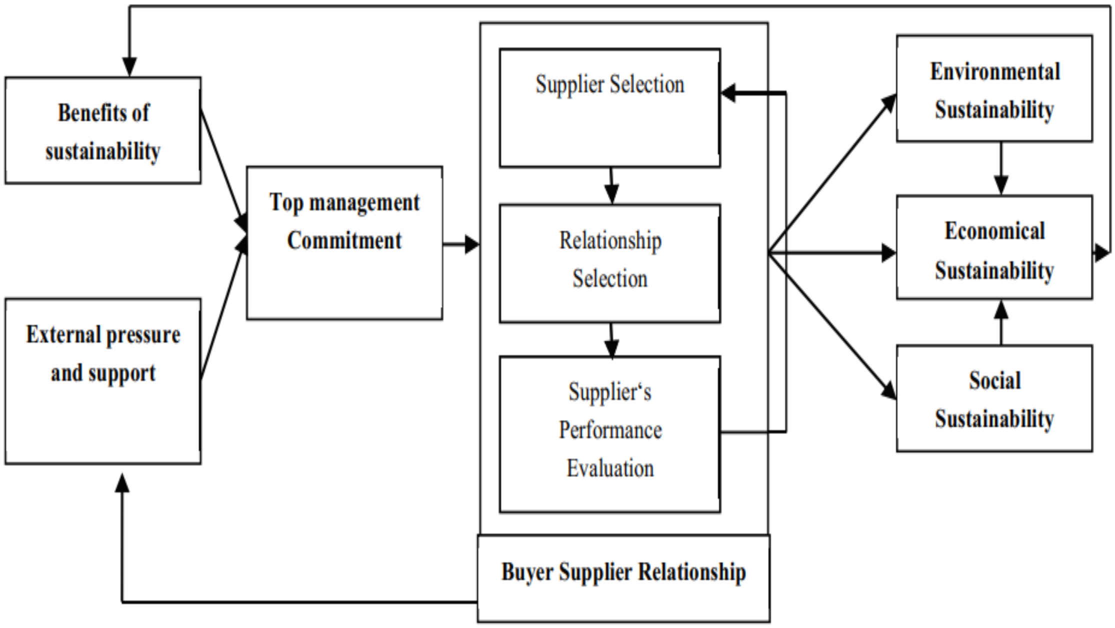

Figure 4- 11: Seventh Theoretical Framework

Source: Ashby et al. (2012)

The theoretical framework developed by Jabbour et al. (2017) illustrates the conceptual framework of the research. Based on an analytical cut-off of the perspective of a focal company concerning the adoption of external GSCM (GP and CC) practices and their impact on EP, such companies are analysed in an EM context, illustrated by NPSW (the National Policy on Solid Waste); and the relationships and environmental impacts have been analysed from an RDT (Resource Dependence Theory) point of view. Consequently, EM and RDT theories are useful in this research due to the fact that they support the comprehension of circumstances in which customers' roles could flourish in collaborating with companies for better EP (Jabbour et al., 2017)

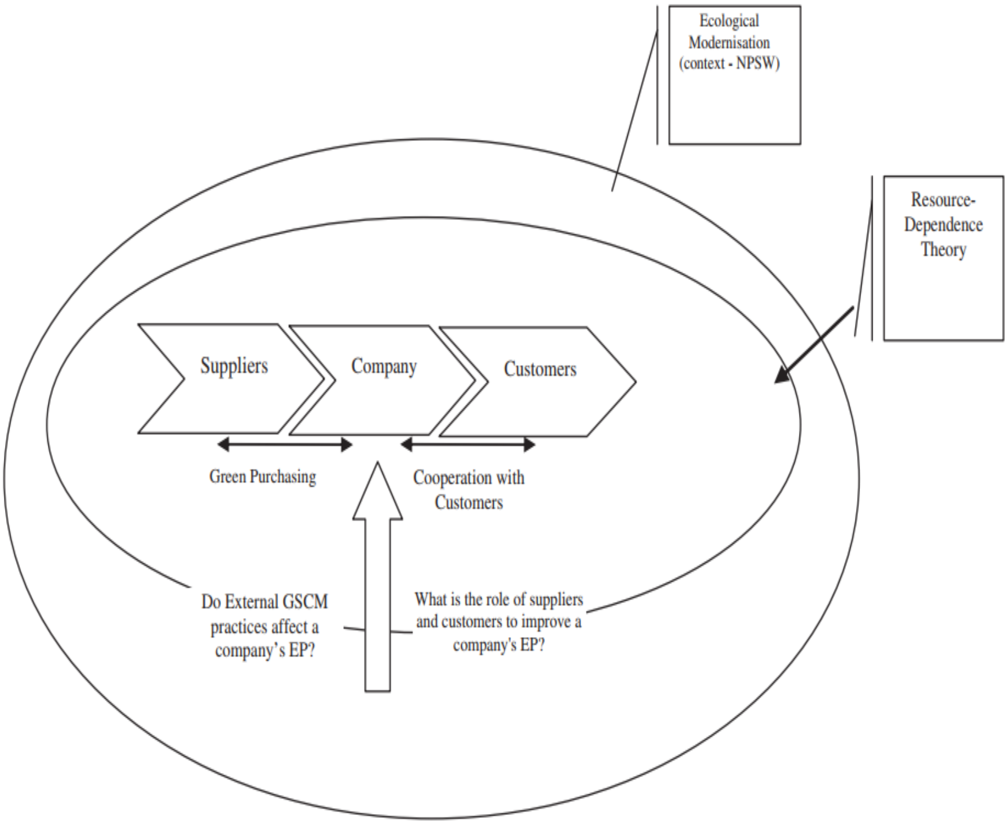

Figure 4- 12: Sixth Theoretical Framework

Source: Jabbour et al. (2017)

The structure of the analytic network as depicted in Fig. 2.15 is proposed to express the internal and external relationships. In the structure of the ANP (analytic network process) network, there are four clusters: Cost, Pollution control, Resource consumption and Quality. Each Cluster has a definition. First, Cost Cluster (CC). In supply chain and GSM as well, minimizing cost is a significant topic. Cost cluster is defined as all expenses occurring during the product manufacture. The three factors that are specifically considered in cost cluster are production costs, costs of component disposal, in addition to costs of chemical waste treatment. Second, Pollution Control Cluster (PC). Providing products and services and applying the GDC require undertaking pollution control. Minimizing the costs that result from the control of air emissions, wastewater and solid waste that include hazardous substance management (HSM) are targeted in the proposed model. Considering the quality cluster (QC), GSC is similar to other supply chains considering the need to satisfy customer demands for reaching the highest possible levels of quality of products and services while maintaining operating in an environmentally friendly way. That is the reason for the inclusion of both production quality and service level in factors of quality cluster. Finally, Resource Consumption Cluster (RC). For products and services to be produced and transported, many resources would be consumed. For the sake of improving environmental performance, resource consumption needs to be minimized. In addition to energy consumption, non-renewable energy is taken into consideration in this model in the resource consumption cluster.

There are at least two advantages to the construction of the ANP network. First, the four clusters: it takes account of both the economic criteria and the business criteria. Therefore, this structure can effectively avoid the possible biases that arise from concentrating on business performance and neglecting the economic performance or vice versa. The projected method is not supposed to be prescriptive with regarding the evaluation criteria within it. On the contrary, it is flexible so that it can be adjusted for different requirements for each decision-making environment for any given company. The criteria for evaluation could be changed to go well with other specific applications in various decision-making situations, in that way freedom of decision-makers and the choices involved are extended (Wu and Barnes, 2016).

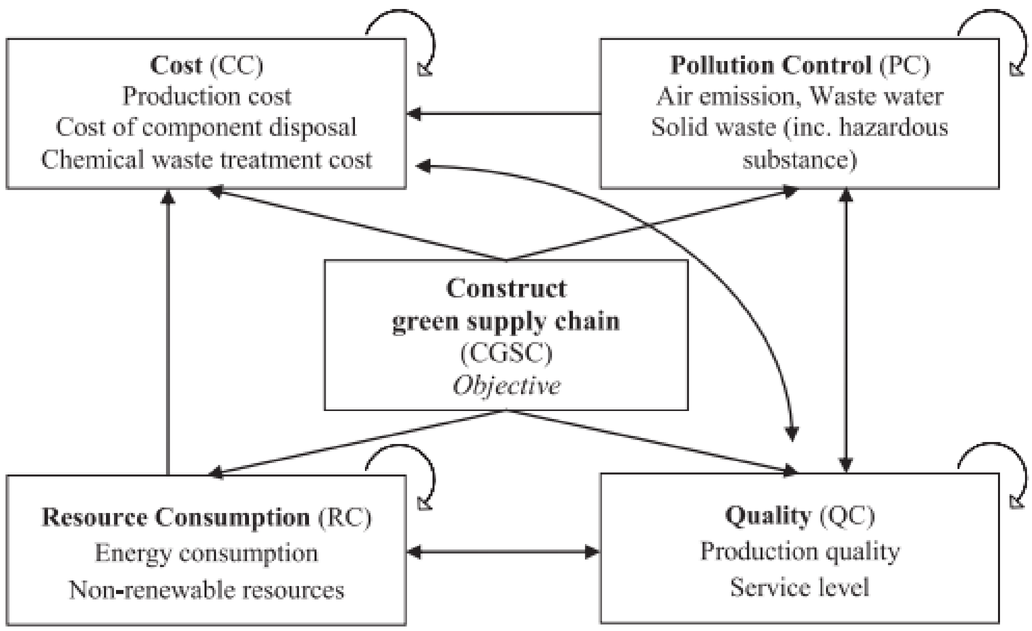

Figure 4- 13: Eighth Theoretical Framework

Source: Wu and Barnes (2016)

Innovation consists of any practice that is new to organizations, including equipment, products, services, processes, policies and projects. Distinguishing types of innovation is necessary for understanding organizations' adoption behaviour and identifying the determinants of innovation in them. Among numerous typologies of innovation advanced in the relevant literature, the concept of administrative and technical innovation is commonly used. Figure 4-14 illustrates the research framework of the study. The technological factors include the relative advantage, compatibility and complexity of green practices; the organizational factors include organizational support, quality of human resources and company size; environmental factors include customer pressure, regulatory pressure, governmental support and environmental support. (Lin and Ho, 2011).

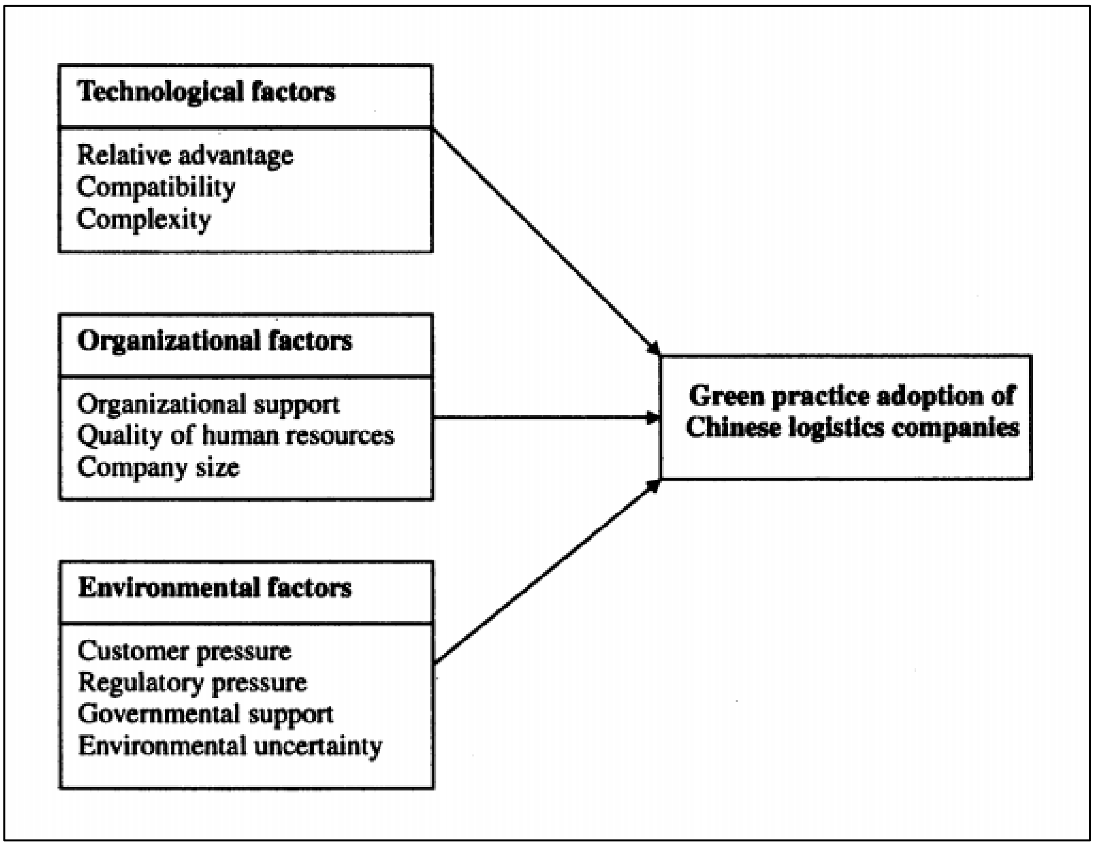

Figure 4- 14: Ninth Theoretical Framework

Source: Lin and Ho (2011)

According to the study of (Cai et al., 2008), the institutional approach of organizations has led to significant insights regarding the importance of institutional environments to organizational structure and actions. Institutional theory posits that organizational environments are characterized by the elaboration of rules and requirements to which individual organizations must conform to if they are to receive support and legitimacy. In particular, institutional theory emphasizes the social context within which firms operate, although firms have discretion to operate within institutional constraints; failure to conform to critical, institutionalized norms of acceptability can threaten the firms' legitimacy, resources and survival. Institutions can include the government, professional associations, and public opinion, etc. Three types of pressures were differentiated: coercive, mimetic, and normative, which influence the rate at which sustainable development practices diffuse among firms.

The institutional theory is relevant to adoption of the GSC strategy among firms for at least two reasons. First, the GSC strategy could be influenced by the need for legitimacy, for social and economic fitness in a wider social structure. Second, elements of GSC practice are becoming institutionalized through regulations and international agreements. As the issues of safety and environmental pollution arise, and as relevant professions and programs become institutionalized in laws, union ideologies and public opinion, organizations incorporate these programs and professions.The research model is presented in Figure 4-15.

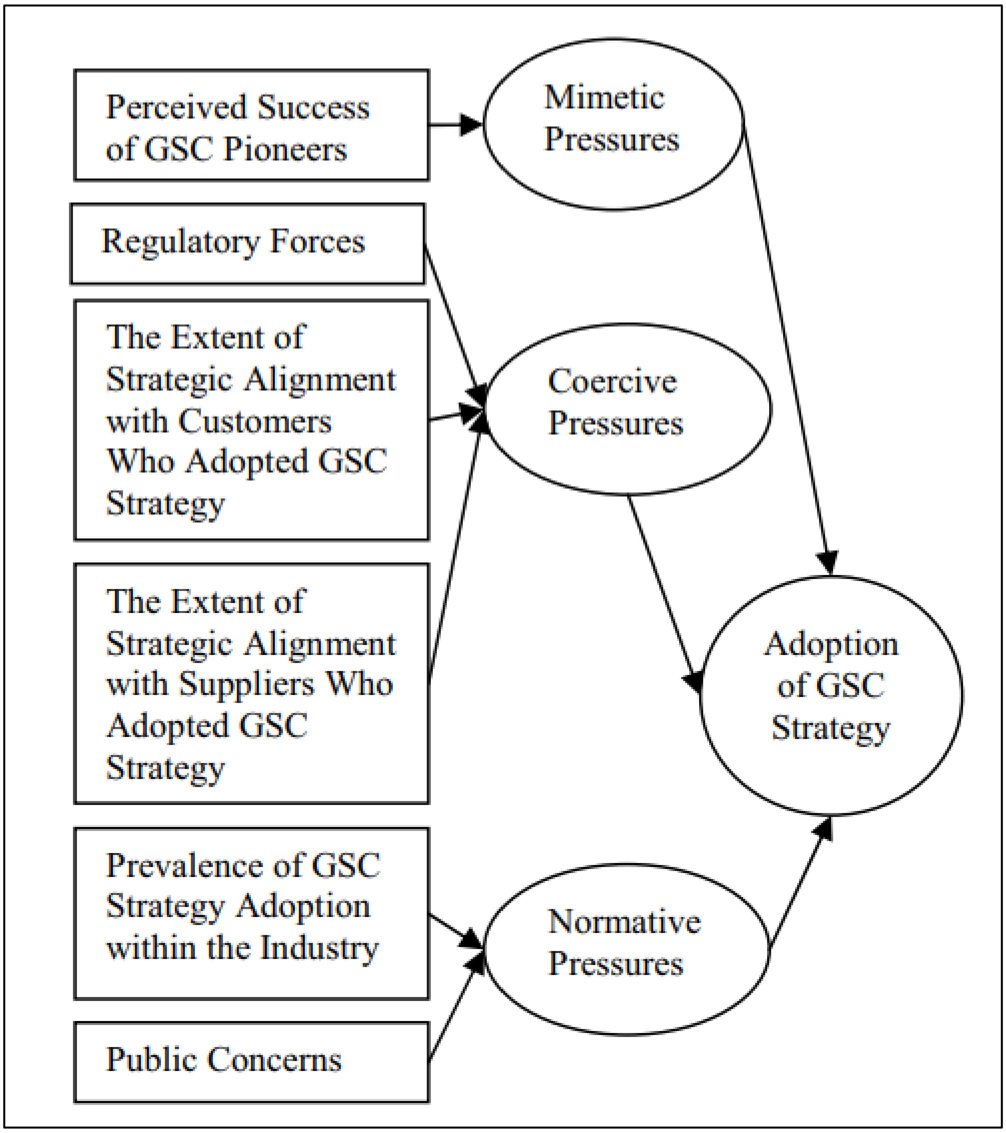

Figure 4- 15: Tenth Theoretical Framework

Source: Cai et al. (2008)

A variety of external and internal organizations or "stakeholders" examine the forces and incentives for acceptance and enhancement of environmental efficiency. Chen and Lee (2010) introduced two major sources of pressures that come from the suppliers, buyers, the competitors, and from the requirements of governmental/ international regulations. First, green consumerism has become a trend: the consumers prefer to purchase green products and are also willing to pay higher prices for green products. As for the competitors, it was demonstrated that through adopting, environmental concern can create value from the "product differentiation strategy" effect and naturally form a "green mobility of barrier" to block out those who did not adopt environmental protection programs.

Furthermore, it was pointed out what within the "green groups" got more market share and price premium than outside the groups. The second sources of pressures are from the requirements of governmental/ international regulations/Act. With the increased environmental concerns over the past decades, there is a growing recognition that issues of environmental pollution accompanying industrial development should be addressed simultaneously. Thus, the external pressures may potentially arise from the industrial-mainly supply chain partners and competitors and the regulators. Our initial hypotheses will be evaluated with empirical data, as Figure 4-16 illustrates the research framework of the study.

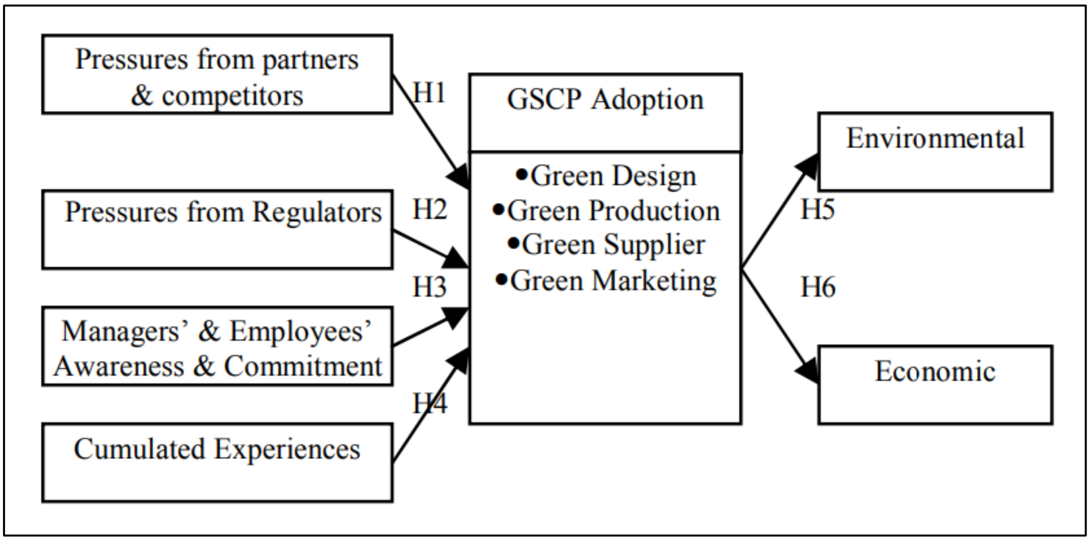

Figure 4- 16: Eleventh Theoretical Framework

Source: Chen and Lee (2010)

Regarding a study conducted by Agarwal et al. (2018), GSCM has been employed for more than two decades, and the literature dedicated to its study is growing. Recent studies have found a positive association between GSCM adoption and firm performance, suggesting that GSCM can indeed help translate a company's environmental sustainability strategy into value-creating activities at the operational level. On this premise, it becomes imperative for managers to understand the factors that drive the adoption of GSCM. To date, the following drivers of GSCM adoption have been identified in the literature government regulations, (ii) market drivers (including customers, competitors, investors, and public pressures), (iii) suppliers, and external drivers, while internal drivers are termed internal impetus in this study. Internal impetus denotes an organization's inner motivation and managerial commitment toward environmental sustainability as expressed in mission statements, corporate strategies, and organizational policies. It captures the commitment of the managers to the adoption of GSCM. Figure 4-17 illustrates the research framework of the study.

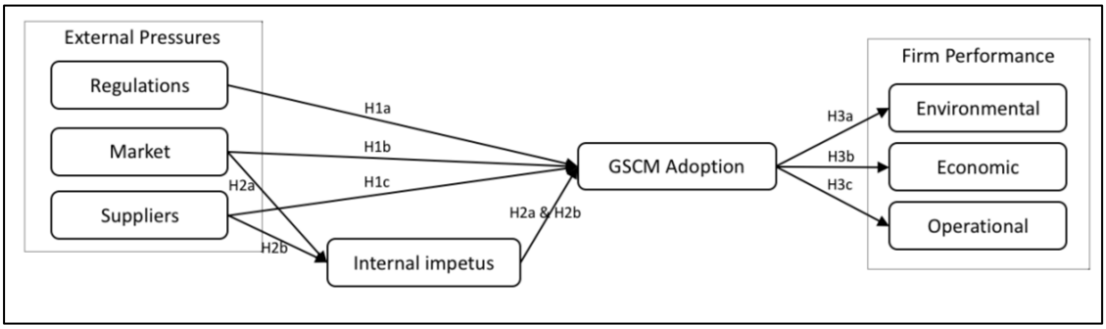

Figure 4- 17: Twelfth Theoretical Framework
Source: Agarwal et al. (2018)

Therefore, the research reached the model development for this study as shown in figure 4-18

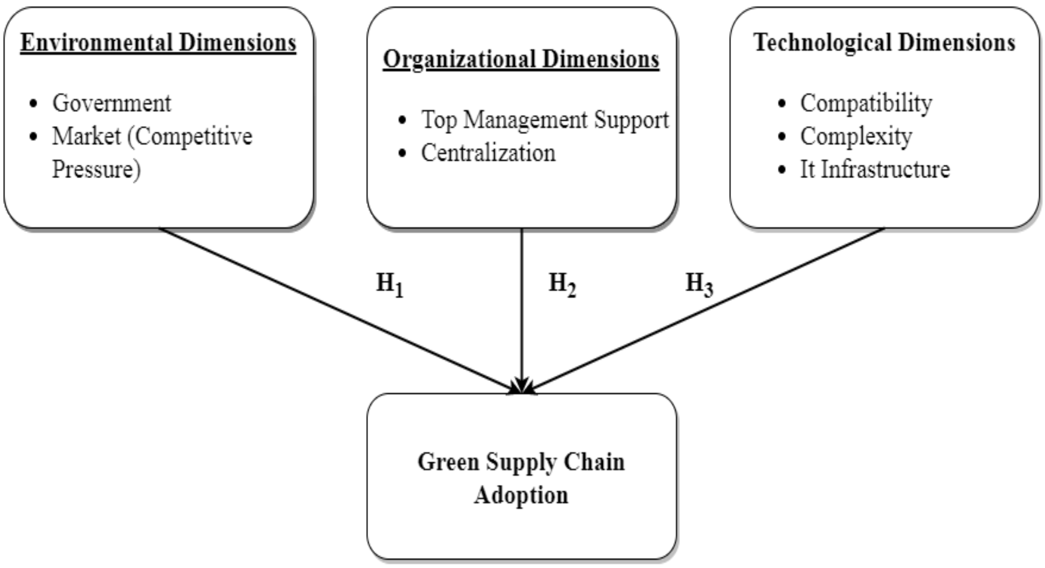

Figure 4- 18: The Model Development

4.4 Conclusion

From the above literature, which was reviewed in short, the following could be concluded.

Businesses are trying to implement emission management approaches in order to develop fundamental competencies for environmental sustainability. To direct inter- and intra-organizational environmental activities, GSCI can be defined as the partnership between a company and its supply chain partners. In addition, the internal incorporation in GSCM literature typically involves promoting and dedicating senior and middle managers to GSCM, focusing on cross-functional environmental management and interdepartmental environmental collaboration. Further integration tasks include implementing environmental compliance and auditing methods, collecting and sharing knowledge on environmental conservation and establishing environmental management processes (Lee, 2008; Wu et al., 2012; Zhu et al., 2008).

Supply chain is shaped by suppliers, customers and management to make production more viable for future collaboration. Some companies are managed by their top management, and others are affected by external factors, such as stakeholder stress or consumer demands, so organizations can suffer from barriers and drivers to implementing sustainable supply chain management. Each representative of the organization is responsible for the sustainable supply chain, and many steps can be taken to guarantee sustainable supply chain management for businesses. But GSCM is still not sufficiently developed. To help educators, researchers as well as practitioners understand integrated GSCM from a wider perspective; a descriptive definition is very much required.

The literature answers the research questions: what are the GSC activities and practices? What are the drivers or the drivers that encourage the implementation of GSCM? And, on the other hand, what are the barriers that hinder its implementation? The answers are discussed in detail throughout the chapter; however, it could be summarized in the following lines. GSC activities are known as industrial ecology, industrial symbiosis, eco-design, life cycle research, product stewardship, increased supplier accountability, and environmental management systems. In addition, the level of green supplier assessment and degree of green partnership reveals a direct impact on environmental efficiency.

Green supply chain management is gaining broad attention nowadays as it is representing one of the best solutions and techniques to respond to the essential environmental problems. The drivers of green supply chain management are numerous. However, they can be divided into six categories from the drivers listed above: external factors, internal factors, competition, suppliers, marketing and customers. Organizations have shown great interest in GSCM theory, but obstacles to GSCM implementation may be external to the enterprise or internal to it. Pressure from consumers for lower prices, lack of knowledge in society, lack of adaptation to technological advancement or resistance to adjust and lack of understanding of green buying are the key obstacles that researchers agreed upon. However, the following table could illustrate how the literature reviewed filled the gap and answered the research questions.

Table 4- 3: Summary of Literature Review

Author's name	Year	Findings	Research Question
Dhull and Narwal	2016	The internal factors refer to the drivers that are initiated by the organization itself and adopted by the founders, top management and employees as well. These drivers are represented in the organizational desire to cut the costs by using materials that are environment-friendly to reduce the cost of their products or services, on the other hand, the desire to involve and motivate employees as the increasing awareness of the organization's environmental concerns will improve the employee's productivity in adopting the green supply chain management practices. The external driver refers to the governmental legislations and policies along with the governmental subsidies and support. In other words, governments enact regulations, which must be followed by different organizations to maintain the environmental situation, in addition to this; governments may provide the organizations with technical or financial assistance to help them to reduce their amounts of wastes.	What are the main drivers that encourage GSCM implementation?

Author's name	Year	Findings	Research Question
Balasubramanian	2014	Regulations and legislation are considered as the main enabler of green supply chain management and play a major role in adopting it. Green supply chain was important	
Dashore and Sohani	2013	To meet the standards of certification of standard quality as ISO 14001	
Shibin et al	2016	Flexible manufacturing refers to acquiring a flexible system that can respond efficiently to the successive fluctuations in the market demand; furthermore, the operating and producing systems of the organization have to be ready to understand the changes in the customers' requirements and be able to go with their tendency to consume more green products and services.	
Diabat and Govindan	2011	Knowledge exchange, strategic preparation to adopt sustainable supply chain activities, customer interest for sustainable practices, collaborative partnerships, indicators to measure sustainability advantages in a supply chain, regulatory structure, support for supply chain partners, top management engagement, recognition of sustainable supply chain activities, availability of funds.	
Balasubramanian	2012	Lack of GSCM practices in firm vision, absence of GSCM activities in business project, lack of support from top management to GSCM implementation, lack of commitment and leadership from middle and senior executives, unawareness and lack of information among supply chain stakeholders in GSCM and lack of experience among stakeholders in GSCM implementation.	What are the obstacles that hinder the implementation of GSCM?
Muduli and Barve	2012	Poor quality of human resource, inadequate pressure from various societies, poor legislation, lack of direct incentives, limited financial resources, technical barriers, absence of management commitment, absence of employee commitment, resistance to change and adoption, poor environmental awareness, and	

Author's name	Year	Findings	Research Question
		Inappropriate approach to implementation.	
Ojo et al.	2014	Lack of knowledge exchange between construction companies and suppliers and the lack of demand.	
Luthra et al.	2014	Market Competition and Uncertainty, Cost Implications, Lack of Implementing Green Practices, Customers Unawareness and Suppliers' hesitation to shift towards GSCM were dependent variables. While absence of Government Support Systems was the independent variable.	
Bhattacharjee	2015	GSCM requires a great deal of money to be spent on programs of R&D. Consumers may not believe in the benefits and advantages of the green strategies of the organization.	
Kim and Chai	2017	Market and competition pressure could be considered one of the reasons to improve the practices of SC in every company. Nowadays, organizations seek to mention their market share in the massive competitive market by utilizing the (green) SC management as one of the tools to attract their consumers and improve their market share and elevate their profit to satisfy their stockholders and stakeholders.	What is the relationship between environmental dimensions and supply chain practices?
Cao and Mu	2011	Each firm seeks to differentiate its products. One of the most recent methods to be differentiated is to go greener in their SC practices or to improve their SC practices to be attractive and differ from the competitors. Thus, there is a significant concern about managing the SC practices.	
Singh	2013	It is very critical to notice the importance of top management to support the development of the SC practices. This upgrading of the coordination between a specific firm and its associated partners, such as its suppliers and consumers needs a wise and professional management to incorporate the practices of its SC in the production system efficiently and	What is the relationship between the organizational dimensions and supply chain practices?

Author’s name	Year	Findings	Research Question
		effectively.	
Kumar et al.	2015	With management support, an effective supply chain plan to execute its practice would accomplish the organizational objectives that improve consumer satisfaction, optimize income, minimize the cost of production and improve the company's competitive advantage.	
Hwang et al.	2016	Technology has an essential effect on the company practices, production system and the quality of SC function.	What is the relationship between the technological dimensions and supply chain practices?
Gimenez et al.	2012	The complexity of SC function has a negative impact on the performance of the organization and by extension the profitability.	
Zhang et al.	2017	The inherited fear of change and complexity of technology may reduce the efficiency of applications of SC practices.	
Chowdhury et al.	2016	GSC adoption could be one of the most essential factors for any company willing to introduce the green into its supply chain practices. The implementation of the GSC involves mainly the practices of reducing the pollution of the production processes, in addition to the practices that have a positive influence on the energy usage, besides the optimum usage of the resources included in manufacturing in order to achieve the best output out of them with minimum wastes that cause harm to the environment on the one hand and on the other hand cause extra burden over the organizational resources and capabilities.	What is the relationship between drivers, barriers and firm practices and supply chain practices and the green supply chain adoption?
Vachon and Klassen	2006	There is a strong, multi-faceted connection between the characteristics of the Supplier Relationship Management and the GSC practices. While the relationship between Customer Relationship Management characteristics and GSC practices appears to be confined to a single significant variable: technological integration.	What is the relationship between GSC adoption and Supplier Relationship Management
Christmann and Taylor	2001	Customer demand is a primary driver of enhancing the understanding and	What is the relationship

Author’s name	Year	Findings	Research Question
		practices of the environment by firms in China.	between GSC adoption and Customer Relationship Management
Yu et al.	2014	Because of the rising environmental demands of consumers, it is critical that businesses engage with green packaging customers on the environment, meet environmental goals jointly and develop a joint environmental strategy.	

Also, Table 2-7 illustrates how the literature reviewed filled the theories utilized in the research.

Table 2- 6 Summary of Theories utilized

Theory	Author	Year	Main Findings
Technology Acceptance model (TAM)	Rauschnabel and Ro	2016	It is a generally referred to and expanded structure with its underlying foundations in data frameworks to clarify the intensions and behavior of potential users concerning the acknowledgment of specific technologies.
	Ali et al.,	2018	The following two variables were developed: ‘perceived usefulness’ and ‘perceived-ease-of-use.’.
	Venkatesh et al.,	2003	Facilitating conditions are characterized as how much an individual accepts that a hierarchical and technical infrastructure exists to help utilization of the system.
Theory of Acceptance and Use of Technology (UTAUT)	Ali. et al.,	2019	The behavioural attitudes of consumers towards an information system or technology and its consequent actions in terms of use.
	Dwivedi et al.,	2019	It aims to explain how the use of technology is affected by individual differences by introducing moderated variables, so UTAUT suggested four moderators (i.e. gender, age, experience and voluntariness) to further improve the model's predictive ability. The four exogenous constructs in the UTAUT model should in any case be treated as technical

Theory	Author	Year	Main Findings
			attributes (i.e. performance expectations and effort expectations) and contextual factors (i.e. enabling conditions and social influence) while they could be perceived as beliefs held by people with regard to technology and background.
Innovation Diffusion Theory (IDT)	Rogers	2003	The presence of an innovation gets known to an individual through communication channels. The individual begins to ask questions like “What”, “How and “Why” about the innovation.
	Wani and Ali	2015	The persuasion stage is increasingly dormant and yet progressively emotional like inclination focused while as knowledge stage is psychological and known. It is in this stage that the uncertainty spinning the utilization of an innovation may increment or abatement.
	Lou and Li	2017	The most notable hypothesis about technical innovation is IDT. Research on IDT has been broadly applied in different fields, for example science, human science, communication, agriculture, marketing and innovation, and so forth. An innovation is "a thought, practice, or item that is seen as new by an individual or another unit of adoption" and, Diffusion is "the procedure by which an innovation is conveyed through specific channels over time among the individuals of a social system". In this way, the IDT theory contends that "potential users make decisions to receive or dismiss an innovation dependent on beliefs that they form about the innovation.
	Chen et al.	2017	IDT theory attempts to clarify innovation decision procedure, deciding elements of rate of adoption, and various categories of adopters. It helps in foreseeing the probability and rate of adoption of an innovation. IDT was first proposed by Rogers (1962), Rogers divided the innovation decision into five phases: knowledge, persuasion, decision, implementation and confirmation.

Despite the fact that many studies had been performed to show the drivers and barriers in the developed countries, yet few studies handled the challenges facing the green supply chain management process in the developing countries and specifically the Middle East and North Africa region (MENA). Accordingly, this study attempts to develop the hypotheses of the current research from previous studies and develop a framework to be able to adopt the green supply chain in the industrial sector in the MENA Region.

Chapter Five: Research Methodology

5.1 Overview

The meaning of methodology in the social science field is gathering and collecting information concerning the real world (Strauss and Corbin, 1998). Bryman and Bell (2007) show the importance of research questions to put and drive the data collection and research design. Consequently, the research approach is divided into two parts: the first one is that based on "grounded theory", which is collected by a series of qualitative interviews for data collection and analysis. In the process of research, grounded theory is derived from data that is collected in a systematic manner (Strauss and Corbin, 1998).

According to Matthews and Ross (2014), research methodology is a process that helps the researcher in conducting research systematically. It is a process of collecting different ideas, theories and concepts so that the researcher can relate them to a particular field of investigation. Research methodology is a system that contains different methods that the researcher can follow to conduct his or her research in order to attain the aim and objectives of the research. According to Goddard and Melville (2004) the research methodology is the way in which different theories, ideas and concepts are gathered so that they can be related to a particular field. To evaluate the results of the research, a specific methodology is necessary. This chapter is divided into four sections including their subsections; section one introduces the overview of this chapter while section two presents the research process, whether research philosophy, research approach, research design, research strategy or research method. In addition, section three introduces data collection, including data collection methods, sampling strategy and sample size, research variables validation, questionnaire design, research framework and hypotheses and research variables measurements. Figure 5-1 illustrates the chapter outline.

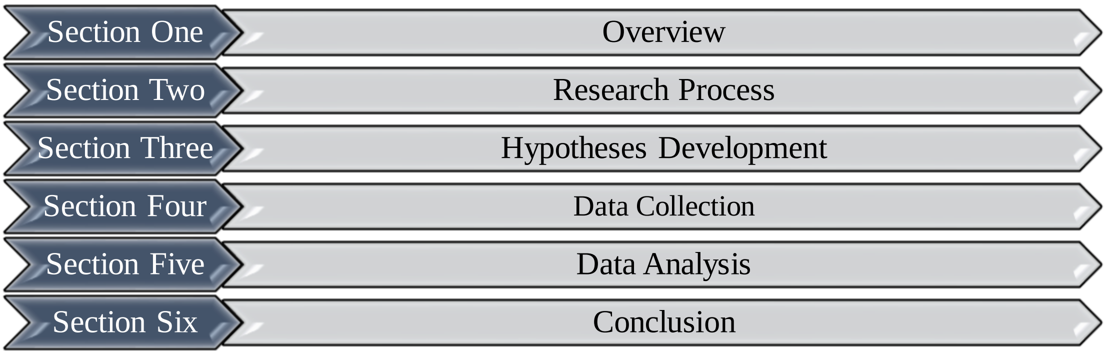

Figure 5- 1: Chapter Four Outline

5.2 Research Process

It is a process containing different steps, and researchers have to follow up those steps so as to evaluate results for the effectiveness of the research. All the steps of the research process are connected to each other, so if there is any variation or change that occurs in any step then the researcher should go through all the steps of the process again (Oliver, 2010). To accomplish the research successfully, there are seven steps of the research process that the researcher must follow (Wilson, 2010).

The identification of the topic for the research is considered the first step of the research process. In this step the researcher had to identify the topic of the process. After identification of the topic, the researcher defined the problem of the research, and then the research questions are developed to find answers to these questions and finding solutions to the problem of the research. After developing the questions of the research, the researcher planned approaches, such as the analytical approach that was necessary for the development of the process effectively.

In the fifth step of the research, the researcher started collecting data from target respondents, while the sixth step of the research was analysis and explanation of the data collected by all the responders of the research. In this step, the researcher analyzed all the data collected for the research to evaluate results for the research and to provide solutions to the research problem. After completing all the above steps of the research, the researcher wrote an overall report of the research presenting and explaining the results of the research. After following all the steps of the research process, the researcher concluded the overall research.

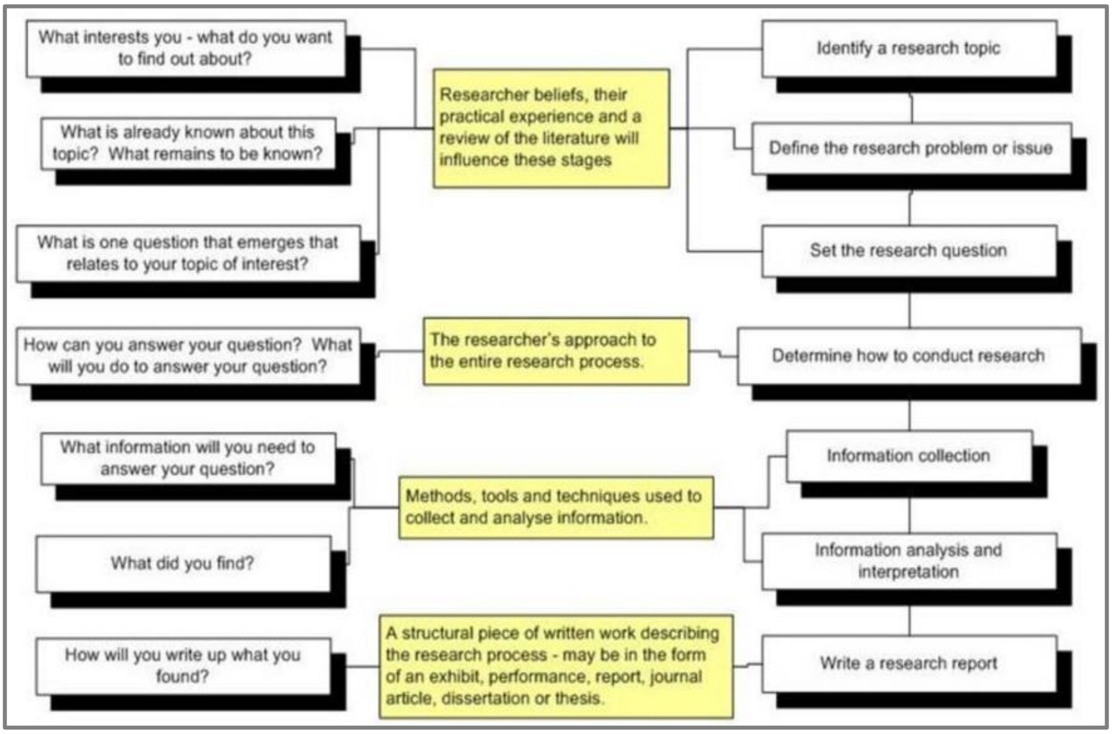

Figure 5- 2: Research Process

Source: Wilson (2010)

5.2.1 Research Philosophy

According to Davies (2007), the development of knowledge can be considered to be a definition of research philosophy. Every researcher develops knowledge while conducting the research. The researcher should understand the philosophical issues of the research before conducting research on a particular field. Davies (2007) classified three major reasons for understanding philosophical issues of the research regarding research methodology. The first one explained by Davies (2007) is that the researcher may clarify the methods he is adopting for conducting the research, which will help the researcher to gather all the collected data for evaluation of results for the research. The second reason is that the researcher will be able to deal with various and several methodologies of the research, such as avoiding inappropriate work by the knowledge of research. The third reason that Davies (2007) classified is that the advantages and benefits of the research can be understood by the researcher by understanding basic issues relating to research philosophy. The researcher can be helped by this process in being creative and probing in the methods of the research. According to Wilson (2010), it is necessary for the researcher to develop his or her research in philosophical manner. Research must be conducted in a way that elaborates and explains aims and the objectives of the research. Wilson (2010) said that the philosophical approach provides a proper framework of the research to the researcher according to the pattern of research and helps the researcher in evaluating the results of the research. There are three approaches of research philosophy that the researcher can adopt for conducting the research: positivism, interpretivism and realism.

According to Wilson (2010), realism is the combination of positivist and interpretivist approaches. In this approach, human characteristics and society are not essential. A realism approach was used for carrying out the research as it helps the researcher to define the problem of the research in a clear way. According to Wilson (2010) in positivism approach, general rules and regulations are developed along with systematic techniques of scientific methods. Positivism approach begins with the idea and observation of the research. For this research, the positivism approach was used by the researcher; by using this approach, the researcher has analyzed the aims and objectives of the research in order to create a logical way of explaining the objectives of the research. The positivism approach stands upon a quantitative study.

The researcher in this study adopted the positivism philosophy to integrate the Green Supply Chain (GSC) Drivers and Barriers Framework for GSC Adoption and explain the aims and the objectives of this study as described in the following:

1. To critically review the previous research studies on green supply chain management accreditations, drivers, barriers and TOE dimensions.
2. To develop conceptual model illustrating the relationship between TOE dimensions, supply chain practice, drivers, barriers and GSC Adoption
3. To demonstrate the applicability of the conceptual model through conducting empirical analysis on the industrial sector of the MENA region.

4. To provide conclusions with applied model upon which recommendations for GSC adoption will be proposed.

5.2.2 Research Approach

This section will explain in detail the research approach and framework through which the research is designed and the research hypotheses and questions that had been obtained. The research approach had been defined as the technique that the researcher followed in order to establish his/her research project (Kothari, 2004).

There are three research approaches or methods: qualitative, quantitative and mixed approaches. The qualitative approach is claimed to be inductive, while the quantitative approach is claimed to be deductive (Williams, 2007). Both approaches differ in the fact that the qualitative research is understanding and interpreting the phenomenon or the problem without depending on numbers, while the quantitative research is dealing with numbers or numerical data (Creswell, 2013).

It is a method of research that observes, understands and interprets the phenomenon without depending on numbers. Therefore, from the word qualitative, it is clear that it deals with qualities rather than quantities. The data used are qualitative, which means not characterized by numbers but by free form or unstructured data, such as texts, experiments, questionnaires or surveys; data are collected through open-ended questions in a form of words. It involves five designs: ethnography study, case study, grounded theory study, phenomenological study and content analysis (Williams, 2007).

The second approach is the mixed method, which combines the qualitative and quantitative research. It was stated that using the mixed research method became more common for investigators within the same study (Sousa et al., 2007). Thus, the study has applied mixed methods approach to benefit from the strengths of both approaches in order to fully understand and solve the problem.

In the preliminary stages of the study, the qualitative method was used to obtain more insight about the drivers and barriers relevant to MENA Regions through some interviews during data collection. Then, some quantitative aspects were used to test and check the relationship among the variables. In other words, the quantitative approach was adopted to formulate the hypotheses from the theoretical and practical perspectives and to analyze the quantitative data and test the validity of the hypotheses. Therefore, the researcher considered the latter type to be the research approach to be used in the current research.

Quantitative research from its word deals with quantities and numbers. The data are usually collected through structured questions. It is a conclusive method of research, which means its aim is to test a specific hypothesis with relevant numbers and statistics, come up with exact relationships and provide numerical facts. Therefore, quantitative research is objective, which means it does not depend on who computes the data; the results do not change, so it gives a reliable conclusion. It usually deals with large samples and analyzes them. Therefore, the quantitative research starts with a research problem and uses a theory to formulate a hypothesis (deductive) and then analyzes the quantitative data to generalize the findings. There are three categories of quantitative research: descriptive, experimental and causal research (Williams, 2007).

The types of data were classified, namely primary data and secondary data. The primary data mean the data that the researcher himself collected for the purpose of his study, for example survey, interview, questionnaire and experiments. While the secondary data mean the data that have already been collected by another person for a specific purpose and then reused by the researcher for his study (Saunders et al., 2015). The researcher in this study adopted the quantitative data and then analyzed the data through (Statistical Package for the Social Sciences) SPSS – version 24 and (Analysis of a Moment Structures) AMOS- version 23, to figure out statistical formulae like percentage and frequency; in addition, research hypotheses are tested and results are found.

5.2.3 Research Design

The research design is a plan through which the methodology and data collection steps are linked to find the optimal solution to the question raised by the research. It can clarify how the research is going to answer questions and determine how the data collected can be analyzed. Therefore, the different research methods and the choice of the optimal method for research will be presented. There are three types: the quantitative approach, the qualitative approach and the mixed approach. Each research design approach is related to a specific research philosophy and approach, for example the qualitative approach is related to interpretivism philosophy, while the quantitative approach is more related to positivism philosophy. Therefore, the research design can be defined as a logical plan to get from here to there, as here can be defined as the first group of questions that must be answered and there as a set of conclusions (answers) about these questions (Creswell and Creswell, 2017).

Qualitative research design is concerned with non-numerical information and the data used are qualitative, which means that they are not distinguished by numbers but by free form or unstructured data, such as texts, experiments, interviews or surveys. Qualitative research depends on an understanding of that it depends on research that aims at exploration, which means understanding and explaining phenomena, and it deals with small samples and seeks to describe the subject not measure it (Silverman, 2020).

While the quantitative research design measures the quantity using a numerical system. In other words, quantitative research produces data in numerical forms. The aim of quantitative research is to test a specific hypothesis with closely related (accurate) numbers and statistics to present numerical facts. Therefore, quantitative research is objective, which means that it does not depend on who computes the data since the results do not change; it gives reliable results and deals with large samples and analyzes them. The quantitative approach attempts to understand the relationships between different combinations and to define appropriate data collection and analysis procedures to measure the situation. The quantitative research approach is part of positivism philosophy that focuses on facts and the natural sciences. Using the quantitative approach, researchers implement a deductive approach and rely on theory to guide the research design and interpretation of their findings (Bloomfield and Fisher, 2019).

This research uses the quantitative design using the questionnaire method to test the research model to investigate the importance and the impact of Technology-Organization-Environment (TOE) dimensions, firm practices and supply chain practices on the supply chain practices and the green supply chain adoption and the Supplier Relationship Management and Customer Relationship Management.

5.2.4 Research Strategy

According to Groat and Wang (2013), research strategy is the overall approach to the research, which includes several processes. He further said that it is important for the researcher not to let terminology and technicalities obscure this process.

A simple basic strategy for any research project is

- Searching the purpose of the research.

- Developing research design to attain the aims and objectives of the research.
- Carrying out the research by analysing results, finding conclusions and offering recommendations.
- Making sure of the achievement of aims and objectives.

There are various research strategies that the researcher can adopt to manage the research. Research strategy is the most important part of the overall research as it helps the researcher in answering research questions and attaining the objectives of research. The choice of research strategy is guided by the questions and objectives of the research. Some major research strategies are survey, case study, ethnography, experiment and archival approach.

This research adopted the survey method that includes closed ended questions to obtain the quantitative data. Surveys include cross-sectional and longitudinal studies using questionnaires or interviews for data collection with the intent of estimating the characteristics of a large population of interest based on a smaller sample from that population. The main strengths of this approach lie in accuracy and control (Sekaran, 2003). Accuracy is achieved by quantitative measurement, and control is reached through the sampling and design. Furthermore, hypotheses are tested via a deductive method and the use of quantitative data allows statistical analysis.

The key limitation of quantitative approach is that the findings offer less detail on human behavior, actions, attitudes, motivations and incentives. Although the response of opinions and perceptions can be converted into digitized results, it mainly leaves no meaning to the researchers. Accordingly, many researchers are concerned that the quantitative approach denigrates human individuality and ability to think (Neuman, 1997).

On the other hand, there are three types of qualitative methods in general:

Case Studies: the researcher examines and explores a single phenomenon (‘the case’) restricted by time and activity (e.g., a program, event, institution, or social group) and collects detailed information through a variety of data collection procedures over a sustained period of time (Cunningham, C. W, 1997). The case study is a descriptive record of an individual's experiences and/or behaviors kept by an outside observer. Ethnographic Studies: the researcher studies an intact cultural group in a natural setting over a specific period of time. A cultural group can be any group of individuals who share a common social experience, location, or other social characteristic of interest, ranging from an ethnographic study of rape victims in crisis shelters to children in foster care, to a study of a cultural group in Africa (Patton, 1990). Phenomenological Studies: human experiences are tested through the detailed description of the people being studied; the goal is to understand the 'lived experience' of the individuals being studied. This approach involves researching a small group of people intensively over a long period of time.

For this research, the researcher has used group interviews and focused workshops, which have helped the researcher in identifying the challenges being faced by industrial institutions so that the model for the development of the Green Supply Chain in those institutions can be developed. For this research, focused workshops and group interviews were used for the data and information collection and helped the researcher in attaining better understanding of the current challenges, which in turn has contributed to the development of the draft version of the Green Supply Chain model that was then further used for examining and obtaining the results of the research.

5.2.5 Research Method

According to Bryman (2008), there are three types of research methods: quantitative, qualitative and mixed methods (quali-quanti). It is upon the researcher to choose any one of these three methods to conduct the research. For the attainment of aims and objectives of this research, the quantitative method was used. In the quantitative method, results are found on a specific topic that is being investigated throughout the research. This method uses mathematical, computational and statistical plans. The quantitative method allows the opportunity to obtain data that can be quantified (in numbers). The proposed research has used the quantitative method to collect data from practitioners of the industry located in the developing countries of the MENA region.

5.3 Data Collection

This section describes the target population and the sampling frame for the current research, as well as the data collection methods used for the purpose of figuring out a framework for Green Supply Chain capabilities in the MENA region.

Data Collection Methods

This study is designed according to quantitative methods chosen, as it was important for the researcher to know the individual views of experts and practitioners in the industrial sector of the developing countries of the MENA region to determine challenges faced by experts in this sector and how the Green Supply Chain skills and behaviour could enhance the impact on effective Green Supply Chain in this sector. The quantitative approach is followed through a questionnaire survey to collect data from practitioners of industrial sector of supply chain. After that, the results found from the questionnaire were validated using a focus group with top managers in the industrial sector represented in the experts of the sector. The objective of following quantitative approaches is to be able to explore challenges facing experts and test if they perceive the same problems or have different visions. The following sub sections will describe the data collection methods used in the questionnaire.

5.3.1. Interviews for Model Modifications

The population is very important for collecting data and analysing them so that it can be defined as the total number of all the objects, subjects or individuals of interest that fit to a set of specifications and characteristics. Typically, it is very difficult and not available to collect all the required data about all members of a population (Kitchenham and Pfleeger, 2002). Thus, a target population is a group of people who are targeted to answer the questions of the study and apply the survey results.

The target population is defined, according to the data collection method used, as the practitioners in the industrial sector; practitioners were determined on the basis that they had 10 years of experience in the industrial sector of supply chain and had positions as middle managers or top managers. The interview followed the convenient non-probability sampling, as the researcher tried to reach the experts in the industrial sector, which is not easy to access. In addition, the study followed a simple random sampling for the questionnaire designed; a probability sampling method, of experts to be able to generalize research results. In addition, a sample size of 400 customers was used in the study to achieve a confidence level of 95%.

The meaning of sampling is taking a targeted population and a representative selection of people for data collection and research information (LoBiondo-Wood and Haber, 2014). The investigators should pay attention when selecting a sample for their research to be valid in order to represent the subgroup of a target population so that they can make valid generalizations of the results (LoBiondo-Wood and Haber, 2014).

There are three main criteria that can be used to decide and determine the appropriate size of sample as well as the purpose of the study and population size (Israel, 1992). These three criteria are the level of confidence, the precision level to be achieved and the degree of variability in the measured attributes. As mentioned above, this study has used a random sample of experts of the industrial sector. According to a 95% confidence level, a sample of 400 is determined to be adequate for the target population (Saunders and Lewis, 2012).

The data for this research were obtained directly from the respondents of the research by the help of group interviews and questionnaires. Group interviews have helped the researcher in obtaining to the point and precise answers to the research topic, and preliminary group interviews have helped the researcher in exploring Green Supply Chain challenges in the developing countries of MENA region, as they have specific characteristics as management method, the available infrastructure, economic development, available facilities (Al-Shboul, 2017), to identify potential training needs appropriate to effective Green Supply Chain in the MENA region.

5.3.2. Questionnaire for Model Testing

A questionnaire can be defined as a form of data collection in which some questions are asked to the participants of the research. The questionnaire is considered to be one of the most common tools that are used for collecting the information needed and appropriate for the analysis of the research, which can be used combined with the other methods (Olsen and George, 2004).

There are three main types of questionnaires: structured, quasi-structured and unstructured questionnaire (Acharya, 2010). These types of questionnaires extremely rely and depend on focus group studies. In quasi-structured questionnaire, the researcher or investigator can use both types: structured questions mixed with some unstructured questions. Thus, to get the quantitative data from the supply chain department, the structured questionnaire with closed ended questions have to be adopted in this study.

5.3.3. Focus Groups for Model Validation

Focus groups are used for model validation. Focus Groups are generally used to gather people's opinions, ideas and beliefs on a certain topic or product. A focus group is a research technique used to collect data through group interaction. The group comprises a small number of carefully selected people who discuss a given topic. Focus groups are used to identify and explore how people think and behave, and they throw light on why, what and how questions. The general characteristics of the focus group are people's involvement, a series of meetings, the homogeneity of participants with respect to research interests, the generation of qualitative data, and discussion focused on a topic, which is determined by the purpose of the research.

Chapter Six: Model Modification

6.1 Overview

This chapter is presented to validate the model developed in the previous chapter. In other words, the researcher needs to make sure if the model development is consistent with the model of the study or not; therefore, qualitative methods were chosen, as it was important for the researcher to know the individual views of experts in the industrial sectors in the MENA region to determine challenges faced by experts in this sector and how the Green Supply Chain skills and behavior could enhance the impact on effective Green Supply Chain in this sector. The study followed a semi structured interview method for collecting information from potential experts in the industrial sector represented in the heads of departments.

The data for this model were obtained directly from the respondents of the research by the help of group interviews and questionnaires. Group interviews have helped researcher to obtain to the point and precise answers to the research topic and preliminary group interviews; explore Green Supply Chain challenges in the developing countries of MENA region, as they have specific characteristics as management method, the available infrastructure, economic development and available facilities (Al-Shboul, 2017) and identify potential training needs appropriate to effective Green Supply Chain in the MENA region.

There are many methods that could be used for data collection; the interview is considered to be one of the most known and commonly used of these methods. An interview can be defined as a method of data collection in which questions are asked by an interviewer to respondent(s) (Polit and Beck, 2010). As considering interview a way to collect data and gain knowledge from individuals, it can be done in many ways, either face-to-face or by telephone. Interviews consist of a standard list of questions but the interviewer could follow the lead of interviewees or ask them additional questions to seek more detailed responses. An interview is conducted using experts in the field of research. The interviewer chooses the interviewee through the process of purposive sampling. Purposive sampling is the process of selecting participants in qualitative research based on practical diversity to make sure that different point of views can be provided upon the studied phenomena (Bauer and

Aarts, 2000). In addition, purposive sampling, known as judgmental, selective or subjective sampling, is a form of non-probability sampling in which researchers rely on their own judgment when choosing members of the population who were specific or experts in the specific field to participate in their study (Musa et al., 2016), and there were five steps for purposive sampling as follows (Ames et al., 2019):

- Identify the population.
- Specify a sampling frame.
- Specify a sampling method.
- Determine the sample size.
- Implement the plan.

To generate a qualitative data, the researcher asked the same questions of the interviews for all respondents of the sample under study. The interview questions were designed for the semi-structured interview. The semi structured interview means an effective method for data collection when the researcher wants to: (1) collect qualitative, open-ended data, (2) explore participant thoughts, feelings and beliefs about a particular topic and (3) delve deeply into personal and sometimes sensitive issues (Kajornboon, 2005).

In general, qualitative data analysis has three types of interviews (Williamson, 2002):

• Structured Interviews are standardized and/or scheduled before their inception. The same questions in the same way and the same sequence are directed to all interviewees. The interviewees take some freedom and space while expressing their opinions, thoughts or views unrelated to the purpose of the research or the agenda followed by the researcher.

• Unstructured Interviews are non-standardized, unscheduled and in-depth interactions with interviewees. Every interview is different from the other and the interview answers open new insights, leading to new questions because of following the discussion by the interviewer. This type of interview helps the interviewer reach new visions and gain new awareness and insights from interviewees and depend on key individuals to collect comprehensive data that are appropriate to the case study. Explicatory research is accepting this type of interview.

• Semi-Structured Interviews are based on a standard list of questions but the interviewer could follow the discussion and make the interviewees lead the interview or ask them additional questions to seek more detailed responses. This type of interview is closer to the unstructured approach than the structured one.

Regarding semi-structured interviews, the interviewer (researcher) is the dominant side and the leader of the interview. This type of interviews is frequently used in qualitative analyses rather than quantitative analyses (Whiting, 2008). The conclusion of this type is that the aim of the researcher or the investigator is not to test a hypothesis but to cover a list of questions about a series of topics in the interview (Edwards and Holland, 2013). In semi-structured interviews, the researcher has a space to manage the interview; he or she is able to take notes or record the interview as opposed to structured interviews. One of the main strengths and advantages of semi-structured interviews is that the researcher can investigate and get deep into the given situation (Kajornboon, 2005). The purpose behind this interview was to gain practical insight about the factors that affect effective Green Supply Chain.

Figure 6-1 illustrates the chapter outline to achieve the outputs expected from this chapter using the input given from previous studies.

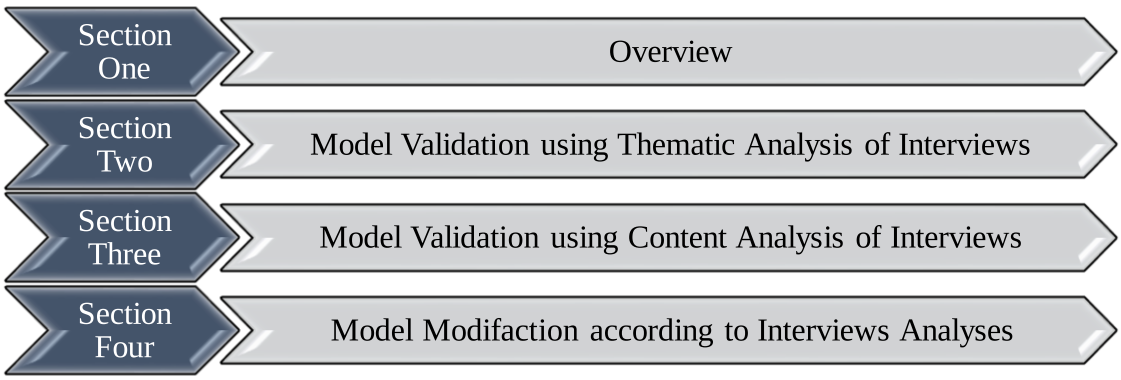

Figure 6- 1: Chapter Six Outline

6.2 Model Validation using Thematic Analysis of Interviews

The study used a situational analysis, where data were collected from ten different interviews, and the responses were analyzed and verified. The research continues in this section, evaluating the answers of the ten interviews, and it is clear that each question is proposed in the interviews so that the research can obtain the main topics that can be extracted from this research.

The research was able to address all the drivers and barriers facing industries in the stage of adopting green refining chains and the future of industries that depend on it. The interviews focused on the barriers facing industries and hindering them from adopting green supply chains. It became clear from these interviews that these barriers can be external or internal barriers in industries and companies themselves. The drivers that are pushing industries to turn to green and environmental supply chains have also been shown. These drivers are also external and internal reasons.

The questions shown below were used to filter the responses of the participants. They were also used to develop themes of the developed model. The questions used in the interviews are as follows:

1. What are the barriers of implication of green supply chain?
2. What are the drivers of implication of green supply chain?

Eight themes emerged from participants:

1. Outsourcing Barriers.
2. Technology Barriers.
3. Knowledge Barriers.
4. Financial Barriers.
5. Involvement and Support Barriers.
6. Government Drivers.
7. Managerial Drivers.
8. Economic Benefits Drivers.

The details of extracting each theme out of the focus groups collected are documented in the subsections below.

6.2.1 Theme of Outsourcing Barriers for Green Supply Chain

In this part, outsourcing barriers that face industries to the implication of green supply chain will be discussed. Outsourcing category that emerged from the data could be expressed into several codes: lack of Government Support, Complexity, and Practices of Suppliers. These codes are illustrated in Figure 3-2, where the codes are presented for the theme of outsourcing barriers for green supply chain.

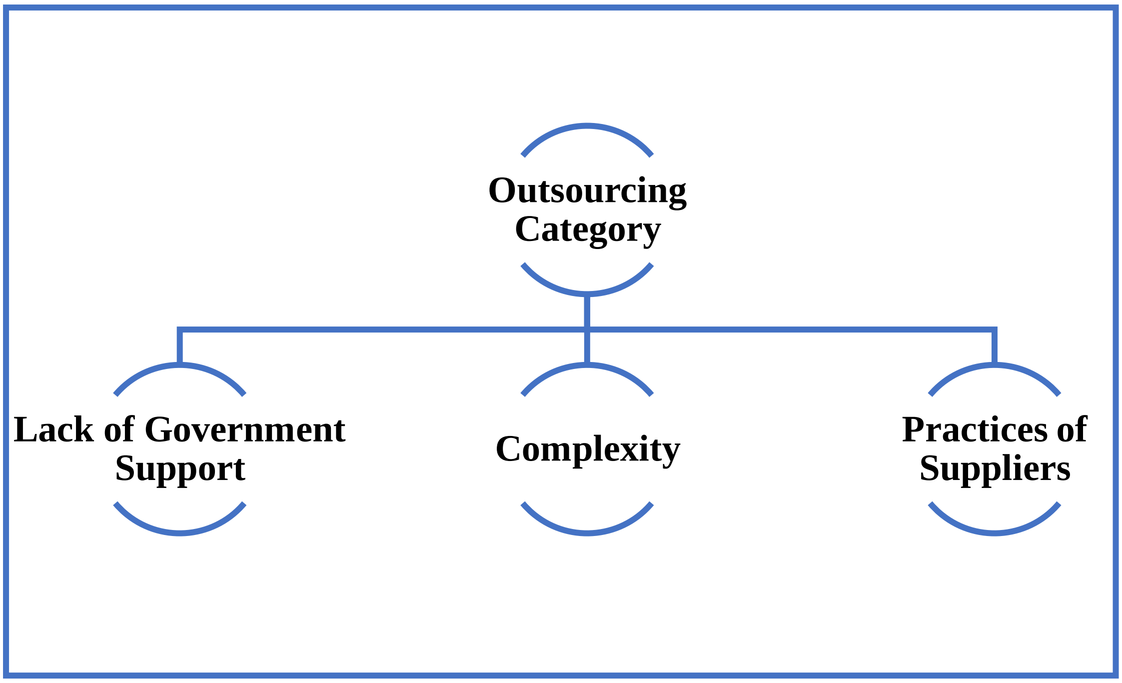

Figure 3- 1: Codes Related to Theme of Outsourcing Barriers

3.3.1.1 Lack of Government Support

One of the most important external barriers facing industries and hindering them from adopting green supply chains is the lack of government support to industries that follow this system, as most industries see that adopting a green supply chain system is very expensive, so industries want to support the advancement of governments by reducing in taxes or reducing the cost of materials used.

The interviews considered that the lack of government support for industries to adopt green supply chains is one of the major barriers, because the regulations and laws that governments put in place have the ability to induce industries to adopt the green supply system. The interviews indicated that these regulations and laws can be achieved through fines for industries that do not adopt the green supply system. The government has to grant bonuses to companies that apply green supply chain system or impose fines on companies that do not apply green supply chain system as all that would encourage more companies to adopt green supply chain system.

Some of the evidence discussed in the interviews will be presented, which shows that the lack of government support is a very important barrier standing in the way of adopting industries and companies into green supply chains, as described in the following:

"In my opinion, I consider the lack of government support to adopt environmentally friendly policies to be one of the most important external barriers that have a negative impact on the performance of the supply chain in the industry and negatively affect suppliers".

"I would also like to add that government regulations and lack of government support are not strong enough to force industries to adopt environmentally friendly policies. There is a general lack of appropriate regulations by government as well as business organizations. Most regulations encourage waste reduction but not higher levels of environmental management such as Design for Environment and green supply chains".

"I see that there are many regulations adopted by countries that extend the responsibility of manufacturers to include not only the waste generated during the manufacturing stage but also the waste generated by the product after the waste. Therefore, the lack of government support could be considered to be a critical barrier for the implication of green supply chain".

Among the clear and agreed upon evidence is that the lack of government support for industries has a very large negative impact on the industries' dependence on the green supply chain system, as well as not focusing on reducing environmental problems and the limited availability and availability of environmentally friendly industries and products.

3.3.1.2 Complexity

The second external obstacle that was illustrated in the interviews was complexity, which means complexity in measuring and monitoring the environmental practices of suppliers. Measuring the environmental practices of suppliers is very difficult and needs a very high cost, so this barrier is a major obstacle that hinders industries in adopting the green supply chain system.

The interviews showed that the complexity of monitoring and screening industries for suppliers is a barrier that enables industries to implement green and ecological supply chains. Companies can use tools aimed at monitoring and evaluating the environmental practices of the supplier, but these tools are very expensive for industries, especially small industries, but if the decision-makers look at the long-term cost, it will become clear that this cost will lead to a reduction in the long-term cost of the impact of pollution emitted from industries.

Some of the evidence discussed in the interviews will be presented, which shows that the complexity is the second barrier standing in the way of adopting industries and companies into green supply chains, as described in the following:
"I can add that the complexity in measuring and monitoring suppliers' environmental practices is one of the barriers that affect the performance ... This is due to the belief that metrics are a main source of inefficiency and disruption in supply chain interactions".

"In my opinion, I see that complexity and uncertainty within the supply chain can lead to increased chaos, such as unnecessary interference, distorted information, second guesswork, mistrust and overreactions within the supply chain".

"From my perspective, I believe companies must use advanced precision instruments with complex supply chains to further complicate their performance measurement systems to overcome this barrier".

Among the clear and agreed upon evidence is that complexity for industries has a very large negative impact on the industries' dependence on the green supply chain system, as well as not focusing on reducing environmental problems and the limited availability of environmentally friendly industries and products.

3.3.1.3 Practices of Suppliers

It was also discussed that supplier practices that are polluting and environmentally unfriendly are another external barrier that limits industries' reliance on green supply chains. This barrier is due to the lack of awareness and lack of understanding by suppliers of the concept of green supply chains.

The interviews also clarified and agreed that suppliers' practices are one of the barriers that hinder industries in adopting green supply chains. The interviews also made some suggestions for companies to reduce this barrier by providing awareness of green supply chains to suppliers through training and reward programs for all suppliers who adopt green supply chains as a solution that can be used by industries.

Some of the evidence discussed in the interviews will be presented, which shows that the practices of suppliers are the third barrier standing in the way of adopting industries and companies into green supply chains, as described in the following:
"I believe that there are external reasons that are barriers in the performance of supply chains, the most important of which is the supply chain practices, and this is from a theoretical point of view to the problem in the maintenance of environmental suppliers. Due to traditional mindsets, suppliers' concerns differ from others in the overall supply chain network".

"I very much agree that suppliers' practices have a great impact on the performance of the green supply chain, but in my view, these practices have a reason, and factories can solve them, which is to put in place a suitable training or reward system for suppliers, and some of them help suppliers to adopt their modern concepts of the environment".

Among the clear and agreed upon evidence is that practices of suppliers for industries have a negative impact on the industries' dependence on the green supply chain system, as well as not focusing on reducing environmental problems and the limited availability of environmentally friendly industries and products.

6.2.2 Theme of Technology Barriers for Green Supply Chain

In this part, technology barriers, which face industries to the application of green supply chain, will be discussed. The Technology Category that emerged from the data could be expressed into several codes: Fear of Failure, Lack of New Technology, and Lack of Materials. These codes are illustrated in Figure 3-3, where the codes are presented for the theme of technology barriers for green supply chain.

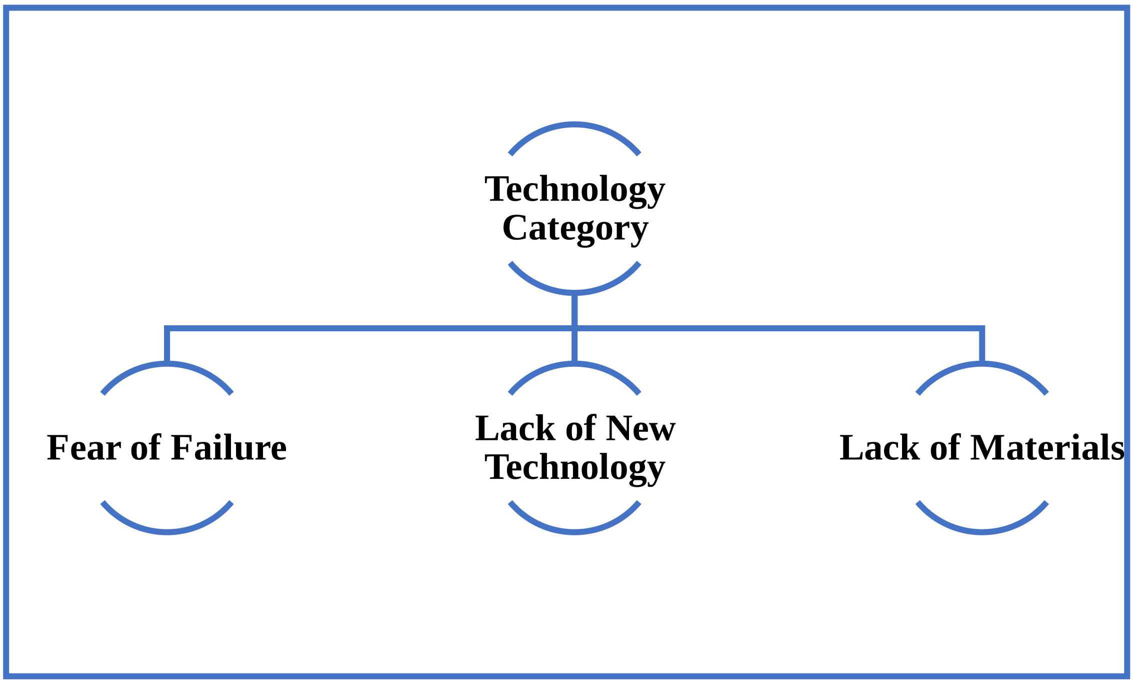

Figure 3- 2: Codes Related to Theme of Technology Barriers

3.3.2.1 Fear of Failure

Fear of failure is one of the technology barriers that prevent industries from adopting green supply chains. This is true, as fear of failure is a barrier that prevents anyone from developing, looking forward, striving for progress, success and fear of consequences without looking at the advantages and developing plans to avoid these risks.

It was agreed that fear of failure is the first and most important technological barrier facing industries and flight-makers from the decision to adopt green supply chains. This fear is a fear of cost increase, a loss in the competitiveness of the industry, or a fear of implementing the green supply chain system itself.

Some of the evidence discussed in the interviews will be presented, which shows that the fear of failure is a barrier of technology standing in the way of adopting industries and companies into green supply chains, as described in the following:

"Likewise, fear of failure, in my view, is a major barrier that hinders the performance of environmental supply chains, and this is due to industries 'fear of failure to adopt the green supply chain. Firms can suffer financial losses / product failures, resulting in a loss of competitive advantage".

"I also agree with the fear of failure leading some companies to avoid heading towards green supply chains, but I can see that science and technology have a merit in contributing to environmental problems as well as their role in treating and preventing them. Hence, they are seen as central institutions for overcoming environmental problems".

"I also see industries that bypass fear of failure and reduce the negative environmental impacts of their products and processes, recycle post-consumer waste, and establish environmental management systems, preparing to expand their markets or displace competitors who fail to enhance strong environmental performance".

Among the clear and agreed upon evidence is that fear of failure for industries has a negative impact on the industries' dependence on the green supply chain system, as well as not focusing on reducing environmental problems and the limited availability of environmentally friendly industries and products.

3.3.2.2 Lack of New Technology

Many companies and factories face a lack of new technology used in industries. This is due to the large cost of companies adopting new technology, and this cost is in training workers and suppliers on this technology or the cost of applying new technology.

The interviews agreed that the lack of modern technology leads to the failure of industries to complete the green supply chains, so some people think that the new technology has an impact on increasing awareness of upper management, workers and suppliers, as it provides companies with modern and circulating information and opens the horizon of industries to development.

Some of the evidence discussed in the interviews will be presented, which shows that lack of new technology is a barrier of technology standing in the way of adopting industries and companies into green supply chains, as described in the following:

"I believe that the lack of modern technology in some factories, which in turn helps factories rely on the green supply chain, is one of the barriers to implementing environmental supply chains within organizations".

“I also think that the lack of appropriate technology and industries' adoption of the green supply chain is a great barrier to measuring their performance and application”.

Among the clear and agreed upon evidence is that the lack of new technology for industries has a negative impact on the industries' dependence on the green supply chain system, as well as not focusing on reducing environmental problems and the limited availability of environmentally friendly industries and products.

3.3.2.3 Lack of Materials

The difficulty of obtaining raw materials from renewable energy and the cost that companies should bear to obtain raw materials of renewable energy make industries face a large barrier in adopting green supply chains as renewable energy does not produce environmental pollution and maintains healthy environmental systems.

The interviews made it clear that the lack of environmentally friendly materials in industries leads to a distance from companies and factories from the idea of adopting green supply chains, and this lack of materials leads to companies heading to non-renewable materials in the industry, such as gasoline, gas, and so on.

Some of the evidence discussed in the interviews will be presented, which shows that the lack of materials is a barrier of technology standing in the way of adopting industries and companies into green supply chains, as described in the following:

“But the lack of environmentally friendly materials used in the industry can also be a barrier in adopting an environmental green supply chain. This can be attributed to the difficulty in accessing environmentally friendly materials for use in industry”.

“From the point of view of the manufacturer, fuel and energy are just catalysts that purify the raw materials and turn them into final products. Optimizing heat and power are the real value propositions behind energy efficiency. This supports the contrast between the environmental view of resources and the business perspective. These explanations must be reconciled in order to reap the benefits”.

“Reducing the use of materials and technologies that can have adverse effects on the environment can have a positive impact on environmental supply chain adoption”.

Among the clear and agreed upon evidence is that the lack of materials for industries has a negative impact on the industries' dependence on the green supply chain system, as well as not focusing on reducing environmental problems and the limited availability of environmentally friendly industries and products.

6.2.3 Theme of Knowledge Barriers for Green Supply Chain

In this section, knowledge barriers, which face industries to the implication of green supply chain, will be discussed. Knowledge Category that emerged from the data could be expressed into several codes: lack of Environmental Knowledge, lack of awareness about reverse logistics, and perception of “out-of-responsibility” zone. These codes are illustrated in Figure 3-4, where the codes are presented for the theme of knowledge barriers for green supply chain.

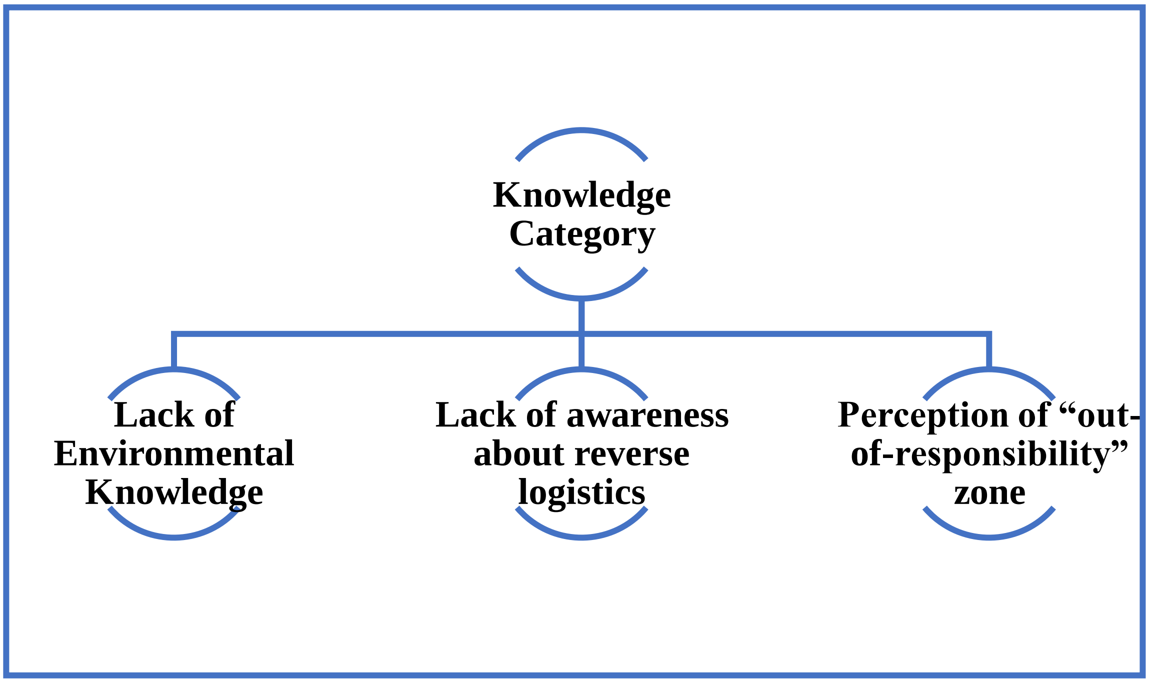

Figure 3- 3: Codes Related to Theme of Knowledge Barriers

3.3.3.1 Lack of Environmental Knowledge

The lack of environmental knowledge in senior management makes it difficult to adopt an environmental supply chain system in industries and supply, and for this the lack of knowledge is a major barrier discussed in the interviews, which hinders industries from adopting the green supply system.

The interviews also indicated that the lack of environmental knowledge is a vital barrier affecting the dependence of companies and industries on adopting green supply chains. All of the interviews agreed on the extent to which the lack of environmental knowledge is affecting the widespread use of green supply chains.

Some of the evidence discussed in the interviews will be presented, which shows that the lack of environmental knowledge is a barrier of knowledge standing in the way of adopting industries and companies into green supply chains, as described in the following:

"But I think that the lack of environmental knowledge of organizations and industries with environmental knowledge of implementing green supply chains is a barrier in the category of knowledge and awareness standing in front of industries."

"Lack of awareness of environmental legislation and ignorance of the environmental impact on the organization's activities and the benefits of adopting a green supply chain have a negative impact on the industry".

Among the clear and agreed upon evidence is that the lack of environmental knowledge for industries has a negative impact on the industries' dependence on the green supply chain system, as well as not focusing on reducing environmental problems and the limited availability of environmentally friendly industries and products.

3.3.3.2 Lack of Awareness

Reverse logistics practices can reduce customer risk when purchasing a product and increase customer value. Successful implementation of reverse logistics requires coordinating the forward and backward flows of both materials and information. Reverse logistics may bring benefits in terms of economic and environmental sustainability.

Interviews also indicated that reverse logistics may bring benefits in terms of economic and green sustainability, as well as customer value, and SC managers may remain reluctant to adopt such a type of SC structure due to its negative impact on the dynamics (both system and inventory fluctuation) in the SC. Therefore, it considered the lack of awareness of reverse logistics to be a barrier to the adoption of green supply chains by industries.

Some of the evidence discussed in the interviews will be presented, which shows that the lack of awareness of reverse logistics is a barrier of knowledge standing in the way of adopting industries and companies into green supply chains, as described in the following:

"I think that the management of parts or products that return to the supply chain network from its external side is a concern for many industries. Reverse logistics can lead to economic benefits by recovering returned products reuse, remanufacturing, recycling or a combination of these options to add value to the product. Implementing reverse logistics has direct benefits for the environment as well. Hence, lack of awareness of these benefits is a major barrier to reversing logistics".

"I also agree that the lack of awareness of reverse logistics is a major barrier to the adoption of green and environmental supply chains, and this is because industries are generally unaware of reverse logistics practices".

"From my perspective, I see that the lack of awareness of the benefits of reverse logistics in both economic and environmental terms can be a major factor in resisting change to reverse logistics and to follow the green supply chain".

Among the clear and agreed upon evidence is that the lack of awareness of reverse logistics for industries has a negative impact on the industries' dependence on the green supply chain system as well as not focusing on reducing environmental problems and the limited availability of environmentally friendly industries and products.

3.3.3.3 Perception of "Out-Of-Responsibility" Zone

The reluctance of industries to take the first step towards adopting green supply chains is a strong obstacle for companies and for the manufacture of environmentally friendly products. Therefore, I consider that the logic of "out-of-responsibility" is a logic used by most companies to avoid implementing environmental programs, and companies rely on governments and other factories to adopt green supply chains.

The interviews discussed companies' perception of "Out-of-Responsibility" as a concept that industries use to not adopt green supply chains. The research took the companies' perception of the concept of "out-of-responsibility" as a barrier standing in front of companies in adopting green supply chains.

Some of the evidence discussed in the interviews will be presented, which shows that perception of "Out-of-Responsibility" is a barrier of knowledge standing in the way of adopting industries and companies into green supply chains, as described in the following:

" From my point of view, I believe that some industries depend on the Perception of "out-of-responsibility" zone, which in turn has a negative impact on the application of green supply chains in organizations' perception that taking steps for environmental goodwill is not their responsibility ".

"I think the perception of "out-of-responsibility" zone has been used by many industries to avoid implementing green development chains, and I think this barrier can be avoided by encouraging organizations to broaden their perspectives beyond the environmental principles of their supply chains or to integrate environmental principles into an emphasis on social responsibility for companies to research their supply chain".

"I believe that the application of green supply chain does not depend solely on its application to managers, but it is the responsibility of all internal and external stakeholders to participate in promoting the objectives of the sustainable supply chain".

Among the clear and agreed upon evidence is that perception of "Out-of-Responsibility" for industries has a negative impact on the industries' dependence on the green supply chain system, as well as not focusing on reducing environmental problems and the limited availability of environmentally friendly industries and products.

6.2.4 Theme of Financial Barriers for Green Supply Chain

In this section, financial barriers, which face industries to the implication of green supply chain, will be discussed. Financial Category that emerged from the data could be expressed into several codes: Financial Constraints, High Cost of Hazardous, and Cost of Switching to New System. These codes are illustrated in Figure 3-5, where the codes are presented for the theme of financial barriers for green supply chain.

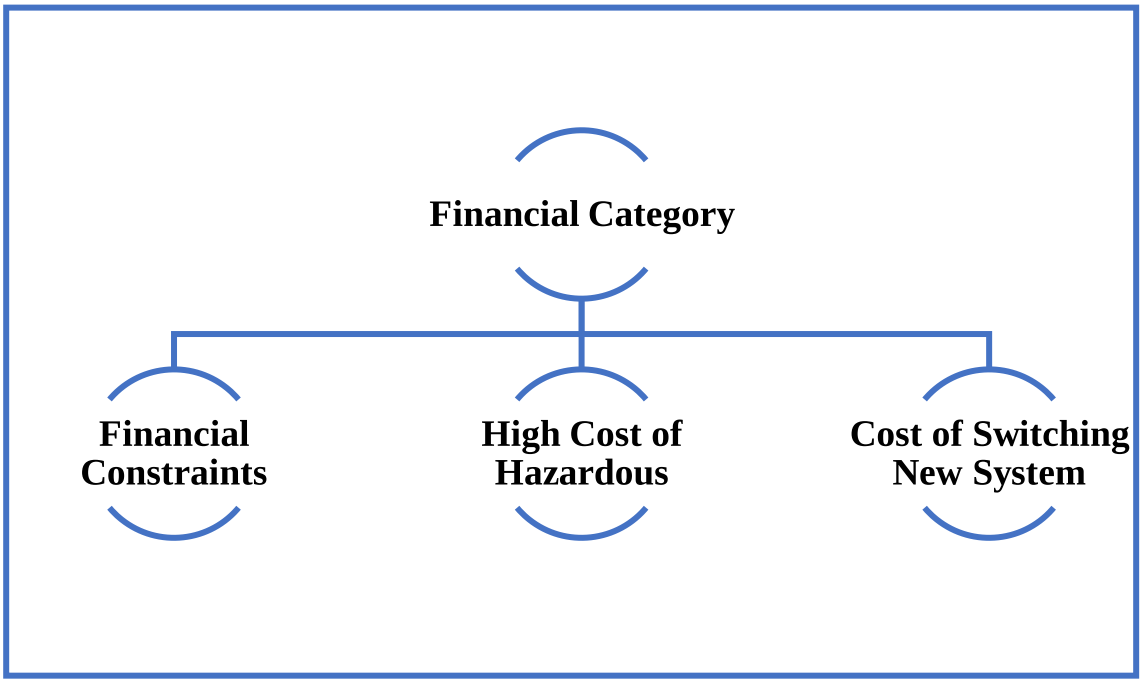

Figure 3- 4: Codes Related to Theme of Financial Barriers

3.3.4.1 Financial Constraints

It was concluded from the above that financial barriers affect a lot on the industries' adoption of green supply chains, the tendency of companies and industries to the environmental trend, and the products are environmentally friendly due to the fact that the materials used in industries are very expensive and environmentally friendly and also the new technology that companies must follow to obtain trainings to increase awareness of green supply chains and environmental style practices.

Therefore, interview answers firmly agree that the biggest and most important barrier hindering the adoption of green supply chains is the financial constraints imposed by either governments or companies themselves, and from which industries cannot increase costs in any way to increase the adoption of green supply chains.

Some of the evidence discussed in the interviews will be presented, which shows that financial constraints are a barrier of financial standing in the way of adopting industries and companies into green supply chains, as described in the following:

"Financial dynamics are also the main barriers as finance plays a major role in implementing green supply chain management; several limitations".

"But I believe that financial constraints are the main obstacle to good reverse logistics programs. Cost considerations are the main challenge in commercial

recycling. Funding is essential to support the infrastructure and workforce requirements of reverse logistics. Firms require allocating funds and other resources to implement reverse logistics".

"I think that the financial constraints have an effect on the industries not making the decision to rely on green supply chains because it is costly for them and increase their expenditure even for green supply chain implication or for the costly training they should give to their employees or for suppliers to make them understand the idea of green supply chain".

Among the clear and agreed upon evidence is that financial constraints for industries have a negative impact on the industries' dependence on the green supply chain system, as well as not focusing on reducing environmental problems and the limited availability of environmentally friendly industries and products.

3.3.4.2 High Cost of Hazardous Waste

Companies face a very high cost of disposing of hazardous waste in industries, and in addition, the cost of disposing of hazardous waste in a healthy and environmentally clean manner is much more prohibitive.

The interviews indicated that the high cost of disposing of hazardous industrial waste in a healthy and environmental manner stands as a barrier to industries on their way to adopting green supply chains. The interview answers dealt with the environmental methods of disposal of hazardous wastes that require machines, equipment and methods for transporting hazardous wastes, and they are very expensive. Therefore, companies avoid relying on these environmental methods.

Some of the evidence discussed in the interviews will be presented, which shows that the high cost of hazardous waste disposal is a barrier of financial standing in the way of adopting industries and companies into green supply chains, as described in the following:

"The financial aspect is a barrier that hinders companies to adopt green financial supply chains as there is a high cost for hazardous waste disposal, costly hazardous materials disposal due to the threats involved".

"I argue that the cost of risk in the inventory of hazardous materials, where maintaining an inventory of hazardous materials involves a high probability of financial loss, and risks can be considered a barrier to the adoption of industries to green supply chains".

"From my experience, I can say that one of the major financial obstacles to improving environmental technology is the impact of collection and treatment costs and disposal prices for hazardous materials".

Among the clear and agreed upon evidence is that the high cost of hazardous wastes for industries has a negative impact on the industries' dependence on the green supply chain system, as well as not focusing on reducing environmental problems and the limited availability of environmentally friendly industries and products.

3.3.4.3 Cost of Switching to New System

Also, one of the financial barriers that the interviews dealt with is the high cost of switching to a new system, as switching to a new system requires new technology and multiple training, whether to high management, workers or suppliers, in addition to the cost of new equipment and the cost of changing the method of work and production and the validity to increase the cost of switching to a known system.

The interviews showed that the adoption of green supply chains is affected by the thinking of the decision-makers in the companies and that the decisions of the decision-makers are affected by the cost in any system followed, as the companies switching to the new systems is very costly, so some decision-makers' decisions stand at the point of switching to a new system.

Some of the evidence discussed in the interviews will be presented, which shows that the cost of switching to new system is a barrier of financial standing in the way of adopting industries and companies into green supply chains, as described in the following:

"Many industries have considered that Switching to green supply chains, is very costly, and many industries are afraid to follow the application of new systems, and, moreover, current industrial practices are unable to convert to new systems".

"Cost has been a major barrier to more proactive environmental behavior, with owner managers realizing few financial benefits from environmental investments, and I argue that industries' dependence on green supply chains depends heavily on their cost analysis. So, I think switching to an expensive new system is a critical barrier to the performance of the green supply chain system".

Among the clear and agreed upon evidence is that the high cost of switching to a new system for industries has a negative impact on the industries' dependence on the green supply chain system, as well as not focusing on reducing environmental problems and the limited availability of environmentally friendly industries and products.

6.2.5 Theme of Involvement and Support Barriers for Green Supply Chain

In this section, involvement and support barriers, which face industries to the implication of green supply chain, will be discussed. Involvement and Support Category that emerged from the data could be expressed into several codes: lack of training courses, lack of customer awareness, lack of top management involvement, and poor supplier commitment. These codes are illustrated in Figure 3-6, where the codes are presented for the theme of Involvement and Support barriers for green supply chain.

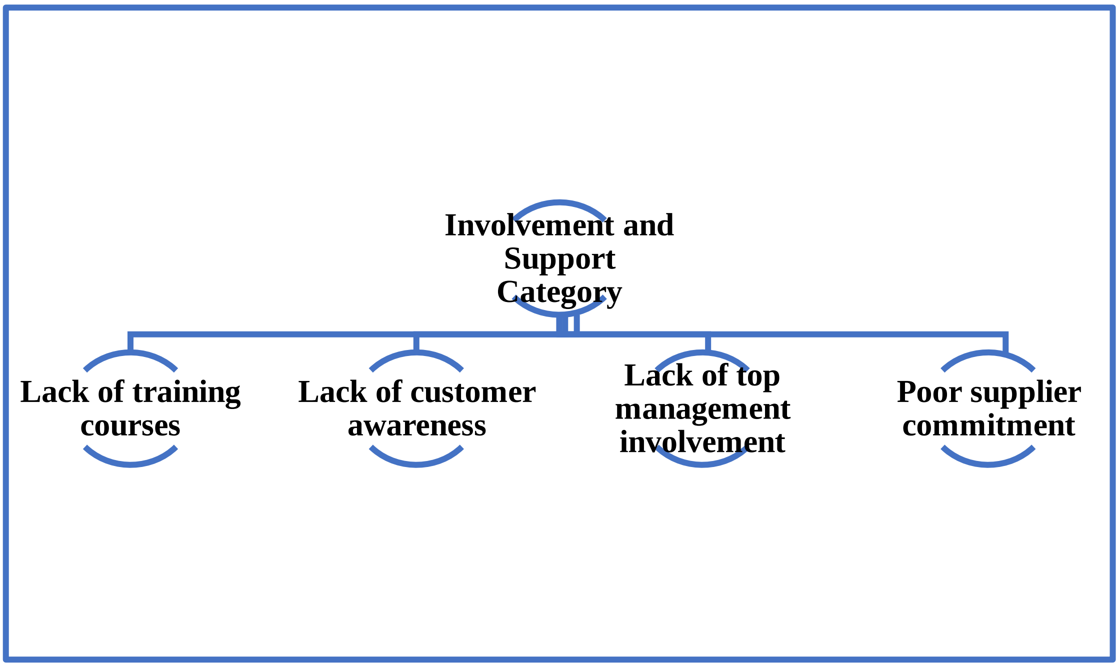

Figure 3- 5: Codes Related to Theme of Involvement and Support Barriers

3.3.5.1 Lack of Training Courses

The lack of training courses that industries must continuously prepare for workers on new technology is a barrier to the industries' adoption of green supply chains. As these training courses provide employees with full awareness of the market, its needs, and the new technology that competitors are following.

The interviews discussed that the lack of training courses offered by companies is one of the barriers that hinder industries in adopting green supply chains. This is due to the lack of awareness of workers on the new systems, which in turn can be environmentally friendly and natural.

Some of the evidence discussed in the interviews will be presented, which shows that the lack of training courses is a barrier of Involvement and Support standing in the way of adopting industries and companies to green supply chains, as described in the following:

"But I think there is an important barrier that hinders some industries from implementing green and environmental supply chains, and this barrier is the absence of training courses, consultations, or institutions for training, monitoring and directing the specific progress of each industry due to the need for industry professionals to train to accredit GSCM in their units and monitor progress. From consulting or institutions"

"It is true, literature in the field of organizational behavior shows that behavior can be modified and job performance increased through training and coordination between jobs".

"I believe that additional training and support for senior management and even changes in employment practices may be required to develop and adopt a more holistic view of the life cycle or total cost of ownership approach compared to traditional costing systems, from which industries can rely on a green supply chain system that keeps the environment rightly".

Among the clear and agreed upon evidence is that the lack of training courses for industries has a negative impact on the industries' dependence on the green supply chain system, as well as not focusing on reducing environmental problems and the limited availability of environmentally friendly industries and products.

3.3.5.2 Lack of Customer Awareness

I also consider that the lack of consumer awareness is a barrier to the adoption of green supply chains in industries and companies, and this shows that industries that target a specific group of consumers who have awareness of environmentally friendly products tend to adopt green environmental supply chains and this to ensure the competitive advantage between them and their competitors in the same industry.

The interviews also expressed that the lack of consumer awareness has a negative side to the industries' adoption of green supply chains and that the direction of companies depends greatly on the direction of their consumers and their awareness, which forces industries to take the environmental aspect if consumers target environmental impacts and environmentally friendly industries.

Some of the evidence discussed in the interviews will be presented, which shows that the lack of customer awareness is a barrier of Involvement and Support standing in the way of adopting industries and companies into green supply chains, as described in the following:

"Decreased customer demand for environmentally friendly products could be the reason industries and companies are not relying on green supply chains and I think that is due to the lack of Customer awareness of GSCM".

"In my opinion, I believe that the emergence of the consumer environment has changed the patterns of competition in industries around the world. Increasing environmental awareness by customers has led industries to adopt a green environment in supply chains to ensure continued market share and a sustainable industrial environment".

"I can add that consumer environmental awareness is an important driving force for companies to participate in environmental management. At times, green product customers may switch to other regular products, creating a negative motivation for new companies to participate in GSCM practices".

Among the clear and agreed upon evidence is that the lack of customer awareness for industries has a negative impact on the industries' dependence on the green supply chain system, as well as not focusing on reducing environmental problems and the limited availability of environmentally friendly industries and products.

3.3.5.3 Lack of Top Management Involvement

The dependence of some industries on decision-makers who lack awareness of environmental industries and the lack of participation of top management in decision-making leads to industrial decisions that pollute the environment. The lack of top management involvement in decision-making was an obvious barrier from the interviews that hinders green supply chains in industries.

The interviews also showed that the lack of senior management involvement in decision-making, the lack of participation of upper management in knowing the market and consumer requirements, lack of development and attendance of training courses that clarify new systems, as well as technology and modernity, and the lack of awareness of environmentally friendly industries and green supply chains are barriers of the category. Participation, support and the lack of top management involvement greatly influence in environmental and health decision-making.

Some of the evidence discussed in the interviews will be presented, which shows that the lack of top management involvement is a barrier of Involvement and Support standing in the way of adopting industries and companies into green supply chains, as described in the following:

“Top management's lack of awareness of the environmental impacts on their business can also be a barrier to relying on green supply chains”.

“I also see that the lack of senior management's participation in adopting green supply chain management is a major barrier in adopting green supply chains. This is due to top management's resistance to changing investments, information systems and current habits that make the transition to a new supply chain system difficult”.

“Also, the support of top management can give employees the impetus to adopt environmental practices. Lack of top management support is a major barrier to developing environmental policies”.

Among the clear and agreed upon evidence is that lack of top management involvement for industries has a negative impact on the industries' dependence on the green supply chain system, as well as not focusing on reducing environmental problems and the limited availability of environmentally friendly industries and products.

3.3.5.4 Poor Supplier Commitment

Finally, after raising the awareness of upper management and suppliers, as well as workers and consumers, and providing them with the necessary training and skills to switch to a new system and use new technology and environmentally friendly materials, the weak commitment of suppliers can be a barrier for companies to implement green supply chains because suppliers are unable to absorb the pollution output to the environment, which is limited by their commitment to green, environmental supply chains.

This is what the interviews made clear that the poor commitment of suppliers to adopting industries for green supply chains and their non-compliance with the regulations set by companies is a barrier for companies to follow environmental industries, and as the interviews determined that companies must follow regulations that penalize suppliers who do not adhere to the laws of green supply chains and sound environmental behaviour.

Some of the evidence discussed in the interviews will be presented, which shows that poor supplier commitment is a barrier of Involvement and Support standing in the way of adopting industries and companies into green supply chains, as described in the following:

"I suspect that a barrier such as weak supplier commitment and unwillingness to share information could affect the adoption of green supply chains. Suppliers do not want to share environmental information with industries for fear of the end product being affected".

"Industries often do not want to share information about green supply chain management, for fear of being exposed to underlying vulnerabilities or giving other companies a competitive advantage".

Among the clear and agreed upon evidence is that poor supplier commitment for industries has a negative impact on the industries' dependence on the green supply chain system, as well as not focusing on reducing environmental problems and the limited availability of environmentally friendly industries and products.

6.2.6 Theme of Government Drivers for Green Supply Chain

In this section, Government Drivers, which face industries to the implication of green supply chain, will be discussed. Government Category that emerged from the data could be expressed into several codes: CEO Initiative, Government Requirement, and International Requirement. These codes are illustrated in Figure 3-7, where the codes are presented for the theme of Government Drivers for green supply chain.

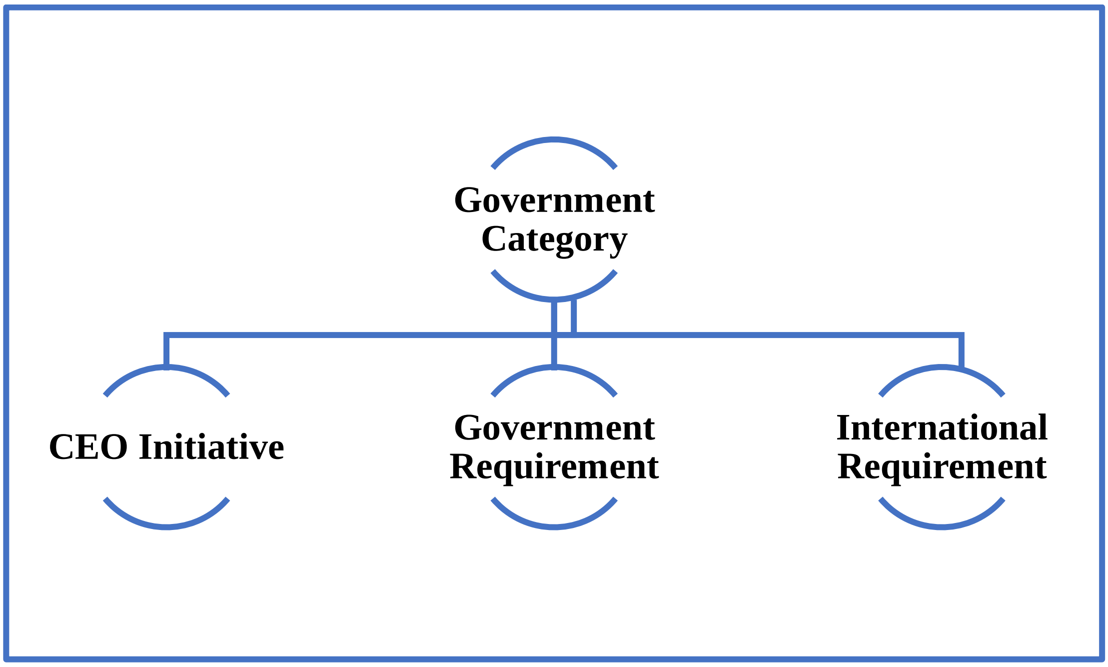

Figure 3- 6: Codes Related to Theme of Government Drivers for Green Supply Chain

3.3.6.1 CEO Initiative

The initiatives presented by the CEO of the company are a driver for the companies' adoption of green supply chains, as these initiatives are considered to be the beginning of the implementation of environmental chains in the industry, and a competitive advantage is added to the industries that adopt this green program and a starting point for more industries to follow this environmental program.

The interviews also made it clear that the CEO's initiatives are an important factor in raising awareness among workers in industries and suppliers about the green supply chain program. The interviews also relied a lot on this aspect of initiatives as they found a significant impact on the spread of green environmental industries methods among companies and factories.

Some of the evidence discussed in the interviews will be presented, which shows that the CEO Initiative is a driver of government standing in the way of adopting industries and companies to green supply chains, as described in the following:
"The CEO's awareness was one of the most important factors affecting companies and industries adopting green and environmental supply chains, so the CEO's initiatives to adopt green strategies were a component for the beginning of adopting green supply chains".

"I believe CEO is driven by cost, compliance and customer demand. Our senior leaders should see these priorities reflected in whatever initiatives they advocate and, in the initiatives, for supporting the environment".

"I agree on that, and I confirm that the most important driver of sustainability is the initiatives of CEO, and I find that the philosophy of CEO has been beneficial in establishing the company's role in society. Senior management members play an active role in encouraging companies to evaluate their role in society and they are responsible for leading the corporate environmental management".

"CEOs must be closely aligned in their pursuit and achievement of organizational goals and objectives".

After the evidence was clarified that the CEO's initiatives as a driver for adopting industries to green supply chains, a positive impact was reached that helps industries to decide to follow environmental industries, and this is to reduce environmental pollution and to reach a sound ecosystem machine and healthy and environmentally friendly industrial products.

3.3.6.2 Government Requirements

Another driver that has been identified is the government requirements. This driver stated that government regulations and requirements for a clean environment free of pollution is an important reason for enacting laws and regulations that limit dangerous emissions and pollution from industries and compel industries to adopt green supply chain programs and health and environmental programs in the industry.

The interviews also agreed that green supply chains are affected and spread between industries through the application of governments to environmental regulations and laws, and this is what forces industries to follow this type of industry that cares about the environment and reduces environmental pollution resulting from industry, and this is to avoid any possible cost that the company or factory is subjected to as a fine imposed by government regulations and requirements.

Some of the evidence discussed in the interviews will be presented, which shows that government requirements are a driver of government standing in the way of adopting industries and companies to green supply chains, as described in the following:
"I think that the tendency of governments to shift supply chains to a green and environmental direction in order to reduce pollution and maintain a clean environment is one of the most basic elements that compel companies to follow green supply chains".

"I believe that adopting green supply chains has received great attention from governments, and I also believe that the establishment of regulations by governments on industries in order to encourage them to adopt environmental supply chains and this leads to a clean and pollution-free ecosystem".

"The government's requirements to reach a clean environment and reduce environmental pollution are a reason for the government's participation in providing direct technical and financial support to indirect encouragement with incentives for tax cuts and the development of infrastructure for environmentally friendly industrial complexes that depend on green supply chains in their manufacture".

"In my view, the government is playing a more important role in pushing not only suppliers of large industries but also suppliers of small and medium enterprises to take an interest in green supply chains initiatives as well as their application in their industry".

After the evidence was clarified that the government requirements as a driver for adopting industries for green supply chains, a positive impact was reached that helps industries to decide to follow environmental industries, and this is to reduce environmental pollution and to reach a sound ecosystem machine and healthy and environmentally friendly industrial products.

3.3.6.3 International Requirements

It can also be said that international requirements greatly affect government regulations, as well as the internal regulations of industries and companies, as recently international organizations have paid much attention to reducing environmental pollution resulting from industries and have imposed bonuses for all industries that follow the ecosystem and work to reduce harmful emissions, which safely dispose of hazardous waste.

The interviews agreed that international organizations affect the industries' adoption of green supply chains, and this is through the regulations they set and their requirements for maintaining a clean and healthy environment, and this is done through regulations and laws that they set for industries.

Some of the evidence discussed in the interviews will be presented, which shows that international requirement is a driver of government standing in the way of adopting industries and companies to green supply chains, as described in the following:

"I agree on that, but I think that international requirements are affecting the governmental requirements in every country, and this is evidenced by the great focus of international institutions in the recent period in reducing pollution in all countries, as well as their interest in providing many training in green supply chains. Therefore, the concept of supply chains has become. Green is the center of attention of many researchers"

"The interest of international organizations in reducing pollution from industries in my view is an important factor in the direction of industries to green supply chains, and this is because global environmental regulations shift the focus from pollution controls in factories to the product life cycle, more governments are participating in green supply chains initiatives".

"Global organizations are moving the industry a step further to green its business activities. The industry has begun to practice sustainability strategies and use green technology to meet emissions standards and reduce the impacts of marine pollution and climate change".

After the evidence was clarified that the international requirement is a driver for adopting industries for green supply chains, a positive impact was reached that helps industries to decide to follow environmental industries, and this is to reduce environmental pollution and to reach a sound ecosystem machine and healthy and environmentally friendly industrial products.

6.2.7 Theme of Managerial Drivers for Green Supply Chain

In this section, Managerial Drivers, which face industries to the implication of green supply chain, will be discussed. The Managerial Category that emerged from the data could be expressed into several codes: Waste Management, Top Management, ISO 50001, and Company Policy. These codes are illustrated in Figure 3-8, where the codes are presented for the theme of Managerial Drivers for green supply chain.

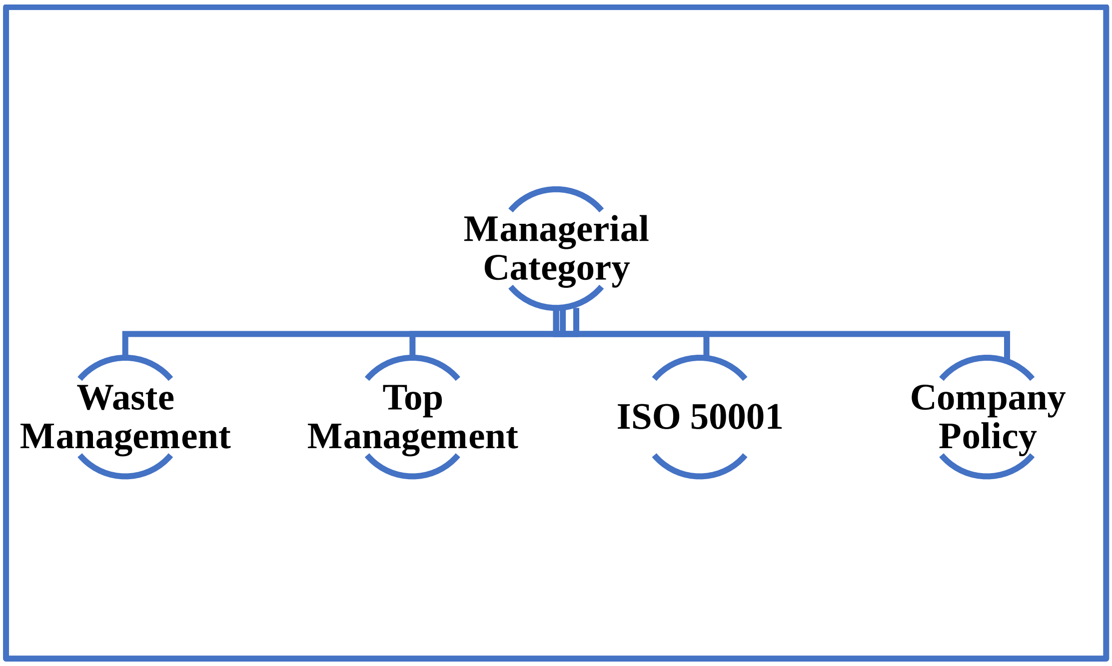

Figure 3- 7: Codes Related to Theme of Managerial Drivers for Green Supply Chain

3.3.7.1 Waste Management

One of the most important goals of most industries is to manage their waste and search for an inexpensive, as well as safe, way to dispose of it. Therefore, industries have a great cost in scientific research for waste management, which can be recycled again in their industries or given to other factories that reuse them.

The interviews discussed that one of the drivers driving industries to adopt green supply chains is the desire of companies to manage their waste in a healthy and environmentally friendly manner. Therefore, industries follow many decisions in the direction of waste management in an environmentally, healthy and harmless approach, without causing pollution to the environment, and this is to reduce the fines imposed by governments and international institutions.

Some of the evidence discussed in the interviews will be presented, which shows that waste management is a driver of managerial standing in the way of adopting industries and companies to green supply chains, as described in the following:
"I think that the interest of industries in managing and reducing the resulting waste is one of the most important factors that make organizations and industries interested in following green supply chains through some legislation. Either those issued by the industries themselves or determined by governments".

"I see that the interest of industries in pushing the development of waste management plans and removing some components and chemicals from products greatly influences the industries decision to adopt green supply chains"

"One of the most important legislations that shed light on many industries is to reduce and manage waste from production and this is to reduce the cost paid to governments as waste taxes, so the industries are interested in studying and analyzing green supply chains"

"Most industries, especially suppliers and retailers, nowadays focus on addressing direct environmental impacts by improving the efficiency of internal processes, including measures of waste management activities".

After the evidence was clarified that waste management is a driver for adopting industries for green supply chains, a positive impact was reached that helps industries to decide to follow environmental industries, and this is to reduce environmental pollution and to reach a sound ecosystem machine and healthy and environmentally friendly industrial products.

3.3.7.2 Top Management

The top management plays an important role in the application of green supply chains, so it is considered that the decisions made by the top management are a driver in the direction of adopting the environmental and health industries, and it is considered that the awareness of the top management is a reason for the trend in the application of green supply chains, and governments depend on them in their plans to reduce the emissions from industries.

The interviews discussed the role of top management in making decisions about the approval of supply chains in industries, due to the fact that the top management always focuses on the market and consumer requirements in environmentally friendly products and works to meet the needs of consumers, and the higher education as well is concerned with regulations launched by international organizations and central governments, which in recent times is much concerned with reducing harmful industrial emissions, limiting environmental pollution, and using health, environmental and green materials that limit pollution caused by industries.

Some of the evidence discussed in the interviews will be presented, which shows that top management is a driver of managerial standing in the way of adopting industries and companies to green supply chains, as described in the following:
"From my perspective, I see that direct involvement of top management on environmental issues is most prevalent in companies that see regulations as a major threat or whose customers come from the green sector".

"Top management members play an active role in encouraging companies to evaluate their role in society, and they are responsible for leading the corporate environmental management. They are also a powerful domestic political force that can enhance corporate environmental protection. Top management team members and company values are helpful in encouraging these companies to evaluate their role in society".

"Top management is responsible for directing the efforts of industries on green supply chains, and caring for the environment through some of the regulations used within companies. This is to ensure a healthy ecosystem, and for this the awareness of top management is very important to implement green supply chain plans".

After the evidence was clarified that top management is a driver for adopting industries for green supply chains, a positive impact was reached that helps industries to decide to follow environmental industries, and this is to reduce environmental pollution and to reach a sound ecosystem machine and healthy and environmentally friendly industrial products.

3.3.7.3 ISO 50001

The implementation of ISO 50001 can be considered a smart and sustainable solution due to the contributions of ISO 50001 that support the certification of GSCM practices. Incorporating ISO 50001 into GSCM practices can pave the way for the development of green and low-carbon supply chains.

The interviews also determined that ISO 50001 requirements would be integrated into green supply chains. They may guide internal environmental management by complementing ecosystem management by proposing actions aimed at reducing energy consumption.

Some of the evidence discussed in the interviews will be presented, which shows that ISO 50001 is a driver of managerial standing in the way of adopting industries and companies into green supply chains, as described in the following:

"In my opinion, ISO 50001 proposal and requirements can generate useful insights on how to structure green and low-carbon supply chains, thus helping to address the challenges posed by climate change".

"I consider implementing ISO 50001 a smart and sustainable solution, and it is possible to conclude that using a management perspective through ISO50001 would be interesting in proposing integration between green supply chain management and energy efficiency management to reduce low carbon emissions".

"I agree that, ISO 50001 guidelines can support the adoption of green supply chain management practices for developing green supply chain and achieving low carbon emissions, and I see that ISO 50001 may improve green procurement practice by including energy savings and emissions reduction targets in supplier monitoring and review".

"But I see that ISO 50001 will drive environmental design practices by designing processes and products to be more energy efficient. The investment recovery practice may increase energy efficiency by replacing old equipment with lower energy efficiency and using highly polluting fuels with energy-efficient equipment that uses clean, renewable energy sources".

After the evidence was clarified that ISO 50001 is a driver for adopting industries for green supply chains, a positive impact was reached that helps industries to decide to follow environmental industries, and this is to reduce environmental pollution and to reach a sound ecosystem machine and healthy and environmentally friendly industrial products.

3.3.7.4 Company Policy

Adopting policies in the company concerned with the environment, from implementing green and healthy programs, is a driver that leads to the adoption of companies to green supply chains, as the application of company policies that are based on environmental concerns and its main goal is to reduce pollution, as well as providing environmentally friendly products, are reasons that lead to adding a new competitive advantage to this industry. This is what leads competitors to follow the same policies to stay competitive.

The company's policies were adopted as a driver that makes industries head to supply chains by interviews. They considered that environmental companies' policies are a strong factor in influencing not only the company but also the entire market, and this in turn increases the awareness of consumers and makes adopting green and environmental methods a pathway for everyone.

Some of the evidence discussed in the interviews will be presented, which shows that Company Policy is a driver of managerial standing in the way of adopting industries and companies into green supply chains, as described in the following:

"The company has set environmental policies aimed at implementing and adopting green supply chains. These policies may not be aimed at preserving and saving the world, but they can, but because they reflect a way to gain a competitive advantage and improve the company's financial performance. Nevertheless, these policies are positively affected in the environment".

"I would like to add that by adopting green environmental policies, all the company's procedures and transactions are displayed under a magnifying glass, and the so-called environmentally friendly policies can easily be mistakenly interpreted as a green wash process for companies or simply as a green pity payment service".

"I agree on that and I think that, for example, the Main Street retailer communicates its environmental policies and procedures and addresses its role as a responsible citizen by publishing reports to its shareholders and the wider community".

"I consider policy leaders or value champions to act as drivers, as the main drive to implement a green supply chain management initiative has been a desire to reduce costs and to confirm results elsewhere".

After the evidence was clarified that company policy is a driver for adopting industries for green supply chains, a positive impact was reached that helps industries to decide to follow environmental industries, and this is to reduce environmental pollution and to reach a sound ecosystem machine and healthy and environmentally friendly industrial products.

6.2.8 Theme of Economic Benefits Drivers for Green Supply Chain

In this section, Economic Benefits Drivers, which face industries to the implication of green supply chain, will be discussed. Economic Benefits Category that emerged from the data could be expressed into several codes: Long Term Cost, Cost Reduction, and Health & Safety. These codes are illustrated in Figure 3-9, where the codes are presented for the theme of Economic Benefits Drivers for green supply chain.

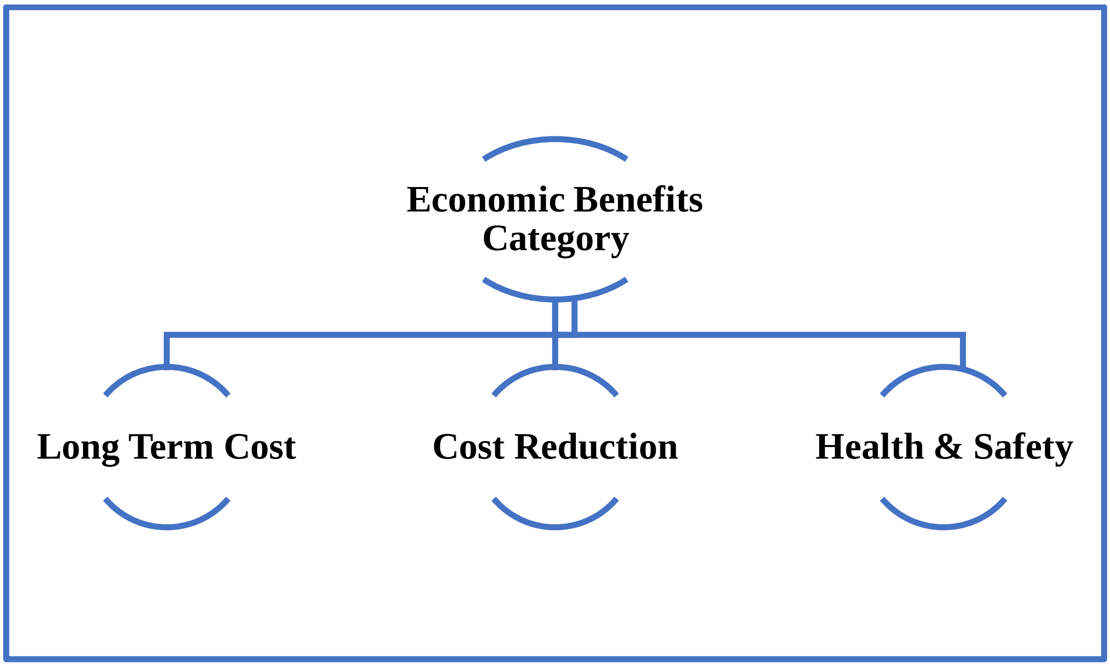

Figure 3- 8: Codes Related to Theme of Economic Benefits Drivers for Green Supply Chain

3.3.8.1 Long Term Cost

There are companies that look at the cost that will be paid in the long term, and these companies are very conscious as they do not care about the current cost, but look at policies that can be followed through which the future cost is reduced and the benefits of green supply chains are that they reduce the long-term cost of companies.

The interviewees also agreed that the industries that make their decisions taking into consideration the long-term cost are always moving towards adopting the green supply chains program and the programs that preserve the environment. This is due, for example, to the fact that the adoption of green supply chains leads to a reduction in the fines resulting from pollution in the long run and also reduces the cost of non-renewable materials used in industries where industries are directed to renewable energy materials and the sources of these renewable energy are much cheaper than their non-renewable counterpart.

Some of the evidence discussed in the interviews will be presented, which shows that Long Term Cost is a driver of Economic Benefits standing in the way of adopting industries and companies into green supply chains, as described in the following:

"I believe implementing green initiatives can provide the impetus for long-term cost benefits".

"Firms view green initiatives as a driver that directs them towards resource efficiency while at the same time helping them create valuable benefits by increasing levels of production, profits and return on investment in the long term".

"I see that long term cost is an important driver, which makes the industries decide to adopt green supply chains as the long-term cost has an impact on the decision-making process of the higher departments".

After the evidence was clarified that long-term cost is a driver for adopting industries for green supply chains, a positive impact was reached that helps industries to decide to follow environmental industries, and this is to reduce environmental pollution and to reach a sound ecosystem machine and healthy and environmentally friendly industrial products.

3.3.8.2 Cost Reduction

All industries and companies have their main goal to reduce the cost used in the industry and increase the profit. Therefore, all companies tend to take decisions whose first goal is to reduce the materials used. This is due to the industries 'great interest in increasing profit.

The interviews indicated that the companies' driver to use the green supply chain (companies with environmental awareness) is to reduce the cost, due to the fact that the use of green supply chains uses clean, environmentally friendly and non-polluting materials for the environment, and methods of disposing of these materials' waste are cheap and inexpensive for companies as it is a waste that is less hazardous than the normal materials used in industries.

Some of the evidence discussed in the interviews will be presented, which shows that cost reduction is a driver of economic benefits standing in the way of adopting industries and companies to green supply chains, as described in the following:
"The desire to reduce costs is a common driving force for environmental sourcing projects, environmental regulations can be seen as a catalyst for innovation and reducing environmental impact at low cost, not a cause for litigation".

"I agree that the industry desire to cut costs has been a driver for both successful and unsuccessful projects. However, a careful analysis of the data revealed an interesting pattern. That what make company follow the green supply chains".

"The basic premise behind a lot of these things is that pollution is costing you somewhere, so companies aim to reduce the cost resulting from pollution by using green supply chains and preserving the country's ecosystem".

After the evidence was clarified that cost reduction is a driver for adopting industries for green supply chains, a positive impact was reached that helps industries to decide to follow environmental industries, and this is to reduce environmental pollution and to reach a sound ecosystem machine and healthy and environmentally friendly industrial products.

3.3.8.3 Health & Safety

In recent times, consumers are interested in using healthy products that are free from any environmental damage and clean, so industries and companies are turning to green supply chains and environmental industrial systems to produce safe and healthy products that are in line with consumers' needs.

The interviews agreed on the consumers' research and their interest in food and health products in their recent use, and the interviews indicated that the direction of the companies depends on the needs and direction of their consumers. Therefore, industries adopt green supply chains and green environmental programs due to consumers 'orientation to environmentally friendly products.

Some of the evidence discussed in the interviews will be presented, which shows that health and safety is a driver of economic benefits standing in the way of adopting industries and companies into green supply chains, as described in the following:

"But also, consumers' search for safe and healthy industrial products makes companies and industries interested in adopting green supply chains, in order to ensure the competitiveness of green and environmentally friendly products".

"From my point of view, one of the drivers for engaging in sustainability strategies in supply chains is consumer demand for environmentally friendly and healthy food,

which creates a market opportunity to increase sales through differentiation between green products".

"Green supply chain is one of the most important systems adopted by companies, and one of the reasons for industries.., adopting green supply chains is the recent trend of consumers towards safe, healthy and environmentally friendly products".

After the evidence was clarified that health and safety is a driver for adopting industries for green supply chains, a positive impact was reached that helps industries to decide to follow environmental industries, and this is to reduce environmental pollution and to reach a sound ecosystem machine and healthy and environmentally friendly industrial products.

The researcher concluded that there are other barriers than model development; therefore, the research aims and objectives provide the framework needed to test the study hypothesis, and that is shown in the next chapter.

6.3 Model Validation using Content Analysis of Interviews

This section describes the qualitative analysis of the data. In the qualitative phase, data were analyzed into generative themes, which were cascaded to categories and codes. Data collected from interviews were analyzed by applying the content analysis using NVIVO software package. The researcher did interview until the redundancy of information started to happen; it happened from the interview then the researcher completed to make interviews until reaching the redundancy of information. Such redundancy started to happen in the seventh interview but the researcher continued to collect interviews till it was confirmed that no new information is obtained, which happened by the tenth interview (Marshal et al., 2013). The findings of the study are presented in this section with the purpose to introduce a qualitative analysis of the GSCM themes, categories and codes. Under the sample of this study and according to the responses received from the participants during an interview, the following themes and codes were obtained from the initial coding and analysis of the word frequency table obtained from NVIVO for interviews analysis.

6.3.1 Barrier Theme

This section illustrates the findings regarding the prevailing barriers theme and its categories; Outsourcing category with its codes; [Lack of Government Support, Complexity, and Practices of Suppliers]; technology category with its codes; [Fear of Failure, Lack of new technology, and Lack of Materials]; knowledge category with its codes; [Lack of Environmental Knowledge, Lack of awareness about reverse logistics, and Perception of "out-of-responsibility" zone]; financial category with its codes; [Financial Constraints, High cost of hazardous, and Cost of switching to new system]; and finally, the Involvement and Support category and their codes; [Lack of training courses, Lack of customer awareness, Lack of top management involvement, and Poor supplier commitment].

When the number of responses is calculated, the number is calculated as many times as the word is repeated in all the interviews, for example the number of people who responded to the interview was 10 people, so 10 people could repeat the word more than once, and therefore the calculation is done on the basis of how many times the word was repeated, not how many people answered.

Figure 3-10 shows in detail the importance of each code of the Outsourcing category. As shown, Lack of Government Support code received "8" responses, while Practices of Suppliers code received "7" responses. Finally, Complexity code received the lowest responses, "6" responses, which means that Lack of Government Support code is relatively the most important factor to the Outsourcing category.

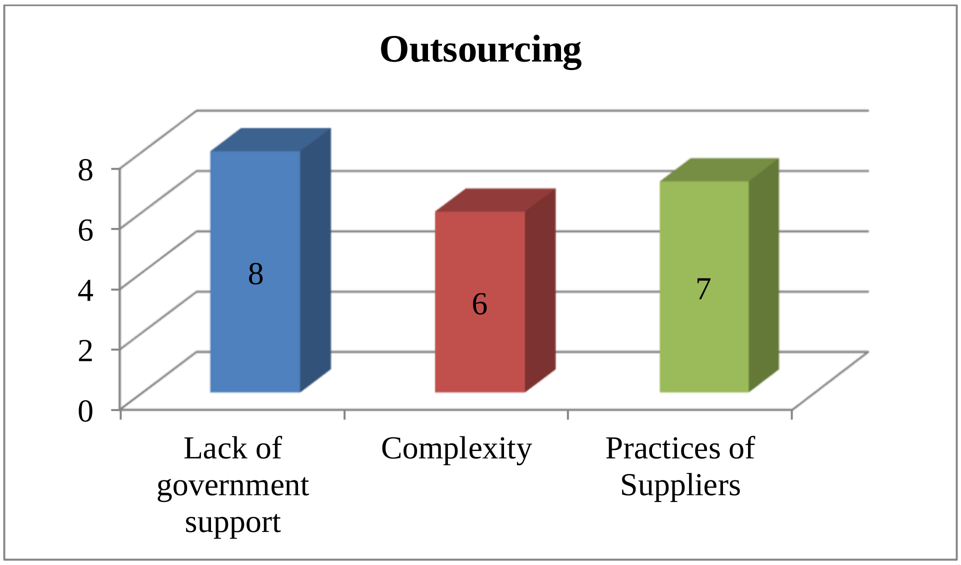

Figure 3- 9: Codes of Outsourcing Category

Figure 3-11 shows in detail the importance of each code of the technology category. As shown, lack of new technology code received "8" responses, while lack of Materials code received “7” responses. Finally, Fear of Failure code received the lowest responses, “6” responses, which means that lack of new technology code is relatively the most important factor to the technology category.

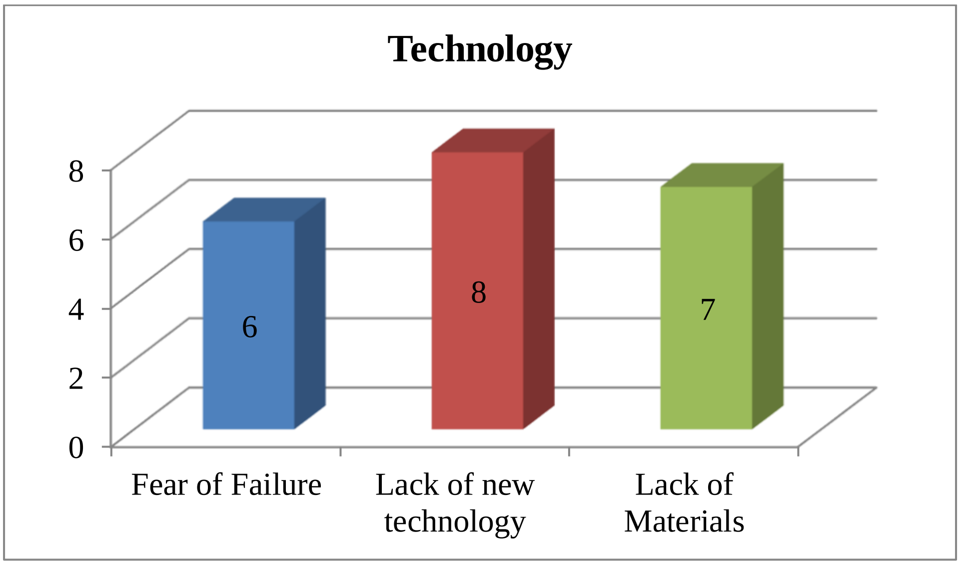

Figure 3- 10: Codes of Technology Category

Figure 3-12 shows in detail the importance of each code of the knowledge category. As shown, Lack of Environmental Knowledge code received “9” responses, while, Lack of awareness about reverse logistics code received “7” responses. Finally, Perception of “out-of-responsibility” zone code received the lowest responses, “5” responses, which means that Lack of Environmental Knowledge code is relatively the most important factor to the Knowledge category.

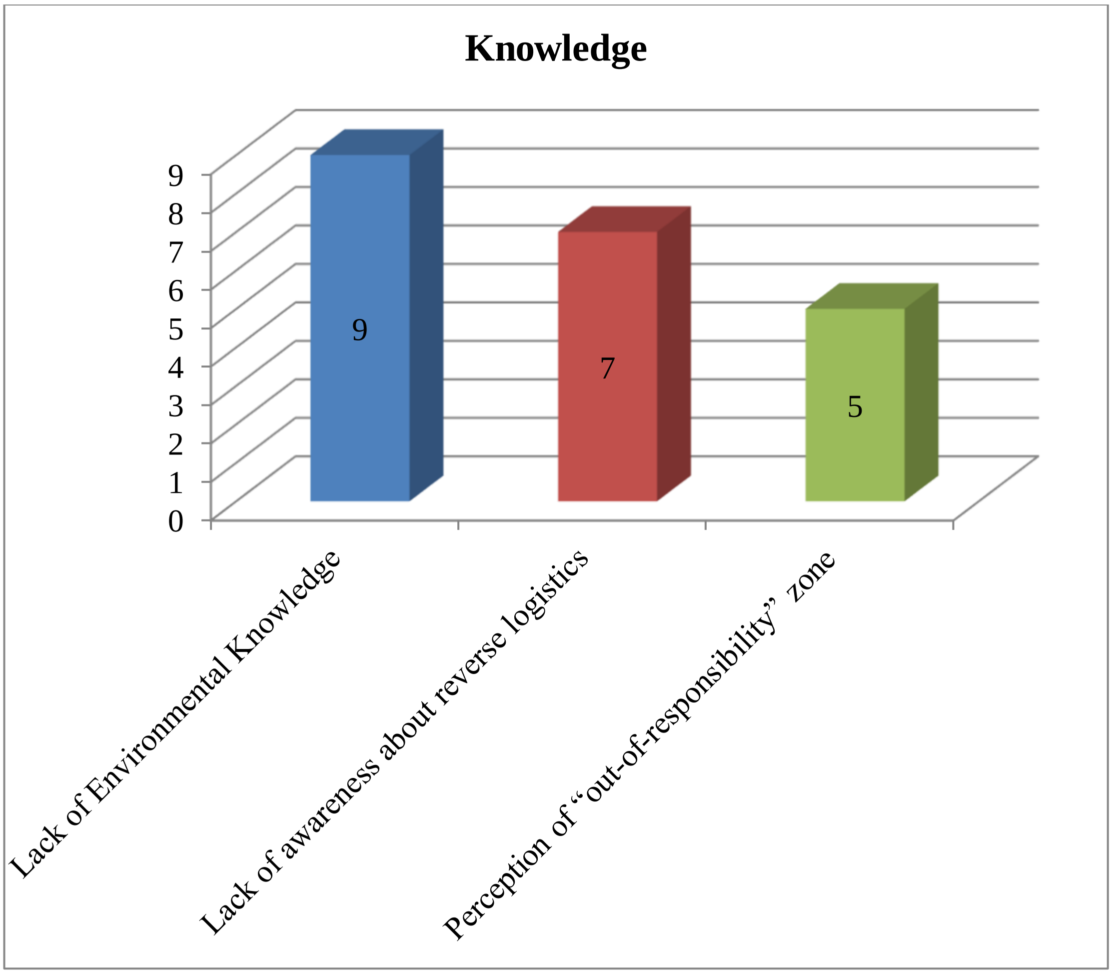

Figure 3- 11: Codes of Knowledge Category

Figure 3-13 shows in detail the importance of each code of the financial category. As shown, Cost of switching to new system code received "9" responses, while, Financial Constraints code received "7" responses. Finally, High cost of hazardous code received the lowest responses, "6" responses which means that Cost of switching to new system code is relatively the most important factor to the Financial category.

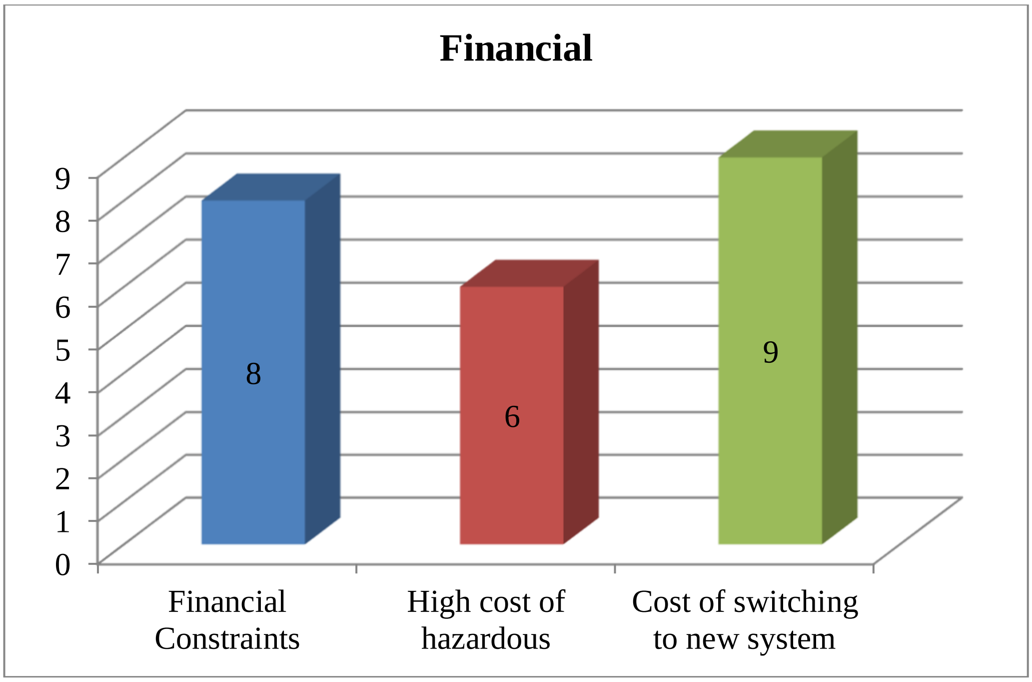

Figure 3- 12: Codes of Financial Category

Figure 3-14 shows in detail the importance of each code of the Involvement and Support category. As shown, Cost of Lack of top management involvement code received “8” responses, while Poor supplier commitment code received “7” responses, then Lack of customer awareness code received “6” responses. Finally, Lack of training courses code received the lowest responses with “5” responses, which means that Lack of top management involvement code is relatively the most important factor to the Involvement and Support category.

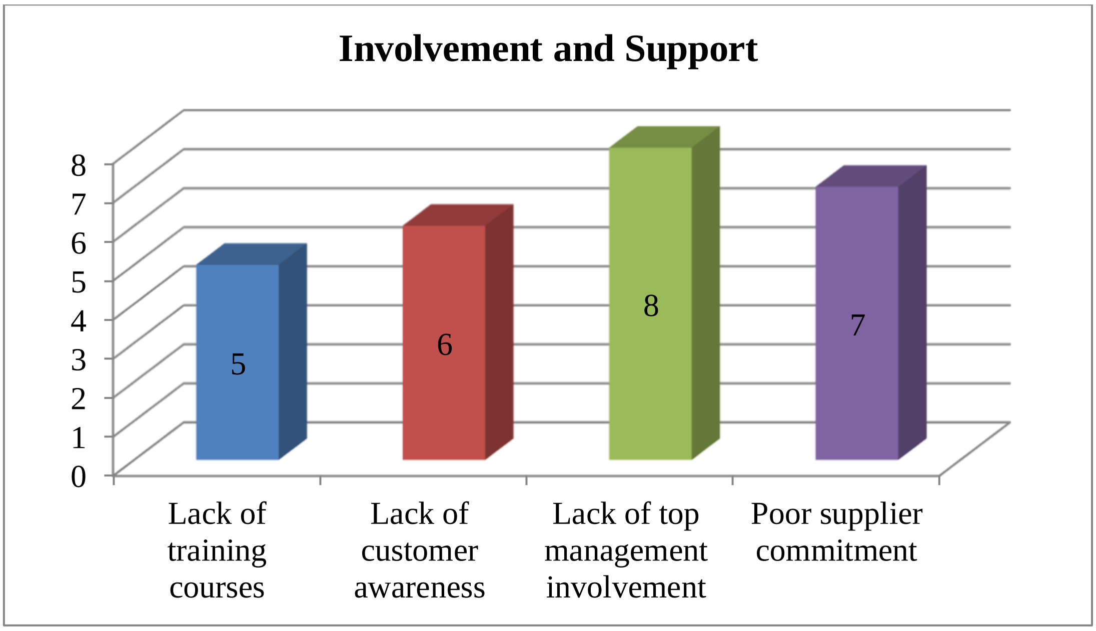

Figure 3- 13: Codes of Involvement and Support Category

Figure 3-15 shows the barriers theme's categories, where it could be observed that Involvement and Support category ranked the highest in importance to the Barriers theme as it received "26" responses, while Financial category ranked the second in importance as it received "23" responses; the lowest responses were for both of the Outsourcing Technology, and Knowledge categories, which received "21" responses.

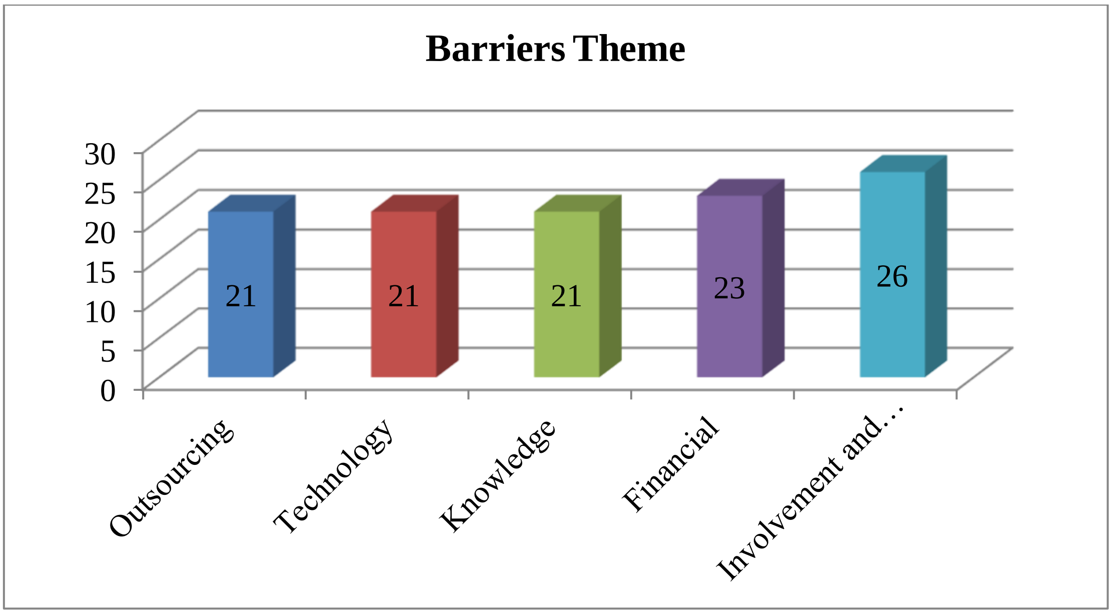

Figure 3- 14: Barriers Theme

6.3.2 Drivers Theme

This section illustrates the findings regarding the prevailing Drivers theme and its categories; Government category with its codes, [CEO Initiative, Government Requirement, and International Requirement]; Managerial category with its codes, [Wasta Management, Top Management, ISO 50001, and Company Policy]; Economic Benefits category with its codes, [Long Term Cost, Cost Reduction, and Health & Safety].

Figure 3-16 shows in detail the importance of each code of the Government category. As shown, CEO Initiative code received "10" responses, while both of Government Requirement and International Requirement codes received equally "9" responses. This means that CEO Initiative code is relatively the most important factor to the Government category.

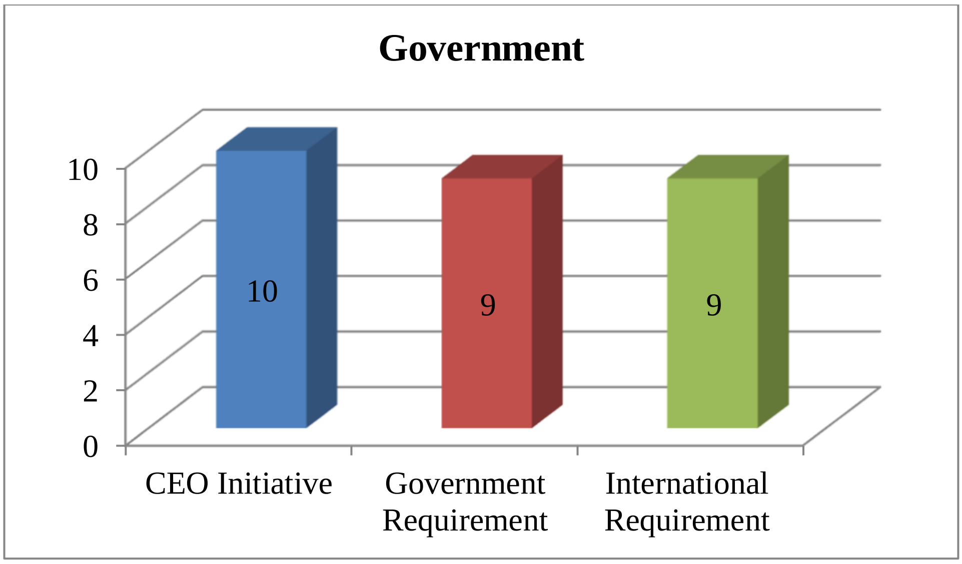

Figure 3- 15: Codes of Government Category

Figure 3-17 shows in detail the importance of each code of the Managerial category. As shown, Top Management code received “10” responses, while ISO 50001 code received “9” responses. Finally, both of Waste Management and Company Policy codes received the lowest responses with equally “8” responses, which means that Top Management code is relatively the most important factor to the Managerial category.

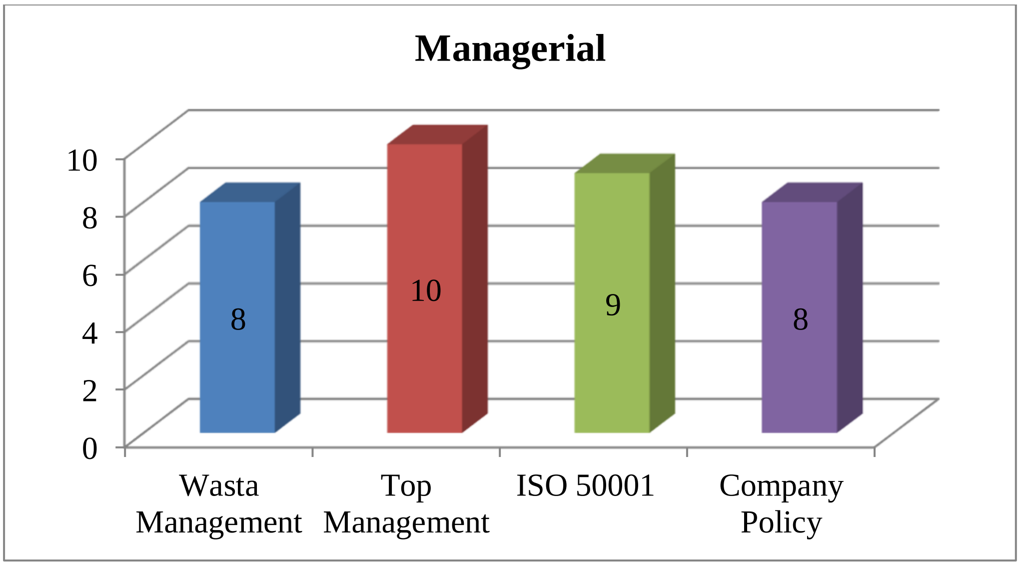

Figure 3- 16: Codes of Managerial Category

Figure 3-18 shows in detail the importance of each code of the Economic Benefit category. As shown, both of Long Terms Cost and Cost Reduction codes equally received “10” responses, while Health & Safety code received “9” responses, which means that both of Long Terms Cost and Cost Reduction codes are relatively the most important factor to the Economic Benefit category.

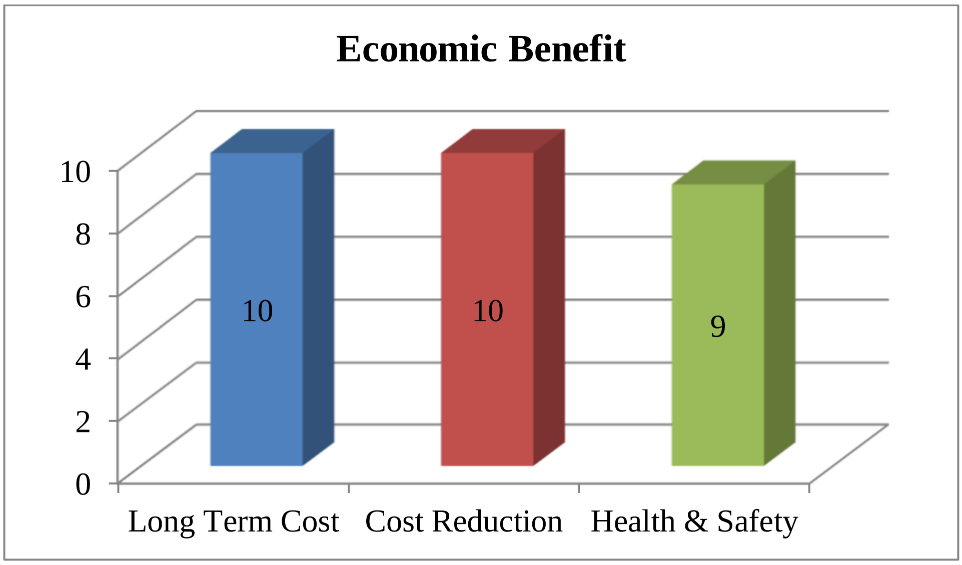

Figure 3- 17: Codes of Economic Benefit Category

Figure 3-19 shows the Drivers theme’s categories, where it could be observed that Managerial category ranked the highest in importance to the Drivers theme as it received “35” responses, while Economic Benefit category ranked the second in importance as it received “29” responses; the lowest responses were for the Government category as it received “28” responses.

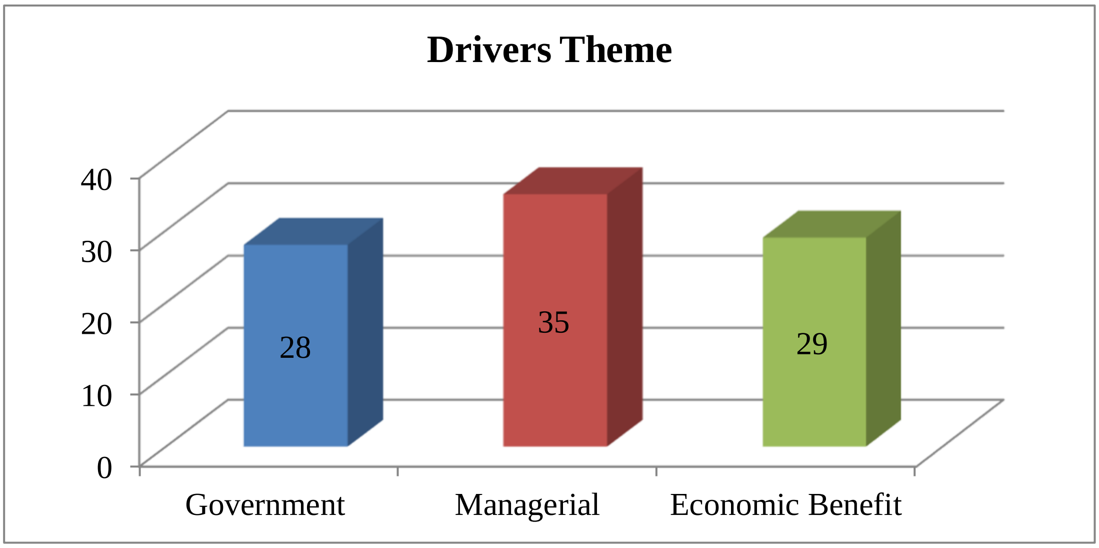

Figure 3- 18: Drivers Theme

Figure 3-20 shows the overall model for GSCM themes.

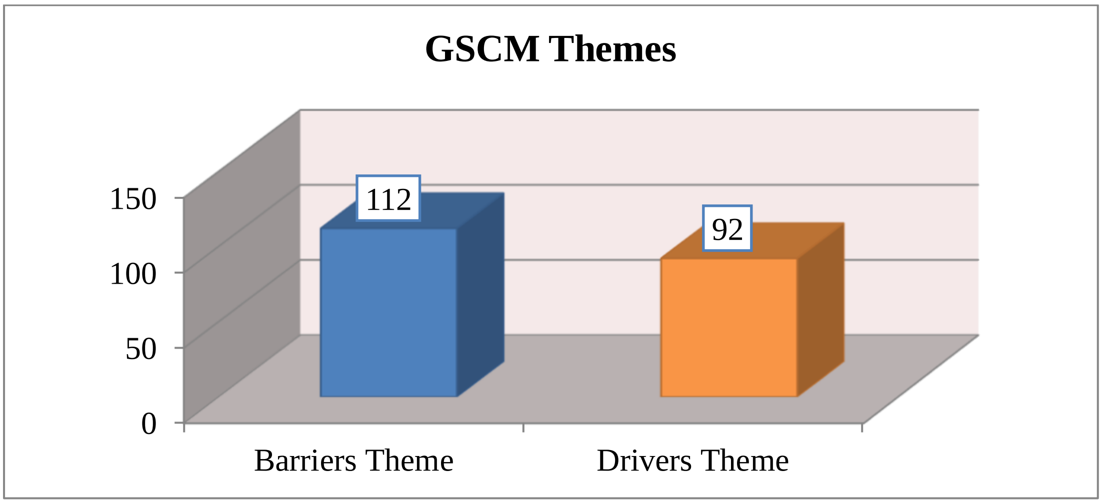

Figure 3- 19: GSCM Themes

6.4 Model Modification according to Interviews Analyses

The main aim and purpose of this research is to develop and understand a framework for different drivers and barriers that affect the green supply chain adoption in the process as well as identifying the role of TOE dimensions in enhancing the process. Thus, the research variables could be divided into Customer Relationship, Supplier Relationship, Supplier Selection, Internal collaboration, Top Management Support, Green Supply Chain Management, Coercive Pressure, Normative Pressure, Mimetic Pressure, Market Pressure, Green purchasing, Barrier for GSCM, and Drivers for GSCM. Figure 6-2 below shows the theoretical framework developed by the researcher.

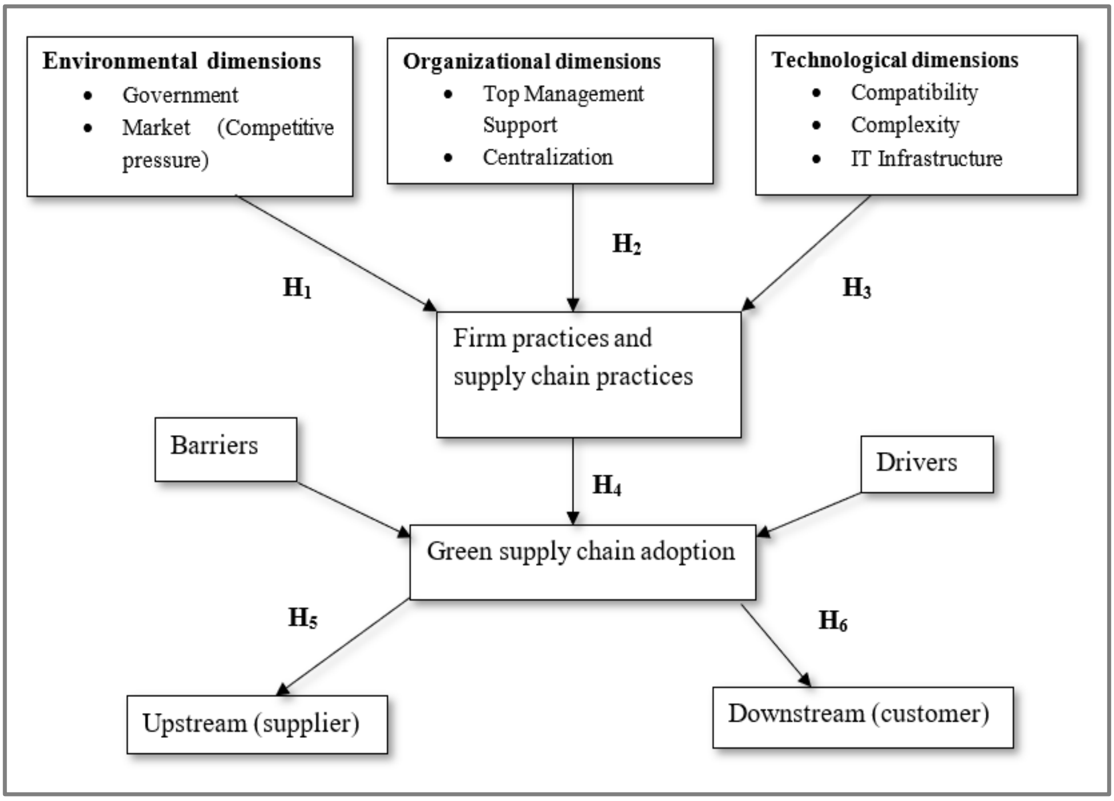

Figure 6- 2: Model Modified According to Interviews

Table 6-1 shows the meaning of the arrows coming from the Barriers and Drivers into the Green supply chain adoption.

Table 6- 1: The Meaning of the Arrows coming from the Barriers and Drivers into the Green supply chain adoption.

Theme	Description	References
Barriers		
Outsourcing	Outsourcing is the business practice of hiring a party outside a company to perform services and create goods that traditionally were performed in-house by the company's own employees and staff. Outsourcing is a practice usually undertaken by companies as a cost-cutting measure.	Govindan et al., 2013 Kannan et al., 2014 Tappin et al., 2015
Technology	Technology is the study and transformation of techniques, tools and machines created by humans. Technology allows humans to study and evolve the physical elements that are present in their lives.	Sandhu et al., 2011 Govindan et al., 2014 Diabat et al., 2016

Theme	Description	References
Knowledge	Knowledge is defined as what is learned, understood or aware of. Knowledge is a familiarity, awareness or understanding of someone or something.	Govindan et al., 2014 Kaur et al., 2018 Sidhu et al., 2019
Finance	Finance is defined as the management of money and includes activities such as investing, borrowing, lending, budgeting, saving and forecasting; this guide provides an overview of how public finances are managed, what the various components of public finance are/government.	Kumar et al., 2011 Govindan et al., 2014
Involvement and Support	Involvement is the act of participating in something. Even if you do nothing but drive the getaway car, you will be held accountable for your involvement in a crime. Involvement is useful because it is not specific. Support the act of showing that you believe that someone or something is good or acceptable, approval of someone or something.	Govindan et al., 2014 Sakundarini et al., 2015 Kaur et al., 2018
Drivers		
Government	The body of persons that constitutes the governing authority of a political unit or organization, such as the officials comprising the governing body of a political unit and constituting the organization as an active agency. The government was slow to react to the crisis.	Giunipero et al., 2012 Zhu and Zhang, 2015
Management	Management is a distinct process of planning, organizing, actuating and controlling, performed to determine and accomplish stated objectives with the use of human beings and other resources. Management is defined as the process by which a co-operative group directs actions towards common goals.	Lee et al., 2015 Fedotkina et al., 2019 Aghajanzadeh et al., 2020
Economic Benefits	The economic benefit embodied in an asset is the potential to contribute, directly or indirectly, to the flow of cash and cash equivalents to the entity or with respect of not-for-profit entities, whether in the public or private sector; the economic benefits are used to provide goods and services.	Tussyadiah et al., 2015 Valentino et al., 2019

Table 6-2 shows the comparison between barriers and drivers of literature reviews and barriers and drivers of interviews.

The researcher found that the barriers that had effects on MENA regions are Lack of Government Support, Complexity, Practices of Suppliers, Fear of Failure, Lack of new technology, Lack of Materials, Lack of Environmental Knowledge, Lack of awareness about reverse logistics, Perception of “out-of-responsibility” zone, Financial Constraints, High cost of hazardous, Cost of switching to new system, Lack of training courses, Lack of customer awareness, Lack of top management involvement and Poor supplier commitment. On the other hand, the researcher found that the drivers that had effects on MENA regions are CEO Initiative, Government Requirement, International Requirement, Waste Management, Top Management, ISO 50001, Company Policy, Long Term Cost, Cost Reduction and Health & Safety.

Table 6- 2: The Comparison between Barriers and Drivers of Literature Reviews and Barriers and Drivers of Interviews

<table>
<tr><th>Literature Reviews</th><th>Interviews</th></tr>
<tr><td colspan="2">Barriers</td></tr>
<tr><td>1. Lack of GSCM practices in firm vision.
2. Absence of GSCM activities in business project.
3. Lack of support from top management to GSCM implementation.
4. Lack of commitment and leadership from middle and senior executives.
5. Unawareness and lack of information among supply chain stakeholders in GSCM.
6. Lack of experience between stakeholders in GSCM implementation.
7. Poor quality of human resource.
8. Inadequate pressure from various societies, Poor legislation.
9. Lack of direct incentives.
10. Limited financial resources, Technical barriers.
11. Absence of management commitment.
12. Absence of employee commitment, Resistance to change and adoption, Poor environmental awareness, and inappropriate approach to implementation.
13. Public awareness.
14. Absence of knowledge and awareness about environmental influences.
15. Poor commitment by top management.
16. Absence of government legal enforcement.
17. Insufficient resources.
18. The lack of a demand for recyclable products.
19. Market Competition and Uncertainty.
20. Cost Implications.
21. Lack of Implementing Green Practices.</td><td>1. Lack of Government Support, Complexity, and Practices of Suppliers.
2. Fear of Failure.
3. Lack of new technology.
4. Lack of Materials.
5. Lack of Environmental Knowledge.
6. Lack of awareness about reverse logistics.
7. Perception of “out-of-responsibility” zone.
8. Financial Constraints.
9. High cost of hazardous.
10. Cost of switching to new system.
11. Lack of training courses.</td></tr>
</table>

Literature Reviews	Interviews
22. Customers Unawareness and Suppliers hesitation. 23. Absence of coordination from academic experts for adoption of eco-design process initiatives. 24. Absence of organizational support for commercialization of cleaner production technology. 25. Difficult external institutional environment 26. Difficulty in regulating and controlling suppliers' environmental practices. 27. Absence of customer awareness on eco-design practices 28. Absence of coordination on eco-design investment 29. Absence of workers' engagement in eco-design initiatives and absence of encouragement from the top management for training initiatives on eco-design practices.	12. Lack of customer awareness. 13. Lack of top management involvement. 14. Poor supplier commitment.
Drivers	
1. Internal Factor (It refers to the drivers that are initiated by the organization itself and adopted by the founders, top management and employees as well. The desire to involve and motivate employees to the increasing awareness of the organization's environmental concerns will improve the employee's productivity in adopting the green supply chain management practices) 2. Governmental Legislations and Policies (Governments enact regulations which must be followed by different organizations to maintain the environmental situation, in addition to this, governments may provide the organizations with technical or financial assistance to help them to reduce their amounts of wastes). 3. Competition Category (It is considered to be a major motive for the adoption of green supply chain management as many businesses tend to adopt the environment-friendly practices to gain a competitive advantage over the other competitors by reducing their emissions, improve their performance and gain good reputation in front of their society as they are concerning with the environmental issue as their concern with generating profits.). 4. Power of Marketing (It is enhancing the implementation of green supply chain management, by announcing that the organization is adopting green supply management practices, the organization will be gaining publicity and good image; in other	1. CEO Initiative. 2. Government Requirement. 3. International Requirement. 4. Waste Management. 5. Top Management. 6. ISO 50001. 7. Company Policy. 8. Long Term Cost. 9. Cost Reduction. 10. Health & Safety.

Literature Reviews	Interviews
words, green supply chain management can be used in advertising and marketing the products and services). 5. Role of Customers (Customer’s awareness and knowledge of the environmental critical need for greening the supply chain will create sever pressure over the organizations and suppliers and will enforce them to adopt the environment-friendly techniques, materials and strategies; in other words, the customer is the main formulator of the standards of the products and services; therefore, the organizations have no other choice rather than meeting the desires of the customers; otherwise, the customers may be rejecting these products and services).	

Chapter Seven: Model Testing

7.1 Hypotheses Development

In this part, the hypotheses of the study will be developed to find out whether these previous studies are consistent with the model of this study or not.

It has been observed that there is a great intention on developing and improving enterprises and industries in each country by using new procedures, methods and strategies. One of those strategies is enhancing the Supply Chain (SC) practices. SC and SC practice are considered to be one of the most essential elements for any industry and company. Therefore, those practices are required from companies to be responsible for. In addition, SC practices have an influence on the society. Thus, one of the main important things is the government intervention for regulating the practices (Zhang et al., 2017).

It is known that any producer seeks to maximize the profit and\or minimize the cost of production. Any production process has a social cost almost no producer recognizes it in their cost. One of procedures of the production process is transferring the product to consumers or receiving raw material from suppliers, which is done by SC practices. For engaging the social cost in the SC practices, there is a need for government intervention. The government takes the responsibility to observe the environmental performance of firms' SC practice to maintain social benefits in the process of production and SC (Zhang et al., 2017).

In addition, Yang et al. (2015) stated that any company needs to be legitimate and proceed with its production process and its SC practices with avoiding penalties. Those penalties could be avoided by obeying and applying the government regulations. One of those regulations is the environmental regulation to reduce the social cost (bad externalities) for society, which is apparent from production and SC practices, such as pollution, emissions and carbon emissions. In addition, the government regulations may help to increase the social benefit (good externalities), which is created from production and SC practices, such as reducing the carbon emissions, using renewable energy, using eco-design system for SC and production practices.

On the other hand, with the rapidity of the production and the competition conditions of any market, the need of enhancing the way of production has been developed. In the competitive market, each firm seeks to differentiate its products. One of the most recent methods to be differentiated is to go greener in their SC practices or to improve their SC practices to be attractive and differ from the competitors. Thus, there is a significant concern about managing the SC practices (Cao and Mu, 2011). This market and competition pressure could be considered one of the reasons to improve the practices of SC in every company. Nowadays, organizations seek to mention their market share in the massive competitive market by utilizing the (green) SC management as one of tools to attract their consumers and improve their market share and elevate their profit to satisfy their stockholders and stakeholders (Kim and Chai, 2017).

Cantor et al. (2015) examined the impact of competitive pressure as it is one of the environmental dimensions on supply chain management. The study depended on a survey that was conducted for collecting data from 230 firms and analyzed the valid data using structural equation modeling (SEM). The results found that there was a significant relationship between competitive pressure and supply chain management. (Chung et al., 2017) illustrated the relationship between government support as one of environmental dimensions and firm practice. A questionnaire was conducted for collecting data from 488 venture companies in South Korea. The results found that there was a positive relationship between government support as one of environmental dimensions and firm practice.

Anwar et al. (2018) investigated the relationship between government support as one of environmental dimensions and firm practice. A questionnaire was conducted for collecting data from 326 Small and Medium Size Enterprises (SMEs) in Pakistan and analyzed the valid data to examine the study hypothesis (the relationship between government support as one of environmental dimensions and firm practice) using structural equation modeling (SEM). The results found that there was a significant relationship between government support and firm practice.

Thus, it could be noticed that the environmental dimensions, which are government regulations and market (competition) pressure, are related to and affected the SC practices. Therefore, the first hypothesis could be concluded that:

H_1: There is a significant relation between the environmental dimensions and supply chain practices.

SC is one of important sectors in any organization because of the importance of its practices that facilitate the connection between the organization and its suppliers (up-streamers) and reduce the gap to reach to its consumers (down-streamers). In addition, it has been noted that with an optimum utilization of SC practices, the way of connection could be cheaper (profitable), efficient and flexible. Therefore, firms seek to achieve efficient and effective practices in the process of SC. The board of directors should support this decision (Sandberg and Abrahamsson, 2010). Thus, it is very critical to notice the importance of top management to support the development of the SC practices. This upgrading of the coordination between a specific firm and its associated partners, such as its suppliers and consumers, needs a wise and professional management to incorporate the practices of its SC in the production system efficiently and effectively (Singh, 2013).

Singh (2013) stated that this sophisticated procedure of developing SC practices at any organization requires a strategic and systematic process and set of organized steps. Those procedures need a few things, such as the willingness of the top management to execute appropriate SC practices in their firm and production process. An efficient and flexible strategy made by top management and supply chain management (SCM), and the most essential thing needed is the top management, supports the achievement of an efficient SC. Kumar et al. (2015) observed that with management support, an effective supply chain plan to execute its practice would accomplish the organizational objectives that improve consumer satisfaction, optimize income, minimize the cost of production and improve the company's competitive advantage.

In addition, companies adopt different structures for their supply chain organization. While one company might retain SC practices, functions and strategies at the corporate level, another might delegate SC practices, functions and strategies to the business units (Sandberg and Abrahamsson, 2010). If it were delegated to corporate level or to managerial level, it would be named as Centralization. However, the delegation of SC practices goes to the business units of the firm may be named as Decentralization. It has been proved that the coordination mechanism of SC is more efficient and effective in case of decentralization control, and the centralization decisions for practices and functions of SC management would not be realistic in most cases (Singh, 2013).

Kamaruddeen et al. (2012) investigated the influence of centralization as it is one of organizational dimensions on firm practices. A questionnaire was conducted and designed for collecting data from 504 housing developers from the Real Estate, and only 183 questionnaires were valid and analyzed for testing the research hypothesis using correlation and regression analysis. The findings indicated that there is significance but not a strong influence of centralization on firm practices.

Brammer et al. (2012) illustrated the relationship between top management as one of organizational dimensions and supply chain management. The study depended on survey conducted for collecting data from 340 buyer–supplier relationships in UK and analyzed the valid data to examine the study variables (top management and supply chain management) using regression analysis. The results showed that there was a significant relationship between top management and supply chain management.

Fareed et al. (2016) explained the impact of top management as one of organizational dimensions on firm practices. The study was built upon conducted survey questionnaire for collecting data from 45 TMT leaders of PNB invested companies and analyzed the valid data using PLS-SEM Analysis. The results found that there was a significant relationship between top management and firm practices.

Both top management support and centralization are combined under the organizational dimensions. Therefore, the researcher could conduct the second hypothesis as follows:

H_2: There is a significant relation between the organizational dimensions and supply chain practices.

Hwang et al. (2016) have clarified that the technology has an essential effect on the company practices, production system and the quality of SC function. The technology has three critical elements to recognize (Complexity, Compatibility, and IT Infrastructure). It could be stated that complexity is how easily the innovation could be understood and implemented, in other words, complexity of executing the

SC functions and practices. Implementing an efficient SC not only requires a good strategy made by a firm but also needs an association between this firm and its external partners, which creates complexity to develop strategic SC practices. This innovative link will be succeeded and achieved in case of technology to facilitate a lower level of complexity (Chou et al., 2012).

In addition, Zhang et al. (2017) have claimed that the inherited fear of change and complexity of technology may reduce the efficiency of applications of SC practices. The complexity could be noticed when the process is converted from buyer's orders into supplier's manufacturing orders. It has been known that the complexity of SC function has a negative impact on the performance of the organization and by extension the profitability (Gimenez et al., 2012). The reduction of complexity to increase the efficiency of SC practices could be done by incorporating appropriate technology in the SCM.

Chou et al. (2012) claimed that compatibility of innovation or technology used in the process of SC should be suitable and reflect with norms and experiences of the potential users, whether the external or the partners of the chain. They have found that compatibility of the technological capabilities in the SC practices enhances the competitive advantage and usage of those practices. Balasubramanian (2012) has observed the lack of technological (IT) infrastructure effect on the efficiency of the SC practices performance. However, Dashore and Sohani (2013) noticed that with a good solid technology infrastructure, it creates an increasing of the capacity of the partners of the SC. In addition, they noted that a firm with an existing, good technology infrastructure has the ability to enhance the process and the strategy of its SC.

Pedersen et al. (2019) clarified the relationship between complexity as one of technological dimensions and firm practice. The study was built upon collecting data from 755 providers in different countries and regions through survey method. The study found that there was a positive relationship between complexity as one of technological dimensions and firm practice.

Shahzad et al. (2020) examined the impact of compatibility as one of technological dimensions on green supply chain management. A structured survey was conducted for collecting data from 370 surveys, and only 187 responses were valid, and was analyzed using structural equation modeling (SEM). The results found that there was a positive impact of compatibility as one of technological dimensions on green supply chain management.

From the previous section, the third hypothesis could be developed as follows:

H_3: There is a significant relation between the technological dimensions and supply chain practices.

Green supply chain (GSC) initiatives help to improve any organization's ecological and economic gains by recycling unused/unwanted goods and disposing of products in an eco-friendly manner. From a holistic view, green SC initiatives in any industry can be defined as the inclusion of green practices at each stage of the SC. The GSC plays a crucial role in distributing goods/materials to stakeholders in industries. Thus, GSC adoption may transform firms to become environmentally friendly and more responsible to the community (Emmet and Sood, 2010). GSC adoption involves optimum utilization of resources as opposed to traditional SC practices. In addition, environmental issues have become a notably prevalent concern for governments, societies and business organizations. Business organizations are considered the source of most of the environmental problems (Green et al., 2012).

Ogunlela (2018) has explained that the most common thought that comes to mind when it comes to going green is the basic act of recycling, reusing and reducing. There are many avenues in which a company can contribute to go green. Thus, GSC adoption could be one of the most essential factors for any company willing to introduce the green into its supply chain practices. The implementation of the GSC involves mainly the practices of reducing the pollution of the production processes, in addition to the practices which have positive influence on the energy usage, besides the optimum usage of the resources, which are included in manufacturing in order to achieve the best output out of them with minimum wastes that cause harm to the environment on the one hand and on the other hand cause extra burden over the organizational resources and capabilities (Chowdhury et al., 2016).

Therefore, the adoption of GSC consists of factors that drive the different manufacturing industries to minimize the wastes and harmful emissions that are combined with different steps of their SC management. Thus, a good firm and SC practices create an efficient adoption of GSC (Zhao et al., 2017).

Diabat and Govindan (2011) examined the drivers that had influence on green supply chain management. The study was built upon the Interpretive Structural Modeling methodology using a structural equation modeling (SEM) framework. The results found that there were eleven drivers that had an effect on green supply chain management as follows: certification of suppliers' environmental management system, environmental collaboration with suppliers, collaboration between product designers and suppliers to reduce and eliminate product environmental impacts, government regulation and legislation, green design, ISO 14001 certification, integrating quality environmental management into the planning and operation process, reducing energy consumption, reusing and recycling materials and packaging, environmental collaboration with customers and reverse logistics.

Diabat et al. (2013) examined the barriers that had an effect on supply chain management. The study was built upon the interpretive structural modeling (ISM) methodology to discover barriers that had an effect on supply chain management of fastener industry in India. The study found that there were 13 barriers that had an effect on supply chain management as follows: lack of sustainability standards and appropriate regulations, misalignment of short-term and long-term strategic goals, lack of effective evaluation measures about sustainability, inadequate facility for adoptions of reverse logistic practices, lack of top management commitment to initiate sustainability practices. These barriers are less dominant for the adoption of SSCM in fastener manufacturing industries, inadequate industrial self-regulation, lack of IT implementation, lack of training and education about sustainability, cost of sustainability and economic conditions, including complex design to reduce consumption of resources and energy, cost for environmentally friendly packaging and lack of clarity regarding sustainability.

Stentoft et al. (2020) investigated the impact of barriers and drivers on firm practice. The study was built upon a questionnaire survey that conducted and designed for collecting primary data from 308 manufacturers. The study found that the drivers and barriers had a significant effect on firm practice. Thus, the fourth hypothesis could be developed as follows:

H_4: There is a significant relationship between drivers, barriers and firm practices and supply chain practices and the green supply chain adoption.

In implementing sustainable development practices, GSCM with Supplier Relationship Management is defined as environmental collaboration between a focal company and its suppliers. It sheds the light on the Supplier Relationship Management segment of an item or entity's supply chain. Businesses should involve their vendors with a view to implementing environmentally sustainable procurement and material management policies. Environmental performance of their suppliers is largely monitored by firms to ensure that the materials and equipment they supply are environmentally friendly and are manufactured through environmentally friendly methods. A real-life example is international automobile manufacturers (e.g. Ford, General Motors (GM) and Toyota); they have required their Chinese suppliers to acquire ISO 14001 certification. Suppliers are recognized as the main group in supply chains, since they can promote environmental policies of companies and help strengthen the environmental standards of the supply chain (Yu et al., 2014).

Vachon and Klassen (2006) focused in their study on GSC practices' antecedents. Supply chain integration, in the context of logistical and technical integration, was evaluated for its effect on supply chain environmental practices. The study focused on the primary suppliers and with major customers. The empirical analysis thus shows that there is a strong, multi-faceted connection between the characteristics of the Supplier Relationship Management and the GSC practices, while the relationship between Customer Relationship Management characteristics and GSC practices appears to be confined to a single significant variable, which is technological integration. Accordingly, the following hypothesis can be developed.

H_5: There is a significant relationship between GSC adoption and suppliers relationship management

GSCM should be considered in each and every step of the SC, starting from sourcing, choosing suppliers, product design, production, manufacturing and manufacturing techniques and until the finished product is delivered to the customer along with end-of-life product management (Suryanto et al., 2018). As mentioned above, GSCM can be enforced throughout the different areas of the SC. It can revolutionize traditional SCM by using green design, green procurement and environmental performance assessment of suppliers as the Supplier Relationship Management practices. GSCM may be extended for Customer Relationship Management operations by considering opportunities for recycling and recovery when the commodity has finally offered its utility. It also covers the selling and disposal of surplus inventories. GSCM includes certain practices within the enterprise, such as Green design, Green production and Green packaging (Emmet and Sood, 2010).

Green et al. (2012) believe that systematic and comprehensive analytical studies should be used to analyze the relationship between GSCM and efficiency. The phenomenon must be seen from the viewpoint of the SC, including both the Supplier Relationship Management and Customer Relationship Management sides as well as the internal processes. The suppliers and customers are the main parties at both Supplier Relationship Management and Customer Relationship Management. Such parties have given the SC an important process, particularly for companies with a strategic plan. Since each focal organization acts as a buyer to its suppliers and as a supplier to its customers, environmental engagement and monitoring in the SC will include both Supplier and Customer Relationship Management (Laari et al., 2016).

GSCM with Customer Relationship Management is defined as environmentally sustainable collaboration between a company and its customers to meet customers' environmental requirements. It concentrates on the Customer Relationship Management side of the SC. Past research set out specific avenues for producers to collaborate on the environmental side with their consumers. For successful implementation of GSCM practices, it is necessary to establish close and long-term relationships with Customer Relationship Management customers. Research by Christmann and Taylor (2001) in the Chinese context has shown that customer demand is a primary driver of enhancing the understanding and practices of the environment by firms in China. Understanding the needs of end customers is also part of GSCM, as it serves as a major factor in value development. Because of the rising environmental demands of consumers, it is critical that businesses engage with green packaging customers on the environment, meet environmental goals jointly and develop a joint environmental strategy (Yu et al., 2014).

Chen and Lee (2010) introduced that green consumerism has become a trend: the consumers prefer to purchase green products and are also willing to pay higher prices for green products. As for the competitors, it was demonstrated that adopting environmental concern can create value from the "product differentiation strategy" effect and naturally form a "green mobility of barrier" to block out those who did not adopt environmental protection programs.

Teller et al. (2016) investigated the relationship between supply chain adoption and supplier. The study was built upon conducted surveys distributed on 174 managers in different supply chain stages and analyzed the valid data to examine the study variables (supply chain adoption and supplier) using structural equation modeling (SEM). The results found that there was a direct relationship between supply chain adoption and supplier.

Cami (2020) clarified the relationship between supply chain adoption and supplier. A survey was conducted for collecting data from Chief Executive Officer, Chief Technology Officer (and representative from Customer Success team) and analyzed the valid data to test the study hypothesis (the relationship between supply chain adoption and supplier). The study found that there was a significant relationship between supply chain adoption and supplier.

Therefore, the following hypotheses can be developed.

H_6: There is a significant relationship between GSC adoption and Customer Relationship Management

7.1.1 Research Variables Validation

After defining the research variables using the previous studies relevant to the research problem and the preliminary interviews assigned in this research, the researcher started operationalizing the research variables. A questionnaire is defined as a set of close ended questions asked to collect data. The questionnaire is one of the most popular instruments used for collecting and gathering the appropriate data and information needed from people (Olsen and George, 2004). These questionnaires are easy to be administrated, consistent in answers and easy for data management.

Thus, this study adopted the structured questionnaire that includes closed ended questions to obtain the quantitative data. A questionnaire is applied to confirm some factors, besides having an overall image of the participants' answers. In order to be able to answer the proposed research questions, this study used quantitative data collection method in the form of a structured, close ended questionnaire. The administrated survey was the method used. Questionnaires are vital tools of data collection, specifically to the case when there are a large number of people to reach in separate geographical areas. They are popular methods to collect data due to the easiness in which researchers fairly obtain responses and also the ease of coding the results (Sekaran and Bougie, 2016).

7.1.2 Research Framework and Hypotheses

Figure 7-1 present the proposed framework for the research.

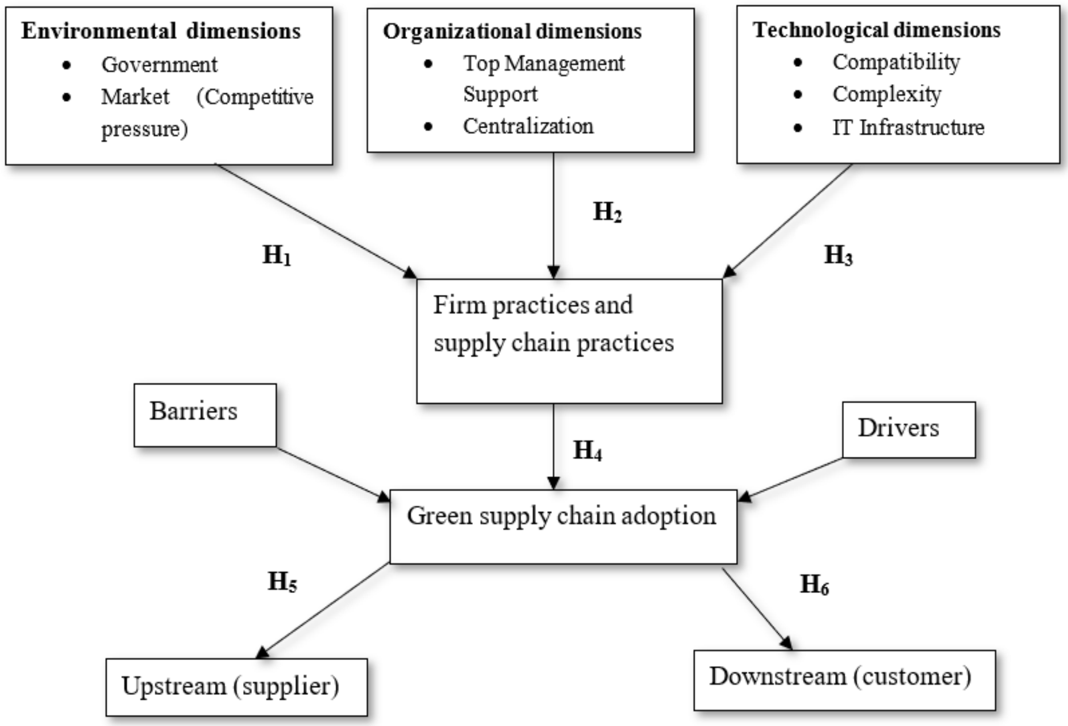

Figure 7- 1: Conceptual Framework
Source: Developed by Researcher

According to the above research framework, the main hypotheses are stated as follows:

H1: There is a significant relationship between environmental dimensions and firm practices and supply chain practices

H2: There is a significant relationship between organizational dimensions and the firm and supply chain practices

H3: There is significant relationship between technological dimensions and the firm and supply chain practices

H4: There is a significant relationship between drivers, barriers and firm practices and supply chain practices and the green supply chain adoption

H5: There is a significant relationship between green supply chain adoption and supplier relationship management.

H6: There is a significant relationship between green supply chain adoption and customer relationship management

7.1.3 Research Variables Measurement

In this section, the questionnaire questions are reviewed and their components are discussed, with the variables divided into Customer Relationship, Supplier Relationship, Supplier Selection, Internal collaboration, Top Management Support, Green Supply Chain Management, Coercive Pressure, Normative Pressure, Mimetic Pressure, Market Pressure, Green purchasing, Barrier for GSCM, and Drivers for GSCM.

Table 7- 1: Research Variables Measurement

Variable	Questions
TOE Dimensions	
Competitive Pressure	1. Competitors' adoption of GSCM places pressure on our organization to adopt GSCM.
	2. The overall operational practices in the industry pressure us to adopt GSCM.
	3. Our organization actively keeps track of new practices of GSC by competitors
	4. Training for GSCM is adequately provided by vendors.
	5. Technical support is adequate during GSCM implementation.
Government regulations and support	6. The availability of government security and protection influence us to use GSCM.
	7. There are adequate financial aids from government (e.g. tax deduction, tariffs, financial subsidy) to

Variable	Questions
	adopt GSCM applications.
Top management support	8. Top management enthusiastically supports the adoption of GSCM.
	9. Top management has allocated adequate resources for the adoption of GSCM.
	10. Top management is aware of the benefits of GSCM.
Centralization	11. All major strategic decisions need to be approved by top management.
	12. We have to ask senior management before taking almost any decision.
	13. Even quite small matters have to be referred to someone higher up for a final answer.
Perceived Compatibility	14. Adoption of the system is compatible with existing operating practices.
	15. GSCM practices are consistent with our organization's values and belief.
	16. The system is/will be incompatible with existing hardware and network facilities.
	17. The implementation of the GSCM system is/will be incompatible with existing software applications and database system.
Perceived Complexity	18. GSCM is complex to use.
	19. GSCM development is a complex process.
	20. GSCM is hard to learn.
	21. Integrating GSCM into our current work practices will be very difficult.
IT Infrastructure	22. Our organization is highly computerized with internal and external network connections that connect the firm with its branches.
	23. The organization has sufficient software and database resources to support the system.
	24. The organization has speedy internet facility.
	25. The organization has a strong backup plan for network failure.
GSCM practices Factors	
Green Purchasing	26. Environmental labels shall be placed on the products.
	27. Cooperate with suppliers for environmental objectives.
	28. The internal supplier management conducts environmental audits
	29. Our Suppliers have ISO 14000 certification.
	30. Second-tier supplier environmentally friendly practice be evaluated
	31. Providing design specification to suppliers that include environmental requirements for purchased item.

Variable	Questions
Cooperation with customers for environmental requirements	32. Cooperation is done with customers for eco-design.
	33. Cooperation with customers is cleaner production.
	34. Cooperation with customers is green packaging.
	35. Cooperation with customers is using less energy during transportation.
Investment recovery	36. Sale of excess inventories/materials.
	37. Sale of scrap and used materials.
	38. Sale of excess capital equipment.
	39. Recycling system is used and defective products.
Eco-design	40. Design of products for reduced consumption of material/energy.
	41. Design of products for reuse, recycle, or recovery of materials or component parts.
	42. Design of products to avoid or reduce use of hazardous products.
Internal environmental management	43. Investment recovery (sale) of excess inventories/materials.
	44. Sale of scrap and used materials.
	45. Sale of excess capital equipment.
	46. Investment recovery (sale) of excess inventories/materials.
GSCM Adoption Factors	
Supplier Relationship Management	47. With regard to our suppliers, we educate and generate awareness.
	48. With regard to our suppliers, we help set up environment-friendly practices.
	49. With regard to our suppliers, we encourage and motivate them to implement EMS and ISO 14001.
	50. With regard to our suppliers, we incentivize for conformance to EMS/ISO 14001.
	51. With regard to our suppliers, we urge to supply environment-friendly materials.
	52. With regard to our suppliers, we audit supplier performance to conformance.
	53. With regard to our suppliers, we select based on environment-related criteria.
	54. In packaging, storage and distribution of raw materials and finished goods, we focus on use of recyclable packaging materials.
	55. In packaging, storage and distribution of raw materials and finished goods, we focus on use of alternative transport mechanisms.
	56. In packaging, storage and distribution of raw materials and finished goods, we focus on achieving economies of scale in transportation.
Customer Relationship Management	57. We adopt GSCM practices under pressure from consumers.

Variable	Questions
	58. In packaging, storage and distribution of raw materials and finished goods, we focus on the use of environment-friendly packaging.
	59. In packaging, storage and distribution of raw materials and finished goods, we focus on the use of environment-friendly storage.
	60. In packaging, storage and distribution of raw materials and finished goods, we focus on use of alternative transport mechanisms.
	61. In packaging, storage and distribution of raw materials and finished goods, we focus on achieving economies of scale in transportation.
	62. Our customers are environment conscious.
	63. We handle returns from customers promptly.
	64. By adopting GSCM practices, we have achieved increase in sales of products.
	65. By adopting GSCM practices, we have achieved increase in market share.
	66. By adopting GSCM practices, we have achieved penetration of new markets.
	67. By adopting GSCM practices, we have achieved acquisition of new customers.
In your opinion, what is the most important barrier for GSCM?	
Barriers	68. Increased cost of adoption.
	69. Focus on short term profitability.
	70. Lack of money.
	71. Lack of integration.
	72. No support from government.
	73. Resistance from suppliers.
	74. Poor supplier commitment.
	75. Lack of partner trust.
	76. Lack of top management commitment.
	77. Lack of training.
	78. Lack of education.
	79. Lack of human resources capability.
	80. Lack of knowledge.
	81. Lack of resources.
	82. No capability.
	83. Outdated auditing standards.
	84. Poor demand forecasting.
	85. No information sharing.
	86. No technology sharing.
	87. Lack of awareness.
In your opinion, what is the most important drivers for GSCM?	
Drivers	88. External pressure.
	89. Incentives and support by various agencies.
	90. Demand of customer and other stakeholders.
	91. Sustainability awareness.

Variable	Questions
	92. Top management commitment and support.
	93. Sharing resources.
	94. Capacity building and development.
	95. Monitoring & auditing supply chain partners.
	96. Competitive and marketing advantage.
	97. Information sharing.
	98. Trust and commitment among partners.
	99. Knowing and solving supply chain partners' problems.
	100. Cost reduction.
	101. Long term Partnership.

7.2 Data Analysis

The quantitative analysis using SPSS (statistical package for social science) was performed (Brammer et al., 2012; Kamaruddeen et al., 2012; Cantor et al., 2015). The quantitative analysis will include data testing and hypotheses testing using correlation, regression and structural equation modeling. The statistical techniques are described in details in the following sections.

7.2.1 Descriptive Analysis for Respondents Profile

The descriptive statistics is a tool which explains and gives a distinct understanding of the features of certain data set, by giving short summaries about the respondents and how the diversification had been applied to select a representative sample for the population under study. In addition, the researcher could be able to identify if there is a gap for improvement in the research variables or not. Data are described here using tables of frequencies that show the number and the percentage of respondents sharing in the questionnaire under each category. Table 7-2 illustrates this by showing the frequencies for the respondent profile.

Regarding gender, it could be observed from Table 7-2 that the number of 'Male' respondents (n = 322) is higher than 'Female, with a percentage of 79.5%. Considering age, it could be noticed that respondents at the age group of '25-35 yrs.' are the most frequently appearing, with a number of 178 respondents and a percentage of 44% of the sample under study. Similarly, respondents working in the position of 'Supply Chain' are the most frequently appearing than other respondents, with a number of 94 responses and a percentage of 23.2%. Likewise, respondents with work experience of '11-20' (n = 169) are higher than other respondents, with a percentage of 41.7% of the sample under study. In addition, respondents that have GSCM establishing for ‘more than 4 years’ (n = 186) are higher than other respondents with a percentage of 45.9%. Furthermore, respondents that have ‘Total quality environmental management’ GSCM Practices (n = 74) are higher than other respondents with a percentage of 18.3%. Moreover, respondents that have ‘Over 900 employees’ Number of Permanent Employees (n = 185) are higher than other respondents with a percentage of 45.7%. Finally, respondents that have ‘ISO 14001’ are more than other respondents, with a percentage of 63% of the sample under study.

Table 7- 2: Respondent Profile

	Frequency	Percent%	Total
Gender			
Male	322	79.5	405
Female	83	20.5	
Age			
Below 25 yrs.	9	2.2	405
25-35 yrs.	178	44.0	
35-45 yrs.	144	35.6	
Above 45 yrs.	60	14.8	
Missing	14	3.5	
Current Occupation/Position			
Supply Chain	94	23.2	405
Procurement Department	47	11.6	
Logistics Department	73	18.0	
Marketing/Sales Department	51	12.6	
Manufacturing/Production	21	5.2	
Distribution Department	9	2.2	
Safety/Environment Department	14	3.5	
Quality Assurance Department	8	2.0	
Other	61	15.1	
Missing	27	6.7	
Work Experience			
0-10	144	35.6	405
11-20	169	41.7	
21-30	61	15.1	
31-40	15	3.7	
Over 40	16	4.0	
GSCM Establishing			
It has been 1 year	136	33.6	405
It has been 2 years	32	7.9	
It has been 3 years	21	5.2	
It has been more than 4 years	186	45.9	
Missing	30	7.4	
GSCM Practices			

	Frequency	Percent%	Total
Green procurement	72	17.8	405
Reverse Logistics	31	7.7	
Green design	17	4.2	
Green Manufacturing	56	13.8	
Green Distribution	12	3.0	
Green Logistics	41	10.1	
Green Suppliers	15	3.7	
Investment Recovery	8	2.0	
Total quality environmental management	74	18.3	
Green marketing, and customer cooperation	40	9.9	
Environmentally friendly packaging	20	4.9	
Missing	19	4.7	
Number of Permanent Employees			
1~299 employee	156	38.5	405
300~499 employee	44	10.9	
500~699 employee	7	1.7	
700~899 employee	5	1.2	
Over 900 employees	185	45.7	
Missing	8	2	
Availability of ISO 14001 Certification			
Have ISO 14001	255	63.0	405
Do not Have ISO 14001	142	35.1	
Missing	8	2	

After presenting the respondents profile, the researcher presents the descriptive analysis for the research variables in the following section.

7.2.2 Descriptive Analysis for Research Variables

Similar to the respondents' profile, the researcher is able to present the frequencies of responses used for representing the research variables. Table 7-3 illustrates the descriptive analysis for the research variables using frequencies, where the value "1" refers to "Strongly Agree" response, the value "2" refers to "Agree" response, the value "3" refers to "Neutral" response, the value "4" refers to "Disagree" response, and the value "5" refers to "Strongly Disagree" response. The Mean and Standard Deviation for the research variables are presented in Table 5-2 as well. The mean value of Competitive Pressure is found to be 3.4815, with a standard deviation of .79776. In addition, the mean value of Government Regulations and Support is found to be 3.5012 with a standard deviation of 1.14888. In addition, the mean value of Top Management Support is found to be 3.6247, with a standard deviation of 1.01347. Moreover, the mean value of Centralization is found to be 3.9259 with a standard deviation of 1.01447. Furthermore, the mean value of Perceived Compatibility is found to be 4.1160, with a standard deviation of .92483. In addition, the mean value of Perceived Complexity is found to be 3.3926, with a standard deviation of .88242. In addition, the mean value of IT Infrastructure is found to be 2.7852, with a standard deviation of .82701. Moreover, the mean value of GSCM Practices Factors is found to be 4.0000, with a standard deviation of .86173. Furthermore, the mean value of Green Supply Chain Adoption is found to be 4.0988, with a standard deviation of .62941. Furthermore, the mean value of supplier relationship management is found to be 3.8025, with a standard deviation of .90679. Also, the mean value of customer relationship management is found to be 3.5951, with a standard deviation of .89220. In addition, the mean value of barriers is found to be 3.6025, with a standard deviation of .85740. Finally, the mean value of divers is found to be 3.9235, with a standard deviation of .73226. According to the above-mentioned numbers, it could be claimed that the mean values refer to the fact that the respondents evaluate the research variables to be within the average value, as most of the mean values are around 3. Only the mean value of IT infrastructure is below average. This means that the respondents are neutral regarding the research variables, and they see that the research variables could be improved better than the current case.

Table 7- 3: Descriptive Analysis for the Research Variables

Research Variables	N	Mean	Std. Deviation	Frequency				
				1	2	3	4	5
Competitive Pressure	405	3.4815	.79776	0	38	174	153	40
Government Regulations and Support	405	3.5012	1.14888	5	97	97	102	104
Top Management Support	405	3.6247	1.01347	8	54	102	159	82
Centralization	405	3.9259	1.01447	0	52	68	143	142
Perceived Compatibility	405	4.1160	.92483	0	21	89	117	178
Perceived Complexity	405	3.3926	.88242	3	56	169	133	44
IT Infrastructure	405	2.7852	.82701	15	142	167	77	4
GSCM Practices Factors	405	4.0000	.86173	0	22	84	171	128
Green Supply Chain Adoption	405	4.0988	.62941	0	0	62	241	102
Supplier Relationship Management	405	3.8025	.90679	0	27	133	138	107
Customer Relationship Management	405	3.5951	.89220	12	15	159	158	61
Barriers	405	3.6025	.85740	0	41	138	167	59
Drivers	405	3.9235	.73226	0	8	101	210	86

*N: Number of respondents valid for the questionnaire analysis

At the end of this section, the research variables had been described and the researcher is ready to analyze the data under study. As a first step in the analysis, the statements are tested to be able to determine to which factor they belong and be able to respond to the research hypotheses. The following section presents data testing using validity and reliability.

7.2.3 Data Testing Using Validity and Reliability

Data validation involves examining data for validity and reliability. Validity test is considered to be the most significant requirement for the quality of a test. If a test has high validity, this means that the items are closely related to the test's objective. On the other hand, if a test has low validity, then this is an indicator that the items are poorly related to a specific job. There are two main factors measuring validity: Average Variance Extracted (AVE) that should be greater than 0.5 (50%) and Factor Loading (FL) for each item that should be greater than 0.3 for high validity. (Sekaran and Bougie, 2016).

In addition, reliability test is an essential element for test quality. It indicates the consistency of a measure. The higher the reliability, the better the test is. The most common test used for reliability is observing the value of Cronbach's Alpha. The coefficient of Cronbach's Alpha varies between zero and one. The higher the coefficient is near to one, the higher the reliability is. If the coefficient is higher than 0.7, then it is adequate reliability. (Hair et al., 2012).

Table 7-4 shows the validity and reliability test of the research variables: Competitive Pressure, Government Regulations and Support, Top Management Support, Centralization, Perceived Compatibility, Perceived Complexity, IT Infrastructure, GSCM Practices Factors, Green Supply Chain Adoption, Supplier Relationship Management, Customer Relationship Management, Barriers, and Drivers. It could be noticed that the data showed Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) greater than 0.5, which was considered to be good, and a significant Bartlett's Sphericity test. The average variance extracted (AVE) was found to be more than 50%. In addition, all Cronbach's alpha values are greater than 0.7. The values obtained implied an adequate convergent validity as well as an adequate reliability.

Table 7- 4: Validity and Reliability Test

Variable	KMO*	AVE%	Cronbach's Alpha	Item	Factor Loading
Competitive Pressure	0.760	54.930	0.833	CP1	0.468
				CP2	0.408
				CP3	0.614
				CP4	0.520
				CP5	0.625
				CP6	0.661
Government Regulations and Support	0.500	82.811	0.792	GRS1	0.828
				GRS2	0.828
Top Management Support	0.719	78.157	0.860	TMS1	0.819
				TMS2	0.718
				TMS3	0.807
Centralization	0.715	77.765	0.847	Ce1	0.747
				Ce2	0.831
				Ce3	0.754
Perceived Compatibility	0.746	66.621	0.831	PCm1	0.521
				PCm2	0.774
				PCm3	0.679
				PCm4	0.691
Perceived Complexity	0.618	64.186	0.813	PCx1	0.646
				PCx2	0.560
				PCx3	0.720
				PCx4	0.642
IT Infrastructure	722	61.693	0.789	ITI1	0.653
				ITI2	0.470
				ITI3	0.708
				ITI4	0.637
GSCM Practices Factors	0.895	64.173	0.942	GSCMP1	Deleted
				GSCMP2	Deleted
				GSCMP3	0.425
				GSCMP4	Deleted
				GSCMP5	Deleted
				GSCMP6	0.757
				GSCMP7	0.725
				GSCMP8	0.676
				GSCMP9	0.657
				GSCMP10	0.757
				GSCMP11	0.491
				GSCMP12	Deleted
				GSCMP13	Deleted
				GSCMP14	0.562
				GSCMP15	0.713
				GSCMP16	0.604
				GSCMP17	0.693
				GSCMP18	Deleted

Variable	KMO*	AVE%	Cronbach's Alpha	Item	Factor Loading
Green Supply Chain Adoption	0.500	77.721	0.713	Ado1	0.777
				Ado2	0.777
Supplier Relationship Management	0.908	66.910	0.944	UpS1	0.765
				UpS2	0.845
				UpS3	0.678
				UpS4	0.630
				UpS5	0.688
				UpS6	0.646
				UpS7	0.700
				UpS8	0.571
				UpS9	0.563
				UpS10	0.604
Customer Relationship Management	0.851	65.903	0.935	DsC1	Deleted
				DsC2	Deleted
				DsC3	0.729
				DsC4	0.635
				DsC5	0.551
				DsC6	0.641
				DsC7	0.596
				DsC8	0.689
				DsC9	0.672
				DsC10	0.695
				DsC11	0.723
Barriers	0.740	53.505	0.780	Ba1	0.476
				Ba2	0.513
				Ba3	0.449
				Ba4	0.715
				Ba5	0.523
Drivers	0.890	58.700	0.939	Drv1	Deleted
				Drv2	0.561
				Drv3	0.466
				Drv4	0.608
				Drv5	0.514
				Drv6	0.454
				Drv7	0.553
				Drv8	0.782
				Drv9	0.650
				Drv10	0.656
				Drv11	0.618
				Drv12	0.736
				Drv13	.450
				Drv14	.584

*KMO: Kaiser-Meyer-Olkin measure of sampling adequacy

7.2.4 Normality Testing for the Research Variables

Normality is one of the assumptions that have to be verified to determine if a data set is normal. If the data are normally distributed, the researcher could use parametric analysis such as Structural Equation Modelling (SEM). Therefore, it could be claimed that the normality of data should be verified as a preliminary step for inferential analysis as it determines whether the researcher could use parametric or non-parametric tests to respond to the research hypotheses. One of the most common methods to check normality of a data set is the *Kolmogorov-Smirnov test of normality*, which tests the normality assumption for samples greater than 50 observations. It assumes that the data are normally distributed if the P-value is greater than 0.05. It is called the formal test of normality.

Table 7-5 shows the formal testing of normality assumption using Kolmogorov-Smirnov test of normality for the research variables. It could be observed that the research variables are not normally distributed, as the corresponding P-values are all less than 0.05.

Table 7- 5: Formal Testing of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Competitive Pressure	.250	405	.000	.861	405	.000
Government Regulations and Support	.177	405	.000	.873	405	.000
Top Management Support	.239	405	.000	.888	405	.000
Centralization	.233	405	.000	.835	405	.000
Perceived Compatibility	.270	405	.000	.811	405	.000
Perceived Complexity	.235	405	.000	.886	405	.000
IT Infrastructure	.216	405	.000	.870	405	.000
GSCM Practices Factors	.238	405	.000	.845	405	.000
Green Supply Chain Adoption	.310	405	.000	.780	405	.000
Supplier Relationship Management	.207	405	.000	.863	405	.000
Customer Relationship Management	.216	405	.000	.862	405	.000
Barriers	.237	405	.000	.873	405	.000
Drivers	.272	405	.000	.834	405	.000

As the formal test shows that the research variables are not exactly normally distributed, an informal test could be used to detect the approximate normality, which is called *Rule of Thumb*. It is called the informal test of normality, which claims that a variable is reasonably close to normal if its skewness and kurtosis values are between

–1.5 and +1.5 (Kleinbaum et al., 1988). This rule could be applied only if the sample size is greater than 150.

In this research, the number of observations or the sample under study is 405, which exceeds the number assigned for the rule of thumb to test the normality of the data. Therefore, the rule of thumb could be used in this research. Table 7-6 shows the informal test of normality, where it could be shown that skewness and kurtosis values of all the research variables under study are all between the ranges of ±1.5. Therefore, all the research variables under study are close to normal.

Table 7- 6: Informal Testing of Normality

Research Variables	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
Competitive Pressure	405	.090	.121	-.441	.242
Government Regulations and Support	405	-.092	.121	-1.255	.242
Top Management Support	405	-.429	.121	-.479	.242
Centralization	405	-.594	.121	-.759	.242
Perceived Compatibility	405	-.629	.121	-.729	.242
Perceived Complexity	405	.036	.121	-.434	.242
IT Infrastructure	405	.128	.121	-.495	.242
GSCM Practices Factors	405	-.513	.121	-.453	.242
Green Supply Chain Adoption	405	-.078	.121	-.498	.242
Supplier Relationship Management	405	-.140	.121	-.940	.242
Customer Relationship Management	405	-.436	.121	.558	.242
Barriers	405	-.108	.121	-.615	.242
Drivers	405	-.184	.121	-.414	.242

7.2.5 Testing Regression Assumptions

This section investigates and verifies the regression assumptions for the above conducted models. The problems of multicollinearity, autocorrelation and heteroscedasticity are discussed below.

7.2.5.1 Testing Multicollinearity Assumption

This section investigates and verifies one of the important assumptions required to avoid redundancy of information in the model under study, which is the problems of multicollinearity. It occurs when two or more predictors in a model are highly correlated with each other. This leads to problems with understanding as which predictors contribute to the variance explained in criterion, as well as technical issues in calculating a multiple regression model. Therefore, redundant information about the criterion is provided. Multicollinearity is one of OLS assumptions. It refers to high correlation between independent variables in multiple regressions. If the value of VIF is more than 5, it means that there is multicollinearity problem, as shown in Table 7-7, which quantifies the extent of correlation between one predictor and the other predictors in the model; it could be observed that all VIF values of the research variables under study are less than 5, implying that there is no problem of multicollinearity between the research variables under study.

Table 7- 7: VIF values for the Research Variables

Research Variables	VIF*
Competitive Pressure	2.085
Government Regulations and Support	1.283
Top Management Support	1.993
Centralization	1.377
Perceived Compatibility	2.424
Perceived Complexity	1.660
IT Infrastructure	1.145
Barriers	1.132
Drivers	1.734

VIF: Variance Inflation Factor

7.2.5.2 Testing Autocorrelation

The Durbin-Watson test will be applied on the model, as it is one of the statistic tests examining the null hypothesis that the residuals are not autocorrelated against the alternative that the residuals follow an autocorrelation process. By observing the Durbin Watson tables for lower and upper values at K=5 regressors, it could be noticed that dL = 1.623 and dU = 1.725. Since the model test results are greater than 1.725 in all stated models, the null hypothesis of no autocorrelation is supported. This implies that there is no problem of autocorrelation.

Durbin Watson Value = 1.838

7.2.5.3 Heteroscedasticity Assumption

With respect to this, the scatter plot of the standardized residuals against the unstandardized predicted values is used to check this assumption visually. The results indicate that the relationships among variables are homoscedastic, as shown in Figure 7-2.

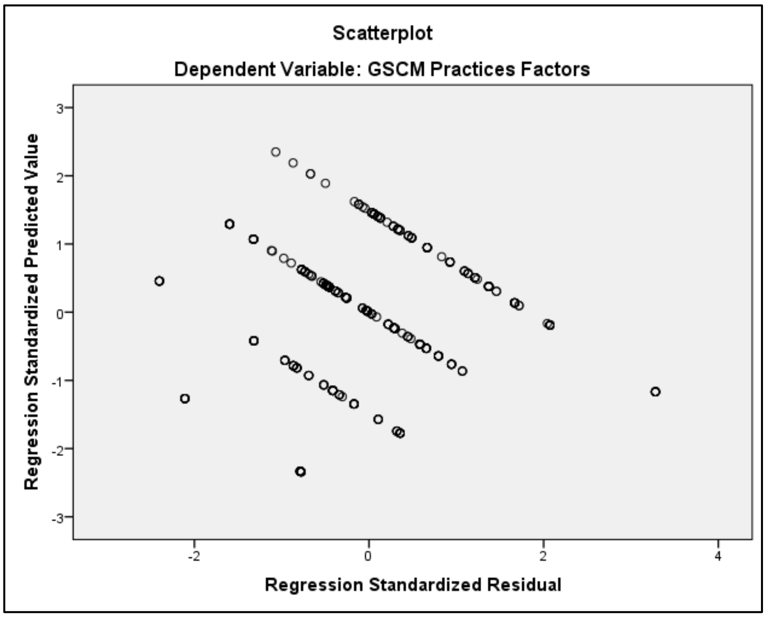

Figure 7- 2: Scatter Plot for Heteroscedasticity

7.2.5.4 Normality of Residual

Table 7-8 shows that it could be claimed that the residuals obtained from the regression analysis are approximately normally distributed, as the corresponding skewness and kurtosis values are between -1 and 1, which means that the data obtained are almost normally distributed.

Table 7- 8: Informal Testing of Residual Normality

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
Unstandardized Residual	405	.450	.121	1.273	.242

Figure 7-3 shows Histogram chart for the research variable, which reveals that the data is almost normal as there is no skewness, yet, there is a small kurtosis deviation.

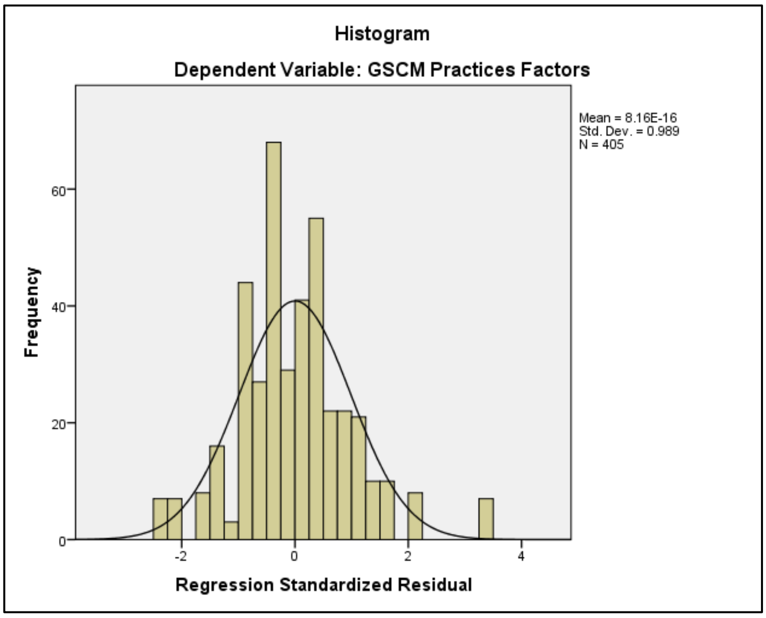

Figure 7- 3: Histogram Chart

7.2.6 Testing the Research Hypotheses

In this section, the hypotheses under study are tested using the correlation, regression and SEM modeling.

7.2.6.1 Testing the Relationship between Environmental Dimensions and Firm Practices and Supply Chain Practices

This section investigates the relationship between Environmental Dimensions: Competitive Pressure, Government Regulations and Support, and Firm Practices and Supply Chain Practices. As the formal and informal tests show that data under study are normally distributed, the Pearson correlation coefficient is used. Table 7-9 shows the correlation matrix for the relationship between Competitive Pressure, Government Regulations and Support, and Firm Practices and Supply Chain Practices. It was found that there is a significant positive relationship between Competitive Pressure, Government Regulations and Support and Firm Practices and Supply Chain Practices, as the corresponding P-values are less than 0.05 and correlation coefficients are 0.609, and 0.443, respectively.

Table 7- 9: Correlation Matrix between Environmental Dimensions and Firm Practices and Supply Chain Practices

		1.	2.	3.
1. Competitive Pressure	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	405		

		1.	2.	3.
2. Government Regulations and Support	Pearson Correlation	.403**	1	
	Sig. (2-tailed)	.000		
	N	405	405	
3. GSCM Practices Factors	Pearson Correlation	.609**	.443**	1
	Sig. (2-tailed)	.000	.000	
	N	405	405	405
**. Correlation is significant at the 0.01 level (2-tailed).				

Table 7-10 shows the regression model fitted for the effect of Environmental Dimensions; Competitive Pressure, and Government Regulations and Support on Firm Practices and Supply Chain Practices. It illustrates that there is a significant positive effect of Competitive Pressure, and Government Regulations and Support on Firm Practices and Supply Chain Practices, as the regression coefficients are 0.555 and 0.177 and P-values are 0.000 and 0.000, respectively. Moreover, the R square is 0.417, which means that 41.7% of the variation of the Firm Practices and Supply Chain Practices can be explained by the Environmental Dimensions together.

Table 7- 10: Regression Model of Environmental Dimensions on Firm Practices and Supply Chain Practices

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	R^2
	B	Std. Error	Beta			
(Constant)	1.450	.154		9.414	.000	.417
Competitive Pressure	.555	.045	.514	12.339	.000	
Government Regulations and Support	.177	.031	.236	5.658	.000	
a. Dependent Variable: GSCM Practices Factors						

Therefore, the first hypothesis, “There is a significant relationship between Environmental Dimensions, and Firm Practices and Supply Chain Practices” is fully supported.

Table 7-11 shows the Structural equation modeling (SEM) analysis of the impact of Environmental Dimensions on Firm Practices and Supply Chain Practices. SEM analysis is a multivariate statistical analysis technique that is used to analyze structural relationships. It is a statistical procedure that consists of a group of equations that interpret the relationships between a set of variables. Estimation involves using SEM computer tool to conduct the analysis. Several things take place at this step: (1) Evaluate model fit, which means determining how well the model explains the data. Perhaps more often than not, researchers' initial models do not fit the data very well. When (not if) this happens, skip the rest of this step and go to the next specification, and then reanalyze the pre-specified model using the same data. Assuming satisfactory model fit, then (2) interpret the parameter estimates. In written summaries, many researchers fail to interpret the parameter estimates for specific effects (Kline, 2011). In the current research, SEM is employed in testing the hypothesis of the study beside the overall model

It could be observed that there is a positive significant impact of Competitive Pressure and Government Regulations and Support on Firm Practices and Supply Chain Practices as the estimates are 0.689, and 0.167, respectively, as well as the P-value is less than 0.05. Moreover, the R square is 0.535, which means that 53.5% of the variation of the Firm Practices and Supply Chain Practices can be explained by the Environmental Dimensions together.

Table 7- 11: SEM Analysis the Effect of Environmental Dimensions on Firm Practices and Supply Chain Practices

			Estimate	P	R^2
GSCM Practices Factors	<---	Competitive Pressure	.689	***	.535
GSCM Practices Factors	<---	Government Regulations and Support	.167	***	

The model fit indices; CMIN/DF = 5.356, GFI = 0.914, CFI = 0.930, AGFI= 0.858, and RMSEA = 0.104 are all within their acceptable levels. The SEM model conducted for the effect of Environmental Dimensions on Firm Practices and Supply Chain Practices is illustrated in Figure 7-4.

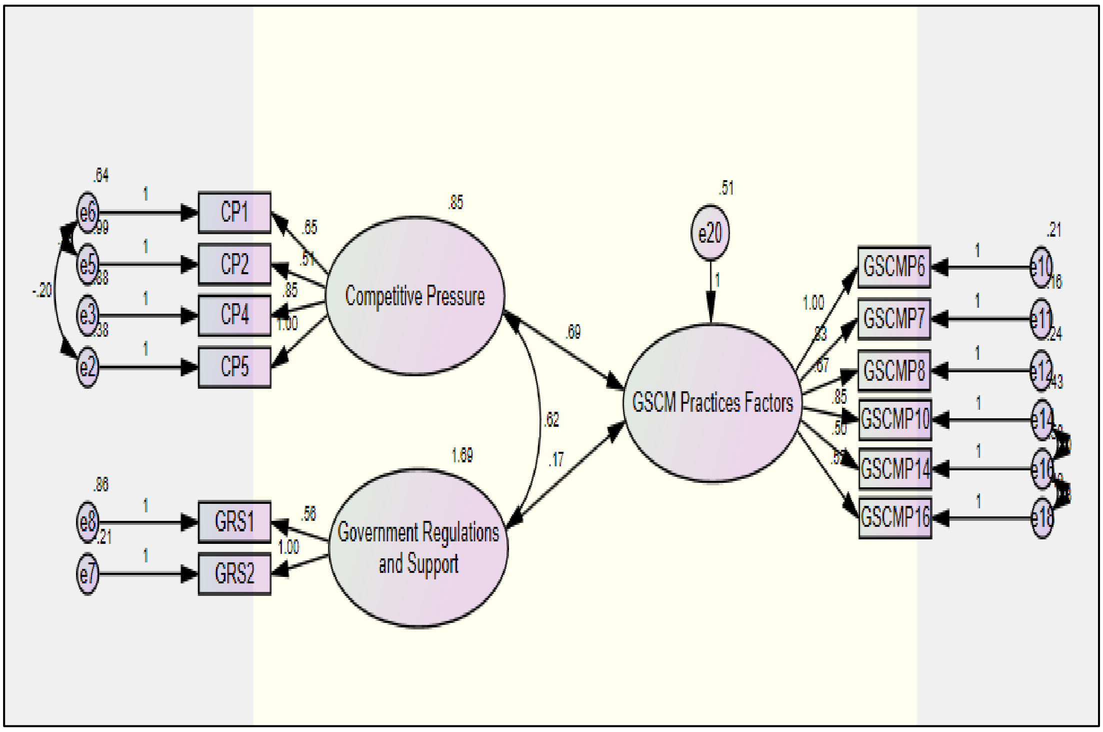

Figure 7- 4: SEM for the Effect of Environmental Dimensions on Firm Practices and Supply Chain Practices

7.2.6.2 Testing the Relationship between Organizational Dimensions and Firm Practices and Supply Chain Practices

This section investigates the relationship between Organizational Dimensions: Top Management Support, Centralization, and Firm Practices and Supply Chain Practices. Table 7-12 shows the correlation matrix for the relationships between Top Management Support, Centralization, and Firm Practices and Supply Chain Practices. It was found that there is a significant positive relationship between Top Management Support and Firm Practices and Supply Chain Practices, as the corresponding P-value is less than 0.05 and correlation coefficient is 0.533, while there is an insignificant relationship between Centralization and Firm Practices and Supply Chain Practices as the corresponding P-value is more than 0.05.

Table 7- 12: Correlation Matrix between Organizational Dimensions and Firm Practices and Supply Chain Practices

		1.	2.	3.
1. Top Management Support	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	405		
2. Centralization	Pearson Correlation	$-.222^{**}$	1	
	Sig. (2-tailed)	.000		

		1.	2.	3.
	N	405	405	
3. GSCM Practices Factors	Pearson Correlation	.533**	-.011	1
	Sig. (2-tailed)	.000	.820	
	N	405	405	405
**. Correlation is significant at the 0.01 level (2-tailed).				

Table 7-13 shows the regression model fitted for the effect of Organizational Dimensions; Top Management Support and Centralization on Firm Practices and Supply Chain Practices. It could be observed that there is a significant positive effect of Top Management Support, Centralization on Firm Practices and Supply Chain Practices, as the regression coefficients are 0.474 and 0.096 and P-values are 0.000 and 0.009, respectively. Moreover, the R square is 0.296, which means that 29.6% of the variation of the Firm Practices and Supply Chain Practices can be explained by the Organizational Dimensions together.

Table 7- 13: Regression Model of Organizational Dimensions on Firm Practices and Supply Chain Practices

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	R^2
	B	Std. Error	Beta			
(Constant)	1.905	.218		8.724	.000	.296
Top Management Support	.474	.036	.558	12.997	.000	
Centralization	.096	.036	.113	2.623	.009	
a. Dependent Variable: GSCM Practices Factors						

Therefore, the second hypothesis, "There is a significant relationship between Organizational Dimensions, and Firm Practices and Supply Chain Practices" is fully supported.

Table 7-14 shows the SEM analysis of the impact of Organizational Dimensions on Firm Practices and Supply Chain Practices. It could be observed that there is a positive significant impact of Top Management Support, and Centralization on Firm Practices and Supply Chain Practices as the estimates are 0.706 and 0.321, respectively, as well as the P-value is less than 0.05. Moreover, the R square is 0.423, which means that 42.3% of the variation of the Firm Practices and Supply Chain Practices can be explained by the Organizational Dimensions together.

Table 7- 14: SEM Analysis the Effect of Organizational Dimensions on Firm Practices and Supply Chain Practices

			Estimate	P	R2
GSCM Practices Factors	<---	Top Management Support	.706	***	.423
GSCM Practices Factors	<---	Centralization	.321	***	

The model fit indices: CMIN/DF = 4.494, GFI = 0.940, CFI = 0.962, AGFI= 0.889 and RMSEA = 0.093 are all within their acceptable levels. The SEM model conducted for the effect of Organizational Dimensions on Firm Practices and Supply Chain Practices is illustrated in Figure 7-5.

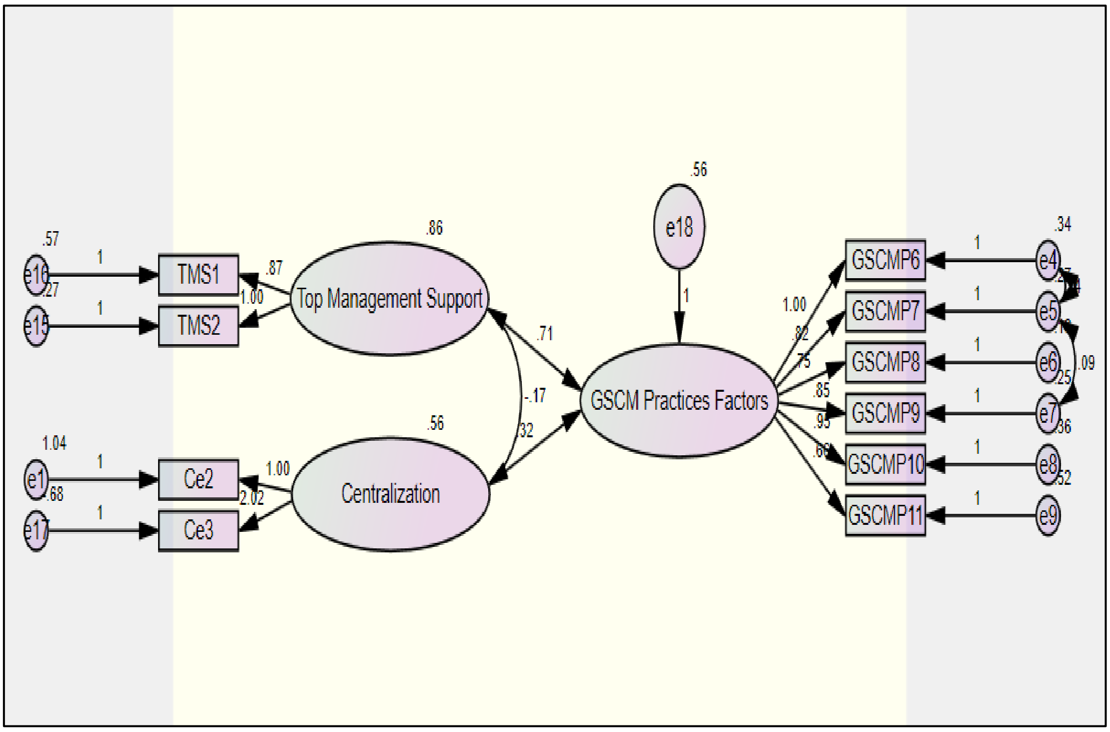

Figure 7- 5: SEM for the Effect of Organizational Dimensions on Firm Practices and Supply Chain Practices

7.2.6.3 Testing the Relationship between Technological Dimensions and Firm Practices and Supply Chain Practices

This section investigates the relationship between Technological Dimensions: Perceived Compatibility, Perceived Complexity, IT Infrastructure, and Firm Practices and Supply Chain Practices. Table 7-15 shows the correlation matrix for the relationship between Perceived Compatibility, Perceived Complexity, IT Infrastructure, and Firm Practices and Supply Chain Practices. It was found that there is a significant positive relationship between Perceived Compatibility, Perceived Complexity, IT Infrastructure, and Firm Practices and Supply Chain Practices, as the corresponding P-values are less than 0.05 and correlation coefficients are 0.503, 0.348 and 0.132, respectively.

Table 7- 15: Correlation Matrix between Technological Dimensions and Firm Practices and Supply Chain Practices

		1.	2.	3.	4.
1. Perceived Compatibility	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	405			
2. Perceived Complexity	Pearson Correlation	.205**	1		
	Sig. (2-tailed)	.000			
	N	405	405		
3. IT Infrastructure	Pearson Correlation	-.026	.174**	1	
	Sig. (2-tailed)	.608	.000		
	N	405	405	405	
4. GSCM Practices Factors	Pearson Correlation	.503**	.348**	.132**	1
	Sig. (2-tailed)	.000	.000	.008	
	N	405	405	405	405

**. Correlation is significant at the 0.01 level (2-tailed).

Table 7-16 shows the regression model fitted for the effect of Technological Dimensions: Perceived Compatibility, Perceived Complexity, and IT Infrastructure on Firm Practices and Supply Chain Practices. It illustrates that there is a significant positive effect of Perceived Compatibility, Perceived Complexity, and IT Infrastructure on Firm Practices and Supply Chain Practices, as the regression coefficients are 0.426, 0.231 and 0.107 and P-values are 0.000, 0.000 and 0.014, respectively. Moreover, the R square is 0.326, which means that 32.6% of the variation of the Firm Practices and Supply Chain Practices can be explained by the Technological Dimensions together.

Table 7- 16: Regression Model of Technological Dimensions on Firm Practices and Supply Chain Practices

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	R^2
	B	Std. Error	Beta			
(Constant)	1.164	.220		5.297	.000	
Perceived Compatibility	.426	.039	.457	10.896	.000	
Perceived Complexity	.231	.042	.237	5.559	.000	.326
IT Infrastructure	.107	.043	.103	2.460	.014	

a. Dependent Variable: GSCM Practices Factors

Therefore, the third hypothesis, "There is a significant relationship between Technological Dimensions, and Firm Practices and Supply Chain Practices" is fully supported.

Table 7-17 shows the SEM analysis of the impact of Technological Dimensions on Firm Practices and Supply Chain Practices. It could be observed that there is a positive significant impact of Perceived Compatibility, Perceived Complexity, and IT Infrastructure on Firm Practices and Supply Chain Practices as the estimates are 0.483, 0.098, and 0.141, respectively, as well as the P-value is less than 0.05. Moreover, the R square is 0.459, which means that 45.9% of the variation of the Firm Practices and Supply Chain Practices can be explained by the Technological Dimensions together.

Table 7- 17: SEM Analysis the Effect of Technological Dimensions on Firm Practices and Supply Chain Practices

			Estimate	P	R^2
GSCM Practices Factors	<---	Perceived Compatibility	.483	***	.459
GSCM Practices Factors	<---	Perceived Complexity	.098	.002	
GSCM Practices Factors	<---	IT Infrastructure	.141	***	

The model fit indices: CMIN/DF = 7.401, GFI = 0.857, CFI = 0.882, AGFI= 0.775 and RMSEA = 0.126 are all within their acceptable levels. The SEM model conducted for the effect of Technological Dimensions on Firm Practices and Supply Chain Practices is illustrated in Figure 7-6.

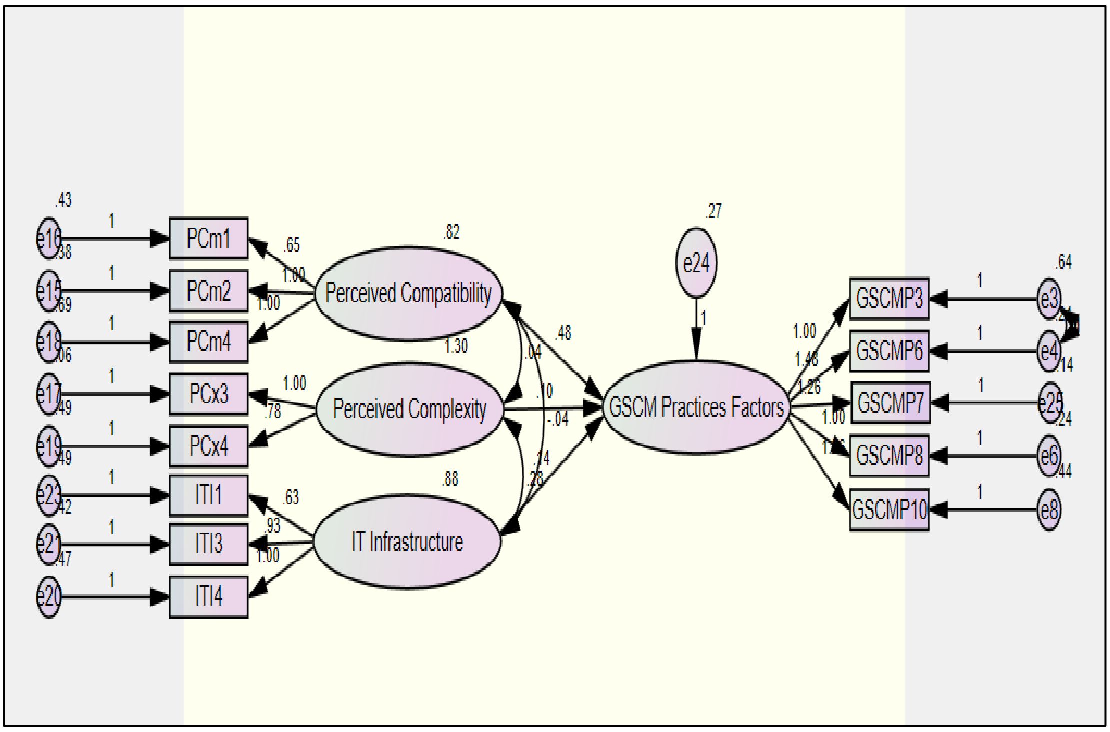

Figure 7- 6: SEM for the Effect of Technological Dimensions on Firm Practices and Supply Chain Practices

7.2.6.4 Testing the Relationship between Drivers, Barriers, Firm Practices and Supply Chain Practices and the Green Supply Chain Adoption

This section investigates the relationship between Drivers, Barriers, Firm Practices and Supply Chain Practices, and the Green Supply Chain Adoption. Table 7-18 shows the correlation matrix for the relationship between Drivers, Barriers, Firm Practices and Supply Chain Practices, and the Green Supply Chain Adoption. It was found that there is a significant positive relationship between Drivers, Barriers, Firm Practices and Supply Chain Practices, and the Green Supply Chain Adoption, as the corresponding P-values are less than 0.05 and correlation coefficients are 0.402, 0.183 and 0.280, respectively.

Table 7- 18: Correlation Matrix between Drivers, Barriers, Firm Practices and Supply Chain Practices and the Green Supply Chain Adoption

		1.	2.	3.	4.
1. GSCM Practices Factors	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	405			
2. Barriers	Pearson Correlation	.214**	1		
	Sig. (2-tailed)	.000			
	N	405	405		
3. Drivers	Pearson Correlation	.424**	.145**	1	

		1.	2.	3.	4.
	Sig. (2-tailed)	.000	.004		
	N	405	405	405	
4. Green Supply Chain Adoption	Pearson Correlation	.402**	.183**	.280**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	405	405	405	405

**. Correlation is significant at the 0.01 level (2-tailed).

Table 7-19 shows the regression model fitted for the effect of Drivers, Barriers, and Firm Practices and Supply Chain Practices on the Green Supply Chain Adoption. It illustrates that there is a significant positive effect of Drivers, Barriers and Firm Practices and Supply Chain Practices and the Green Supply Chain Adoption, as the regression coefficients are 0.239, 0.069 and 0.109 and P-values are 0.000, 0.042 and 0.011, respectively. Moreover, the R square is 0.184, which means that 18.4% of the variation of the Firm Practices and Supply Chain Practices can be explained by the Drivers, Barriers and Firm Practices and Supply Chain Practices together.

Table 7- 19: Regression Model of Drivers, Barriers and Firm Practices and Supply Chain Practices on the Green Supply Chain Adoption

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	R^2
	B	Std. Error	Beta			
(Constant)	2.463	.192		12.804	.000	
GSCM Practices Factors	.239	.037	.327	6.480	.000	.184
Barriers	.069	.034	.094	2.041	.042	
Drivers	.109	.043	.127	2.550	.011	

a. Dependent Variable: Green Supply Chain Adoption

Therefore, the fourth hypothesis, "There is a significant relationship between Drivers, Barriers and Firm Practices and Supply Chain Practices and the Green Supply Chain Adoption" is fully supported.

Table 7-20 shows the SEM analysis of the impact of Drivers, Barriers, and Firm Practices and Supply Chain Practices on the Green Supply Chain Adoption. It could be observed that there is a positive significant impact of Drivers, and Firm Practices and Supply Chain Practices on the Green Supply Chain Adoption as the estimates are 0.104, and 0.222, respectively, as well as the P-value is less than 0.05, while there is an insignificant effect of Barriers on the Green Supply Chain Adoption as the P-value is more than 0.05. Moreover, the R square is 0.226, which means that 22.6% of the variation of the Green Supply Chain Adoption can be explained by the Drivers, and Firm Practices and Supply Chain Practices together.

Table 7- 20: SEM Analysis the Effect of Drivers, Barriers, and Firm Practices and Supply Chain Practices on the Green Supply Chain Adoption

			Estimate	P	R^2
Green Supply Chain Adoption	<---	Barriers	.014	.385	
Green Supply Chain Adoption	<---	Drivers	.104	.003	.226
Green Supply Chain Adoption	<---	GSCM Practices Factors	.222	***	

The model fit indices: CMIN/DF = 4.727, GFI = 0.889, CFI = 0.899, AGFI= 0.843 and RMSEA = 0.096 are all within their acceptable levels. The SEM model conducted for the effect of Drivers, Barriers, and Firm Practices and Supply Chain Practices on the Green Supply Chain Adoption is illustrated in Figure 7-7.

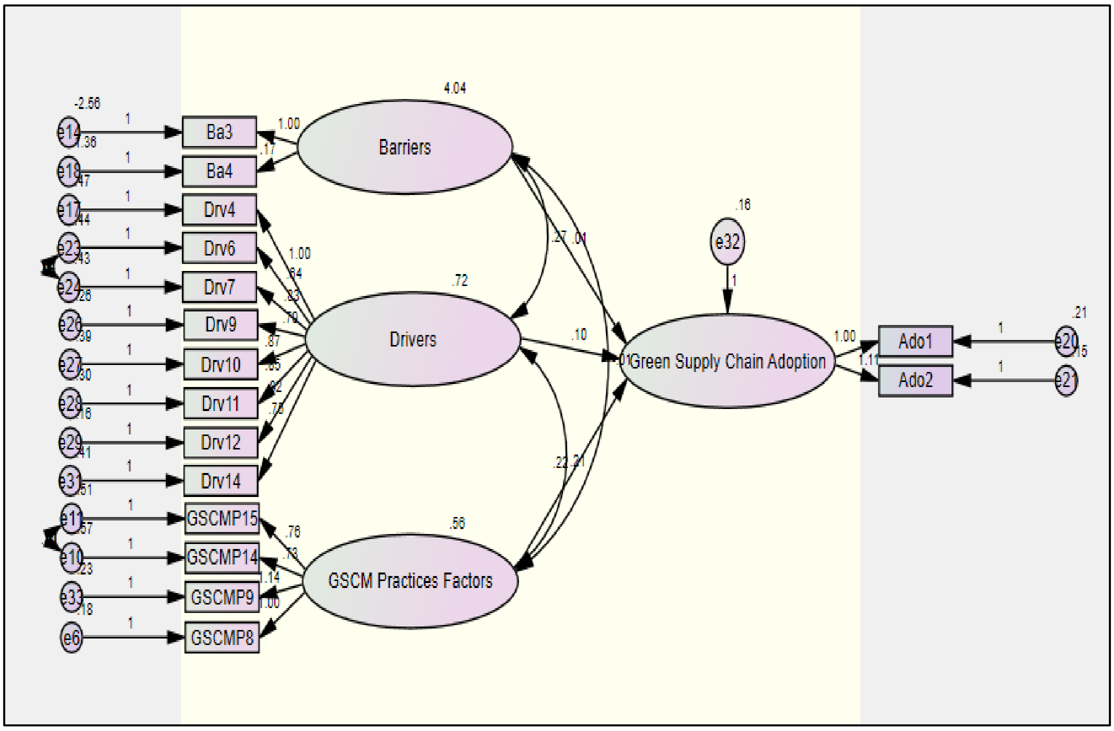

Figure 7- 7 SEM for the Effect of Drivers, Barriers, and Firm Practices and Supply Chain Practices on the Green Supply Chain Adoption

7.2.6.5 Testing the Relationship between Green Supply Chain Adoption and Supplier Relationship Management

This section investigates the relationship between Green Supply Chain Adoption and Supplier Relationship Management. Table 7-21 shows the correlation matrix for the relationship between Green Supply Chain Adoption and Supplier Relationship Management. It was found that there is a significant positive relationship between Green Supply Chain Adoption and Supplier Relationship Management, as the corresponding P-value is less than 0.05 and correlation coefficient is 0.334.

Table 7- 21: Correlation Matrix between Green Supply Chain Adoption and Supplier Relationship Management

		1.	2.
1. Green Supply Chain Adoption	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	405	
2. Supplier Relationship Management	Pearson Correlation	.334**	1
	Sig. (2-tailed)	.000	
	N	405	405

Table 7-22 shows the regression model fitted for the effect of Green Supply Chain Adoption on Supplier Relationship Management. It illustrates that there is a significant positive effect of Green Supply Chain Adoption on Supplier Relationship Management, as the regression coefficient is 0.480 and P-value is 0.000. Moreover, the R square is 0.111, which means that 11.1% of the variation of the Supplier Relationship Management can be explained by the Green Supply Chain Adoption.

Table 7- 22: Regression Model of Green Supply Chain Adoption on Supplier Relationship Management

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	R^2
	B	Std. Error	Beta			
(Constant)	1.833	.281		6.534	.000	
Green Supply Chain Adoption	.480	.068	.334	7.102	.000	.111
a. Dependent Variable: Supplier Relationship Management						

Therefore, the fifth hypothesis “There is significant relationship between Green Supply Chain Adoption and Supplier Relationship Management” is fully supported.

Table 7-23 shows the SEM analysis of the impact of Green Supply Chain Adoption on Supplier Relationship Management. It could be observed that there is a positive significant impact of Green Supply Chain Adoption on Supplier Relationship Management as the estimate is 0.823, as well as the P-value is less than 0.05. Moreover, the R square is 0.178, which means that 17.8% of the variation of the Supplier Relationship Management can be explained by the Green Supply Chain Adoption.

Table 7- 23: SEM Analysis the Effect of Green Supply Chain Adoption on Supplier Relationship Management

			Estimate	P	R^2
Supplier Relationship Management	<---	Green Supply Chain Adoption	.823	***	.178

The model fit indices: CMIN/DF = 3.680, GFI = 0.947, CFI = 0.973, AGFI= 0.892 and RMSEA = 0.081 are all within their acceptable levels. The SEM model conducted for the effect of Green Supply Chain Adoption on Supplier Relationship Management is illustrated in Figure 7-8.

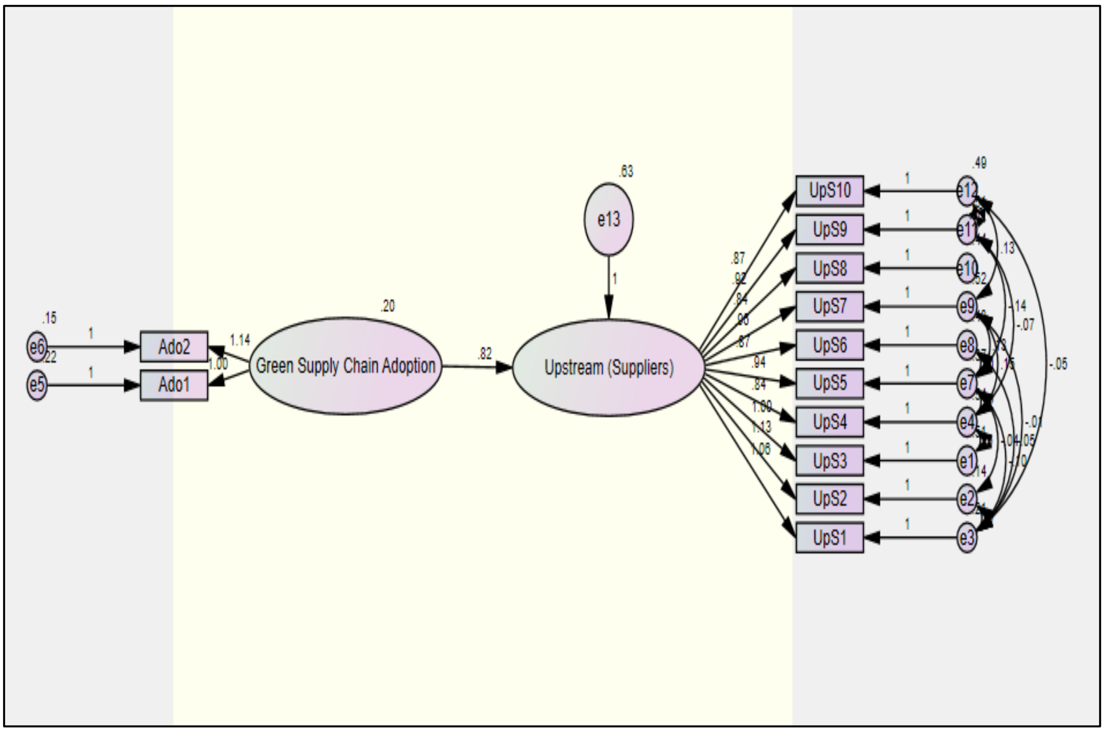

Figure 7- 8: SEM for the Effect of Green Supply Chain Adoption on Supplier Relationship Management

7.2.6.6 Testing the Relationship between Green Supply Chain Adoption and Consumer Relationship Management

This section investigates the relationship between Green Supply Chain Adoption and Consumer Relationship Management. Table 7-24 shows the correlation matrix for the relationship between Green Supply Chain Adoption and Consumer Relationship Management. It was found that there is a significant positive relationship between Green Supply Chain Adoption and Consumer Relationship Management, as the corresponding P-value is less than 0.05 and correlation coefficient is 0.265.

Table 7- 24: Correlation Matrix between Green Supply Chain Adoption and Consumer Relationship Management

		1.	2.
1. Green Supply Chain Adoption	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	405	
2. Consumer Relationship Management	Pearson Correlation	.265**	1
	Sig. (2-tailed)	.000	
	N	405	405

Table 7-25 shows the regression model fitted for the effect of Green Supply Chain Adoption on Consumer Relationship Management. It illustrates that there is a significant positive effect of Green Supply Chain Adoption on Consumer Relationship Management, as the regression coefficient is 0.376 and P-value is 0.000. Moreover, the R square is 0.070, which means that 7% of the variation of the Consumer Relationship Management can be explained by the Green Supply Chain Adoption.

Table 7- 25: Regression Model of Green Supply Chain Adoption on Consumer Relationship Management

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	R^2
	B	Std. Error	Beta			
(Constant)	2.053	.282		7.274	.000	
Green Supply Chain Adoption	.376	.068	.265	5.525	.000	.070
a. Dependent Variable: Consumer Relationship Management						

Therefore, the sixth hypothesis, "There is a significant relationship between Green Supply Chain Adoption and Consumer Relationship Management" is fully supported.

Table 7-26 shows the SEM analysis of the impact of Green Supply Chain Adoption on Consumer Relationship Management. It could be observed that there is a positive significant impact of Green Supply Chain Adoption on Consumer Relationship Management as the estimate is 0.722, as well as the P-value is less than 0.05. Moreover, the R square is 0.738, which means that 13.8% of the variation of the Consumer Relationship Management can be explained by the Green Supply Chain Adoption.

Table 7- 26: SEM Analysis the Effect of Green Supply Chain Adoption on Consumer Relationship Management

			Estimate	P	R^2
Consumer Relationship Management	<---	Green Supply Chain Adoption	.722	***	.138

The model fit indices; CMIN/DF = 3.717, GFI = 0.957, CFI = 0.978, AGFI= 0.898, and RMSEA = 0.082 are all within their acceptable levels. The SEM model conducted for the effect of Green Supply Chain Adoption on Consumer Relationship Management is illustrated in Figure 7-9.

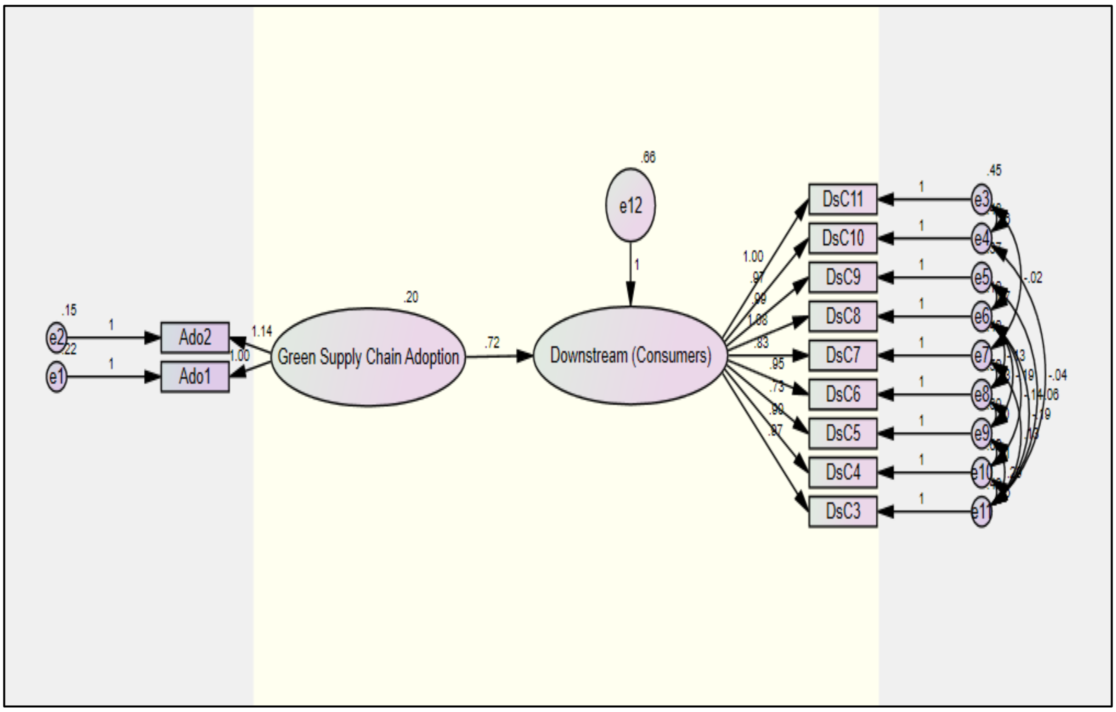

Figure 7- 9: SEM for the Effect of Green Supply Chain Adoption on Consumer Relationship Management

From the above, the mode testing can be represented in Figure 7-10, where the importance of the research variables and the drivers and barriers using the standardized estimates could be listed as follows:

- Market pressure comes in the first rank with a standardized estimate of 0.689.
- Top Management Support comes in the second rank of importance for green supply chain adoption with a standardized estimate of 0.474.
- Compatibility comes in the third rank with a standardized estimate of 0.426.
- Complexity comes in the fourth rank in importance with a standardized estimate of 0.231.
- Government regulations come in the fifth rank with a standardized estimate of 0.167.
- IT infrastructure comes in the sixth rank in importance with a standardized estimate of 0.107.

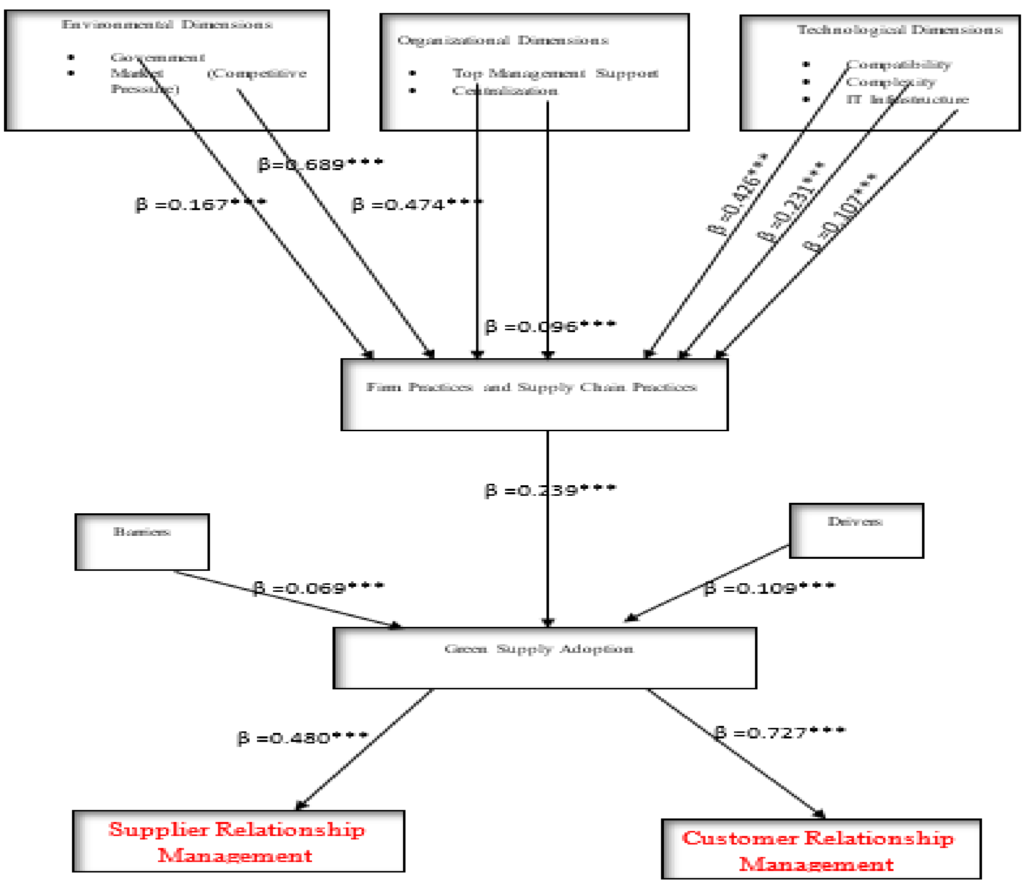

Figure 7- 10: Model Testing

7.3 Conclusion

This chapter presented the empirical study to test the research hypotheses by measuring the research variables concluded from the literature review through a descriptive, correlation, regression and SEM analysis using SPSS and AMOS. Table 7-27 shows a summary for the conducted analysis and the resulting response for the research hypotheses.

Table 7- 27: Summary of Research Hypotheses

Description	Results
H1: There is a significant relationship between environmental dimensions and firm practices and supply chain practices	Fully Supported
H2: There is a significant relationship between organizational dimensions and the firm and supply chain practices	Fully Supported
H3: There is a significant relationship between Technological dimensions and the firm and supply chain practices	Fully Supported
H4: There is a significant relationship between drivers, barriers and firm practices and supply chain practices and the green supply chain adoption	Fully Supported
H5: There is a significant relationship between Green Supply Chain Adoption and Supplier Relationship Management	Fully Supported
H6: There is a significant relationship between green supply chain adoption and Consumer Relationship Management	Fully Supported

Chapter Eight: Model Validation

8.1. Theme of Barriers to Adopting Green Supply Chains in MENA Region

In this section, the barriers that affect the adoption of green supply chains by MENA region industries will be discussed. Barriers that emerged from the data could be expressed into five codes: The Increased Cost of Adoption, Focus on Short-Term Profitability, Lack of Money, Lack of Internal Integration and Lack of External Integration. These codes are illustrated in Figure 8-1, where the codes are presented for the theme of barriers to adopting green supply chains in MENA region.

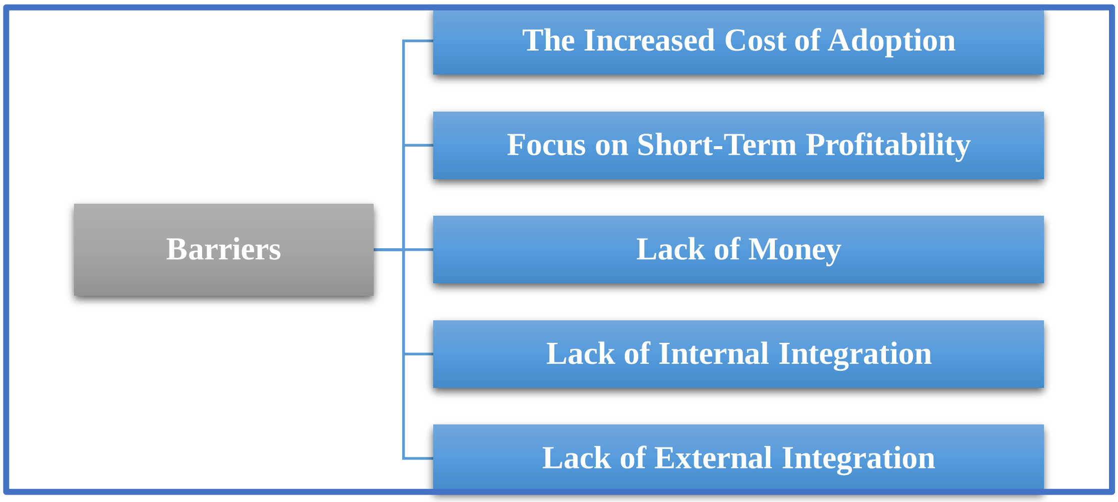

Figure 8- 1: Codes Related to Theme of Barriers to Adopting Green Supply Chains in MENA Region

8.1.1.1 The Increased Cost of Adoption

Adoption of new systems in industries always costs a lot, and this is due to the following: training for employees and workers on using the new systems, the cost of purchasing new machines and equipment to follow the new regulations, as well as the cost of risk of adopting the new system and its impact on the decisions of decision-makers and senior management and suppliers as well as consumers.

This is what the interviews agreed upon. The main reason for the obstacle of MENA region industries to follow new environmental regulations; for example, green supply chains are due to the cost resulting in the short term due to the implementation of the system. The interviews considered that the increase in cost in adopting the new systems is a major barrier for decision-makers to implement environmental and green supply chains.

Some of the evidence that was explained in the interviews will show that the increase in the cost of adopting the system is a barrier to MENA region industries' adoption of the green supply chain system and the environmental systems, and the evidence is as follows:

"I think that most decision-makers in industries, especially in MENA region, always move away from the decision to adopt industries for green supply chains and the environment, and this is due to the fact that one of the most important pillars that are taken into account during decision-making is the cost resulting from adopting environmental system".

"Increasing the cost of adopting new environmental systems such as green supply chains is a barrier that stands in front of the upper management in industries on the way they make decisions to transform their industries into environmentally friendly eco-industries, especially at MENA region".

From the above, it became clear that the increase in the cost of adopting the green supply chain system is an obstacle that, the interviews clarified, impedes the adoption of MENA region industries to environmental regulations and the application of regulations that help to reduce pollution and increase industries that are environmentally friendly and that preserve the ecosystem from pollution. Supply chain costs are defined as costs that constitute a considerable percentage of the total sales price of a product or service. Manufacturers usually define supply chain costs using the total cost of ownership; therefore, they add the additional costs incurred before or after the product or service delivery. Therefore, supply chain costs do matter. They affect farm profitability, export earnings and market risk. Thus, the expected benefits of diversifying our crop mix needs to be balanced against the added cost of constructing, maintaining and operating supply chains that support such diversification. Therefore, there were 13 ways to reduce the cost of a supply chain:

1. Automating Processes.
2. Inventory Management.
3. Improving Space Utilization.
4. Reviewing Customer Demand.
5. Streamlining Ordering Process.

6. Not offering Free Expedited Shipping.
7. Outsourcing the Supply Chain.
8. Improving Packaging

8.1.1.2 Focus on Short-Term Profitability

The lack of awareness of top management and decision-makers makes them always focus on short-term profit and search for systems with lower costs. This is what prevents industries from adopting environmental systems because they are of high cost in the short term, and this leads to a reduction in their short-term profitability.
The interviews also discussed that the decision-makers' focus on short-term profitability is a barrier to MENA region's adoption of the green supply chain system, and because the profitability of adopting this system in the short term is very small due to its high cost that it caused at the beginning of its adoption.

Some of the evidence that was explained in the interviews will show that the focus on short-term profitability is a barrier to MENA region industries' adoption of the green supply chain system and the environmental systems, and the evidence is as follows:

"From my perspective, upper management and decision-makers are interested in increasing the short-term profitability of institutions and this by reducing the cost using low cost systems and machines in MENA region".

"I would like to point out that one of the most important goals of private and public institutions and industries is to increase short-term profitability. Therefore, MENA region industries' adoption of green supply chains is in a limited and non-widespread scale".

From the above, it became clear that the focus on short-term profitability is an obstacle that, the interviews clarified, impedes the adoption of MENA region industries to environmental regulations and the application of regulations that help to reduce pollution and increase industries that are environmentally friendly and that preserve the ecosystem from pollution.

8.1.1.3 Lack of Money

Some industries and small companies suffer from lack of money and their financing. Therefore, it is difficult for them to adopt the costly systems that require high costs because this leads to a shortage in the budget. Therefore, small industries and some large industries that suffer from budget deficiencies, high costs and a lack of investment capital are always moving away from adopting costly environmental systems.

This is what the interviews relied on to clarify that the money barrier always hinders industries in the MENA region from adopting green supply chains. It also made clear that governments must adopt regulations that stimulate and finance small industries to implement the green supply chain system, and this will add a new competitive advantage to small industries, which in turn will help companies and large industries to adopt environmental regulations as well.

Some of the evidence that was explained in the interviews will show that lack of investment capital is a barrier to MENA region industries' adoption of the green supply chain system and the environmental systems, and the evidence is as follows:
"Most of the countries in MENA suffer from poverty, so their lack of money becomes a barrier for industries to adopt green supply chains and a barrier stands before governments to implement environmental regulations that limit industrial pollution".

"I also see that companies and industries that suffer from lack of money and funding find it difficult to adopt environmental regulations and green supply chains because they are very expensive for them in the short term and it is difficult for them to finance these systems, and this is what most industries in MENA region suffer from".

"Most of the countries in the MENA region are developing countries that suffer from deficits in their budgets, and this is reflected in their industries and institutions due to the inability of governments to implement environmental regulations and adopt green supply chains".

From the above, it became clear that lack of money is an obstacle that the interviews clarified impedes the adoption of MENA region industries to environmental regulations and the application of regulations that help to reduce pollution and increase industries that are environmentally friendly and that preserve the ecosystem from pollution.

8.1.1.4 Lack of Internal Integration

The lack of internal corporate consolidation has been identified as a barrier to industries to adopt environmental regulations and to corporate decision-making.

Vision and internal integration work together to reduce uncertainty and ambiguity, thus producing a better supply chain response.

The interviews revealed that the lack of internal regulations in companies leads to a lack of confidence among decision-makers and senior management in making decisions in companies, greatly affects the MENA region industries and impedes their adoption of green supply chains. In order to implement environmental regulations, industries in the MENA region must avoid a shortage of internal integration, increasing confidence and internal credibility in industries.

Some of the evidence that was explained in the interviews will show that lack of internal integration is a barrier to MENA region industries' adoption of the green supply chain system and the environmental systems, and the evidence is as follows:

"Internal integration is a realized capacity that results from a set of interconnected systems and processes that facilitate decision-making processes. The lack of internal integration in the MENA region is a barrier to companies and industries adopting the green supply chain system".

"I believe that the lack of internal integration of MENA region industries can be a hindrance to the adoption of green supply chains in industries as internal integration can be described by the ways in which the organization "structures its practices, procedures, and organizational behaviors in collaborative, concurrent and manageable processes", including mainly Integration of data and information systems".

From the above, it became clear that lack of internal integration is an obstacle that, the interviews clarified, impedes the adoption of MENA region industries to environmental regulations and the application of regulations that help to reduce pollution and increase industries that are environmentally friendly and that preserve the ecosystem from pollution.

8.1.1.5 Lack of External Integration

The lack of external integration between suppliers, consumers, or other industries and the top management of companies is a reason that impedes the industries' adoption of modern systems because of the lack of information that the industry will suffer due to the lack of its external integration and will reduce the opportunities for innovation and competition.

The interviews agreed that companies and industries in the MENA region must get rid of the barrier of lack of external integration of companies so that industries can properly adopt green supply chains in accordance with the requirements of consumers, and the suppliers adhere to it, and the higher management establishes correct regulations for this system.

Some of the evidence that was explained in the interviews will show that lack of external integration is a barrier to MENA region industries' adoption of the green supply chain system and the environmental systems, and the evidence is as follows:

"From my point of view, I think that the lack of external integration may prevent companies from achieving higher levels of internal integration by becoming the root of conflict within the company, which hinders the adoption of green supply chains, and this is very clear in the industries of MENA region".

"I think from my point of view that the adoption of green supply chains and ecosystems and the production of environmentally friendly products in MENA suffers from the lack of external integration is the lack of willingness to share strategic information with the main supply chain partners. This limits the institutions' adoption of regulations that help to pollution reduction".

From the above, it became clear that lack of external integration is an obstacle that, the interviews clarified, impedes the adoption of MENA region industries to environmental regulations and the application of regulations that help to reduce pollution and increase industries that are environmentally friendly and that preserve the ecosystem from pollution.

8.2. Theme of Drivers to Adopting Green Supply Chains in MENA Region

In this section, the drivers that affect the adoption of green supply chains by MENA region industries will be discussed. Drivers, which emerged from the data could be expressed into five codes: Top Management Commitment and Support, External Pressure, Incentives and Support by Various Agencies, The Demand of Customer and Other Stakeholders, Knowing and Solving Supply Chain Partners' Problems, Cost Reduction, Awareness, Capacity Building and Development, Competitive and

Marketing Advantage, Sharing Resources, Information Sharing, Monitoring & Auditing Supply Chain Partners, Trust and Commitment Among Partners, Long Term Partnership. These codes are illustrated in Figure 8-2, where the codes are presented for the theme of drivers to adopting green supply chains in MENA region.

Figure 8- 2: Codes Related to Theme of Drivers to Adopting Green Supply Chains in MENA Region

8.1.2.1 Top Management Commitment and Support

One of the most important factors that drive industries to adopt green systems and the first of them is the commitment and support of the top management to adopt environmental regulations, implementing regulations that limit and reduce environmental pollution resulting from industry and adherence to green methods of disposal of hazardous waste.

The interviews adopted a decision that the commitment and support of top management in the countries of MENA is the most important factor that drives industries in the region to the adoption of green supply chains as well as the adoption of environmentally friendly systems, and confirmed the role of top management in making environmental decisions that preserve public health as well as the health of workers.

Some of the evidence that was explained in the interviews will show that top management commitment and support is a driver to MENA region industries' adoption of the green supply chain system and the environmental systems, and the evidence is as follows:

"Administrative support by top managers is critical to introducing and implementing innovations in MENA companies, especially environmental management systems. This is because green supply chains are a broad-based regulatory endeavor; it is likely that you will benefit from the support and commitment of top management".

"Supporting top management can affect the success of new initiatives by facilitating employee participation or by promoting a cultural transformation in the company, for example. Top management in MENA region can commit to and support the adoption of green supply chains in order to reduce pollution levels in the region".

It is evident from the above that the support and commitment of top management has always led companies in MENA region to adopt environmental supply chains. It is also a very important factor for the trend of industries towards an environmental and health trend.

8.1.2.2 External Pressure

External pressures faced by companies, whether from governments or from international organizations, always drive industries to adopt environmental regulations, and this is because recently governments and external organizations are interested in preparing regulations that limit pollution and stimulate the adoption of environmentally friendly products.

The interviews discussed the role of governments and international organizations through regulations that support and preserve industries in the MENA region to adopt green supply chains. The interviews also considered that urging governments to industries to adopt environmental regulations helps to maintain a healthy ecosystem.

Some of the evidence that was explained in the interviews will show external pressure is a driver to MENA region industries' adoption of the green supply chain system and the environmental systems, and the evidence is as follows:

"I think that external pressures are important factors that affect green supply chain management's practices for the company, and external pressures such as government interference in adopting environmental regulations or also pressure from international organizations to adopt green regulations; therefore, external pressures determine the level of green supply chain management practices for companies in MENA region".

"It was also agreed that external pressures greatly push companies to become more aware of environmental problems and practice some green supply chain management activities, and this is what helps many industries in MENA to become aware of green industries that are environmentally friendly".

It is evident from the above that external pressure has always led companies in the MENA region to adopt environmental supply chains. It is also a very important factor for the trend of industries towards an environmental and health trend.

8.1.2.3 Incentives and Support by Various Agencies

There are various agencies whose aim is to stimulate and support companies and industries in order to reduce pollution resulting from the industry and support them to choose environmental and health systems, and these organizations work to maintain a pollution-free environment and increase the percentage of environmentally friendly products, and for each organization to reach its goal, it works to support industries for the sake of adopting clean materials in the industry that cause very little or no percentage of pollution.

The interviews agreed that the support and incentives that the various agencies can provide to the industries of MENA region to reduce pollution and the use of environmental regulations will lead the industries to adopt green supply chains, as these agencies set some regulations and conditions that direct the industries to adopt green systems and then grant support and incentives for industries and companies that properly apply these regulations.

Some of the evidence that was explained in the interviews will show that incentives and support by various agencies is a driver to MENA region industries' adoption of the green supply chain system and the environmental systems, and the evidence is as follows:

"Some different agencies are concerned with environmental safety, so they seek to provide incentives and support to small industries that are unable to bear the cost of adopting modern environmental systems in developing countries such as MENA region".

"I believe that providing support and incentives to MENA region can be a driver for adopting the green supply chain system in industries. These barriers and support can be adopted by various agencies and international organizations that care about the environment, reduce pollution and maintain a healthy environmental system".

It is evident from the above that incentives and support by various agencies has always led companies in MENA region to adopt environmental supply chains. It is also a very important factor for the trend of industries towards an environmental and health trend.

8.1.2.4 The Demand of Customer and Other Stakeholders

The demand of consumers and stakeholders control the decisions of the company, and the needs of consumers always direct the companies' industries in the way that is consistent with their requirements, so if the consumer is aware, as well as the stakeholders, and they target environmentally friendly health products, this will facilitate the industries to adopt environmental regulations and use health materials in order to reach products that meet the demand of stakeholders and consumers.

The interviews made it clear that one of the most important factors driving industries in the MENA region is meeting the demands of consumers and stakeholders, and this is what the interviews referred to as that raising awareness of consumers due to increasing levels of education leads consumers and stakeholders to direct towards environmentally friendly products, and this in turn helps guide companies to adopt green supply chains in their industry.

Some of the evidence that was explained in the interviews will show the demand of customer and other stakeholders is a driver to MENA region industries' adoption of the green supply chain system and the environmental systems, and the evidence is as follows:

"To achieve sustainable business goals and solutions, the environmental characteristics of products and services must meet customer requirements and many concerns about the company's environmental performance will be facilitated from external stakeholders, who may generate pressure on the company's efforts in green supply chain management practices in MENA region".

"It should also be taken into consideration that the requirements of clients as well as other stakeholders drive industries in MENA region to adopt environmental industries and green supply chains".

It is evident from the above that the demand of customer and other stakeholders has always led companies in the MENA region to adopt environmental supply chains. It is also a very important factor for the trend of industries towards an environmental and health trend.

8.1.2.5 Knowing and Solving Supply Chain Partners' Problems

One of the obstacles that stand in the way of companies adopting environmental regulations is the problems facing supply chain partners, so the knowledge and problem-solving factor of supply chain partners is a vital factor and influencing decision-making and markets companies in the way of adopting environmental regulations.

The interviews recorded that knowing and solving supply chain partners' problems help industries in making decisions that are beneficial to companies and affecting their efficiency. The interviews urged industries in the MENA region to pay attention to their knowledge and solve the problems of supply chain partners. The interviews considered this factor to be an influential factor that markets companies and industries in the direction of adopting the green supply chain system.

Some of the evidence that was explained in the interviews will show that knowing and solving supply chain partners' problems is a driver to MENA region industries' adoption of the green supply chain system and the environmental systems, and the evidence is as follows:

"I believe that the companies and industries of MENA region should be based on knowing and solving the problems of supply chain partners because the confidence and dependence of supply chain partners on industries drives industries towards implementing the green supply chain system".

"Market knowledge and solution to supply chain partners' problems for companies to implement border systems, as some companies rely on supply chain partners to make decisions about the systems used. Therefore, industries in MENA region must become familiar with the problems of supply chain partners and search for ways to solve them to reach environmental industries that support the Green supply chain system".

It is evident from the above that knowing and solving supply chain partners' problems has always led companies in the MENA region to adopt environmental supply chains. It is also a very important factor for the trend of industries towards an environmental and health trend.

8.1.2.6 Cost Reduction

One of the most important goals of institutions and companies is to reduce the cost resulting from the industry and from the materials used and others; studies have indicated that the adoption of environmental regulations has a positive effect in reducing the industrial cost of companies and factories in the long term.

This was covered by the interviews and proved when talking about the statistics of industries that adopt green supply chains, which in turn prove that the adoption of green supply chains leads to lower costs in the long run. Therefore, the adoption of the *MENA region* industries and companies of environmental systems has advantages in reducing the industrial cost resulting in the long term.

Some of the evidence that was explained in the interviews will show that cost reduction is a driver to MENA region industries' adoption of the green supply chain system and the environmental systems, and the evidence is as follows:

"I think that increasing the awareness of decision-makers in the industries of MENA region will drive the industries to implement green supply chains, because when increasing awareness among decision-makers, they will look to reduce the long-term cost resulting from the application of modern environmental systems".

"Cost reduction in the long run is always the factor that drives decision-makers to implement a new system. Research has shown companies and industries that adopt the green supply chain system until cost reduction is in the long run, so I think that the decision-makers in companies in MENA region should train them to study expectations of cost reduction expected in the long term when adopting environmental regulations".

It is evident from the above that cost reduction has always led companies in MENA region to adopt environmental supply chains. It is also a very important factor for the trend of industries towards an environmental and health trend.

8.1.2.7 Awareness

Increasing levels of awareness among workers, suppliers, consumers and higher management has a role in directing industries to adopt environmental chains and health systems and to adopt new systems that reduce pollution, and this is not only for the sake of maintaining a clean environment, but also in order to reduce costs in the long run, and this leads to increase profits and ensure the health of workers.

The interviews also demonstrated that increasing awareness in the MENA region will lead to the adoption of industries and companies for green supply chains, as well as the development of environmental regulations by various agencies and governments applied by industries in order to reach a clean and healthy environment.

Some of the evidence that was explained in the interviews will show that awareness is a driver to MENA region industries' adoption of the green supply chain system and the environmental systems, and the evidence is as follows:

"Increasing environmental awareness in MENA region could be a reason for industries to adopt green supply chains as well as preserving the environment from pollution by adopting new environmental regulations, as well as machines that reduce pollution from industries".

"I also believe that environmental awareness resulting from high levels of education in MENA region is important for transforming industries into ecological industries and adopting green supply chains for institutions, as increasing the awareness of consumers, workers, upper management and decision-makers leads to the use of clean industrial methods and the production of environmentally friendly products. Using clean materials and energy that does not pollute the environment, as well as disposing of hazardous waste in a healthy and safe manner".

It is evident from the above that awareness has always led companies in the MENA region to adopt environmental supply chains. It is also a very important factor for the trend of industries towards an environmental and health trend.

8.1.2.8 Capacity Building and Development

Building and developing capabilities in companies and industries through training courses helps industries adopt new regulations, including environmental systems, through training courses provided by industries to workers, employees and people. These increase their environmental awareness and provide them with creative ideas that help them adopt environmental systems.

The interviews discussed the role of building and developing the capabilities of employees and suppliers in companies in the MENA region in adopting green supply chain systems, as capacity building increases awareness levels of suppliers and employees, while capacity development helps workers to innovate in adopting green systems in companies.

Some of the evidence that was explained in the interviews will show that capacity building and development is a driver to MENA region industries' adoption of the green supply chain system and the environmental systems, and the evidence is as follows:

"The ability to implement innovative environmental methods is usually built and developed through employee self-learning, professional education and on-the-job

training, and this in turn influences companies' decisions to adopt green supply chains, and as such, MENA region tends to adopt environmental chains in industries".

"I believe that the MENA region's adoption of green supply chains is due to building and developing the capabilities of industries. This is a strong driver that drives industries to produce healthy, safe and environmentally friendly products, and also increases the awareness of workers in factories and companies".

It is evident from the above that capacity building and developments has always led companies in the MENA region to adopt environmental supply chains. It is also a very important factor for the trend of industries towards an environmental and health trend.

8.1.2.9 Competitive and Marketing Advantage

Increasing a new competitive advantage for products is always an incentive for decision-makers to adopt new ideas and systems that add to their products an advantage that differs from their competitors, and this factor has relied on scientific organizations in order to urge companies to adopt green supply chains and environmental and health systems.

The competitive and marketing advantage is an incentive discussed in the interviews that directs the industries of MENA region to adopt green supply chains, and this is intended to increase a new competitive advantage for industrial products as environmentally friendly products free of any pollution.

Some of the evidence that was explained in the interviews will show that competitive and marketing advantages is a driver to MENA region industries' adoption of the green supply chain system and the environmental systems, and the evidence is as follows:

"I also see that market competition is an important factor that drives industries to adopt green supply chains in their manufacture and production of environmentally friendly materials, and for this reason, the market in MENA region has many industries and companies and this increases competitiveness, which in turn increases the adoption of green supply chains".

"Competitiveness between industries and companies and the increase in competitive advantage, industries are always driving to develop their products, and therefore some industries tend to produce environmentally friendly and healthy products for consumers, so consumers turn to these products in the interest of their children and so on, and from these other industries tend to adopt green supply chains and environmental systems are the other for that. MENA region should support some industries to take over the adoption of environmental industries, which in turn will lead to other industries heading to the system as well".

It is evident from the above that competitive and marketing advantages have always led companies in MENA region to adopt environmental supply chains. It is also a very important factor for the trend of industries towards an environmental and health trend.

8.1.2.10 Sharing Resources

The participation of companies and industries for environmentally friendly and healthy resources helps companies reduce the cost resulting from adopting environmental systems, and this in turn helps companies to adopt the green supply chain system in industries, and this is due to the fact that the cost has become less shared by the number of companies not one company.

The interviews focused on the fact that sharing resources among companies helps reduce the cost of adopting a green supply chain system. Therefore, the idea of sharing resources must be presented to industries in the MENA region in order to adopt environmental regulations in them.

Some of the evidence that was explained in the interviews will show that sharing resources is a driver to MENA region industries' adoption of the green supply chain system and the environmental systems, and the evidence is as follows:

"I think from my point of view that sharing environmental and green resources among industries in MENA region could lead to a cycle of adopting a large number of industries for green supply chains as well as to reduce the cost of environmental resources used and this is because of their high cost".

"I also believe that the cost of environmental resources that limit pollution from industries can be reduced by sharing resources between industries and companies,

and this in turn leads to the adoption of MENA region industries for green supply chains and the production of environmental and health products".

It is evident from the above that sharing resources has always led companies in MENA region to adopt environmental supply chains. It is also a very important factor for the trend of industries towards an environmental and health trend.

8.1.2.11 Information Sharing

Sharing information between companies, industries, suppliers and consumers leads to increased confidence, which in turn gives credibility to products, which reduces the cost of searching for information and helps companies obtain accurate information about consumers' requirements and about adopting environmental regulations more and at a lower cost.

The interviews discussed the point of view that sharing information helps Middle East industries in their way to adopt green supply chains as well as to adopt them in the production of environmentally friendly products and to obtain information about disposing green waste in a correct way that does not pollute the environment.

Some of the evidence that was explained in the interviews will show that information sharing is a driver to MENA region industries' adoption of the green supply chain system and the environmental systems, and the evidence is as follows:

"I think sharing information provides significant cost savings and how manufacturers can use this information more effectively in a dedicated inventory production system, not well understood so it helps MENA region industries in adopting green supply chains".

"Sharing information can reduce demand uncertainty in MENA region to the point where suppliers can build up inventory long before a promotional order is received. This helps reduce unnecessary costs in industries and in turn helps industries adopt green supply chains and eliminate beneficial materials are all reduced in a non-environmental way".

It is evident from the above that information sharing has always led companies in MENA region to adopt environmental supply chains. It is also a very important factor for the trend of industries towards an environmental and health trend.

8.1.2.12 Monitoring and Auditing Supply Chain Partners

Monitoring and auditing supply chain partners help companies ensure that supply chains are certified green and environmentally sound, and when monitoring and reviewing supply chain partners, companies make sure that they put in place sound and correct regulations to manufacture environmentally friendly and sound products.

The interviews concluded that Middle Eastern industries should monitor and vet with supply chain partners in order to make sound environmental decisions and adopt a healthy green supply chain system. The interviews also agreed that monitoring and auditing of supply chain partners always direct companies to adopt a green supply chain system in industries.

Some of the evidence that was explained in the interviews will show that monitoring and auditing supply chain partners are a driver to MENA region industries' adoption of the green supply chain system and the environmental systems, and the evidence is as follows:

"Monitoring and auditing green supply chain partners are an important driver for MENA to adopt environmental regulations, develop environmentally friendly industries and reduce pollution".

"The partnership with customers was positively related to product quality and flexibility, while the partnership with suppliers was associated with better deliveries and led to many industries adopting green supply chains. This is an incentive for MENA region as well to adopt green and environmental supply chains".

It is evident from the above that monitoring and auditing supply chain partners have always led companies in MENA region to adopt environmental supply chains. It is also a very important factor for the trend of industries towards an environmental and health trend.

8.1.2.13 Trust and Commitment among Partners

Commitment and trust among partners lead to decisions that help develop and improve the performance of companies. Therefore, studies indicated that trust and commitment a partners lead to the adoption of sound and healthy environmental systems, and they considered this element important for adopting green supply chains in many industries.

The interviews were based on the fact that the industries of the Middle East region adopting green supply chain systems depends on commitment and trust with supply chain partners, and considered that cohesion and trust is a great reason for companies' tendency towards environmental systems because providing green supply chain partners with confidence leads to an increase in the efficiency of industries.

Some of the evidence that was explained in the interviews will show trust and commitment among partners is a driver to MENA region industries' adoption of the green supply chain system and the environmental systems, and the evidence is as follows:

“Mutual trust and commitment are developed between partners, they become more aware of pivotal corporate behavior patterns and product offerings, and this is what promotes the adoption of green supply chains among industries and this is an important driver for the adoption of environmental chains in MENA region”.

“Building trust and relationships with external components acts as a catalyst to take advantage of the innovative potential of green supply chain partners. I believe that increased trust and commitment between partners is an important driver for adopting green supply chains and environmental products. Therefore, MENA region companies and industries should pay attention to providing supply chain partners with confidence and commitment”.

It is evident from the above that trust and commitment among partners has always led companies in MENA region to adopt environmental supply chains. It is also a very important factor for the trend of industries towards an environmental and health trend.

8.1.2.14 Long Term Partnership

Long-term partnership leads to adding an advantage to companies and increasing their efficiency, and this helps industries to adopt green supply chain systems because the long-term partnership increases confidence in the company and leads to the adoption of environmental systems and the production of environmentally friendly products.

The interviews made it clear that the adoption of green supply chains depends greatly on long-term partnership. Therefore, it was made clear that industries in the Middle East region must adopt long-term companies in order to reach the green supply chain system and apply it properly.

Some of the evidence that was explained in the interviews will show long term partnership is a driver to MENA region industries' adoption of the green supply chain system and the environmental systems, and the evidence is as follows:

"By exploring, monitoring and auditing the operational performance due to the green partnership along the supply chain, and can help MENA region in the adoption of the green supply chain system".

"I also think that a long-term partnership makes companies not only share information with their supply chain partners, but also make joint decisions to improve supply chain performance. So, the dependence of companies in MENA region on supply chain partners should be large and for a long time".

It is evident from the above that long term partnership has always led companies in MENA region to adopt environmental supply chains. It is also a very important factor for the trend of industries towards an environmental and health trend. Figure 8-3 shows the model validation.

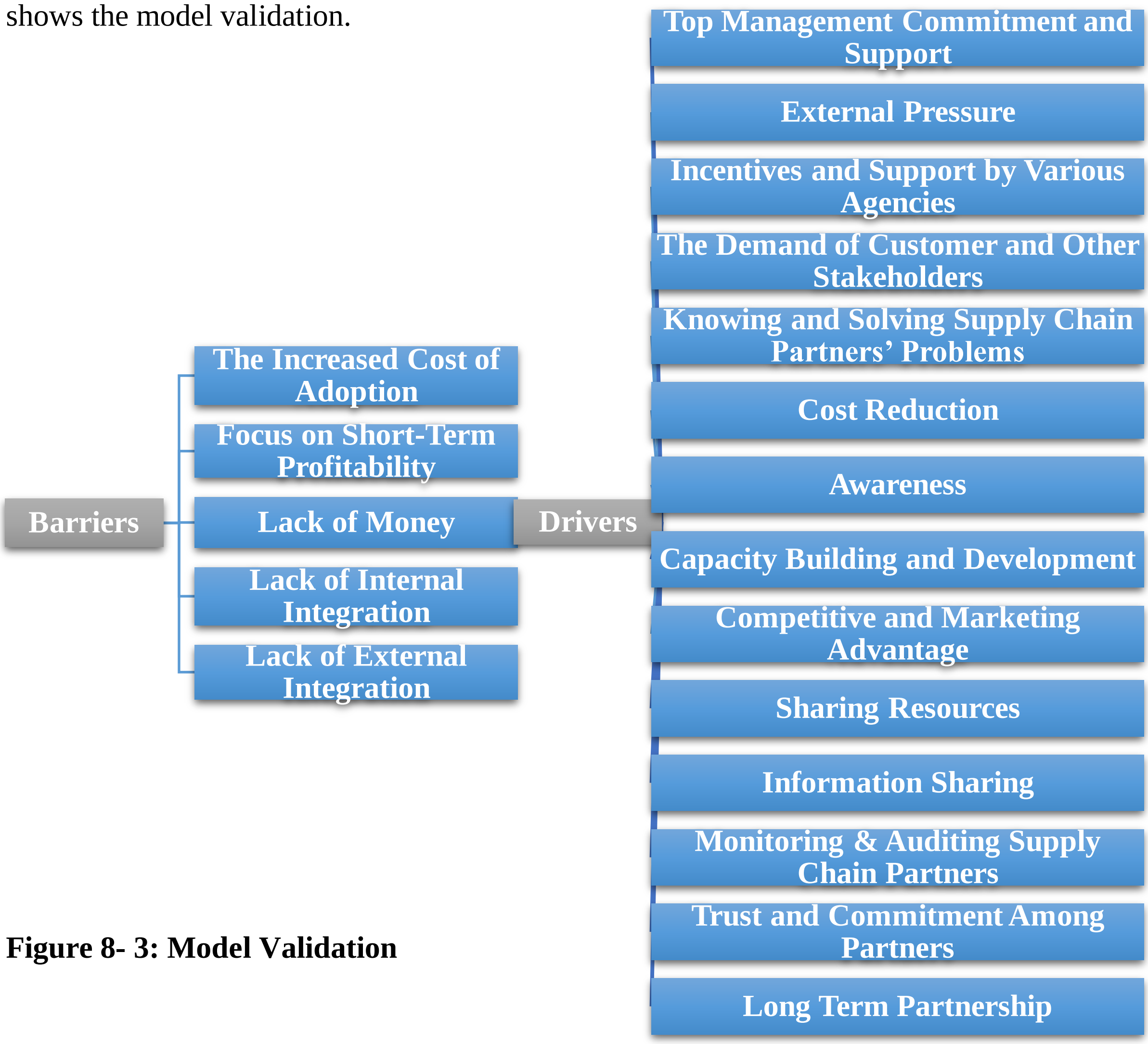

Figure 8- 3: Model Validation

Chapter Nine: Discussion and Conclusion

9.1 Introduction

Businesses are trying to implement emission management approaches in order to develop fundamental competencies for environmental sustainability. To direct inter- and intra-organizational environmental activities, GSCI can be defined as the partnership between a company and its supply chain partners. In addition, the internal incorporation in GSCM literature typically involves promoting and dedicating senior and middle managers to GSCM, focusing on cross-functional environmental management, and interdepartmental environmental collaboration. Further integration tasks include implementing environmental compliance and auditing methods, collecting and sharing knowledge on environmental conservation and establishing environmental management processes (Lee, 2008; Wu et al., 2012; Zhu et al., 2008). The integration of the supply chain is an attempt to elevate the interconnections within each element of the chain by promoting better decision-making and attempting to make all parts of the chain interact more efficiently by developing supply chain visibility and identifying bottlenecks. It can therefore be anticipated that incorporation within a supply chain will have a positive impact on collaborative activities related to environmental concerns (Abdullah et al., 2014).

Consequently, literature had been extensively reviewed to define the research gap, and then the conceptual framework and hypotheses were developed. Next, the methodological philosophy and approach had been selected for answering the research questions. The analysis had been conducted to explore the Green Supply Chain Management (GSCM) practice. The correlation and regression analyses were utilized to test the research hypotheses. Results and findings had been obtained and illustrated in the previous chapter.

The current chapter is a discussion of the research main findings, as well as the research contribution and originality. In addition, the research implications, recommendations and limitations had been illustrated in this chapter respectively. Figure 5-1 illustrates the chapter outline.

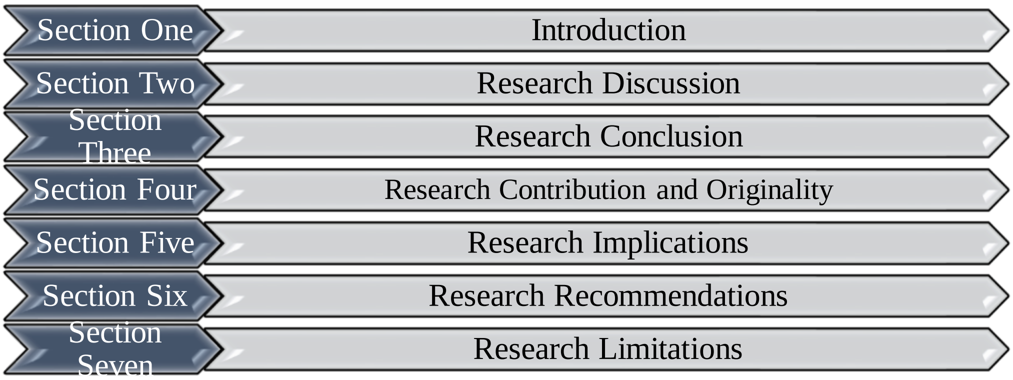

Figure 5- 3: Chapter Five Outline

9.2 Research Discussion

This section discusses how this research was able to achieve the research objectives, as the main purpose of this study is to develop and understand a framework for different drivers and barriers that affect the green supply chain adoption in the process as well as identifying the role of TOE dimensions in enhancing the process. This section is divided into six sections, where each one discusses the main findings obtained for each hypothesis of the current research. Therefore, this section discusses to what extent the researcher has achieved the purpose of the study, in addition to discussing the result of collecting data from the questionnaire survey from employees of the industrial sector represented in the academic and non-academic in the field of supply chain.

9.2.1 Testing the Relationship between Environmental Dimensions and Firm Practices and Supply Chain Practices

This section investigates the relationship between Environmental Dimensions: Competitive Pressure, Government Regulations and Support, and Firm Practices and Supply Chain Practices. When conducting correlation, it was found that there is a significant positive relationship between Competitive Pressure, Government Regulations and Support and Firm Practices and Supply Chain Practices (P-value < 0.05, $r > 0$). Moreover, the regression model for the effect of Environmental Dimensions: Competitive Pressure, and Government Regulations and Support on Firm Practices and Supply Chain Practices shows that there is a significant positive effect of Competitive Pressure and Government Regulations and Support on Firm Practices and Supply Chain Practices (P-value < 0.05, $\beta > 0$).

Therefore, the first hypothesis, “There is a significant relationship between Environmental Dimensions, and Firm Practices and Supply Chain Practices” is fully supported.

This result is consistent with some of previous studies (Coa and Mu, 2011; Yang et al., 2015; Kim and Chai, 2017; Zhang et al., 2017) as the environmental dimensions government regulations and market (competition) pressure are related to and affect the supply chain practices. The government takes responsibility to observe the environmental performance of firms' SC practice to maintain social benefits in the process of production and supply chain.

The Structural equation modeling (SEM) analyses the impact of Environmental Dimensions on Firm Practices and Supply Chain Practices. SEM analysis is a multivariate statistical analysis technique that is used to analyze structural relationships. A statistical procedure consists of a group of equations that interpret the relationships between a set of variables. Estimation involves using SEM computer tool to conduct the analysis. Several things take place at this step: (1) Evaluate model fitness, which means determining how well the model explains the data. Perhaps more often than not, researchers’ initial models do not fit the data very well. When (not if) this happens, skip the rest of this step and go to the next specification, and then reanalyze the pre-specified model using the same data. Assuming satisfactory model fitness, then (2) interpret the parameter estimates. In written summaries, many researchers fail to interpret the parameter estimates for specific effects (Kline, 2011). In the current research, SEM is employed in testing the hypothesis of the study beside the overall model. It could be observed that there is a positive significant impact of Competitive Pressure, and Government Regulations and Support on Firm Practices and Supply Chain Practices (P-value < 0.05, $r > 0$).

Through the previous findings of the research, it recommends the following:

The need for the organization to take more advanced environmental measures that contribute to the sustainability of the supply chain as a whole, including:

1. Guiding and directing suppliers to their own environmental programs as well as pressuring them to make more advanced environmental decisions.
2. The organization develops advanced methods for managing waste in an environmentally friendly way.
3. The organization seeks to use environmentally friendly means of transportation.
4. The organization conducts discussion groups and meetings with suppliers to educate them and raise their level of knowledge of the importance and benefits of applying green practices, as well as gathering suppliers who work in one type of industry to share knowledge and common problems.
5. The organization develops a future plan in terms of selecting suppliers according to environmental standards

9.2.2 Testing the Relationship between Organizational Dimensions and Firm Practices and Supply Chain Practices

This section investigates the relationship between Organizational Dimensions: Top Management Support, Centralization, and Firm Practices and Supply Chain Practices. When conducting correlation, it was found that there is a significant positive relationship between Top Management Support and Firm Practices and Supply Chain Practices (P-value < 0.05, $r > 0$). However, there is an insignificant relationship between Centralization, and Firm Practices and Supply Chain Practices (P-value > 0.05). Moreover, the regression model for the effect of Organizational Dimensions; Top Management Support, and Centralization on Firm Practices and Supply Chain Practices shows that there is a significant positive effect of Top Management Support, Centralization on Firm Practices and Supply Chain Practices (P-value < 0.05, $\beta > 0$).

Therefore, the second hypothesis, “There is a significant relationship between Organizational Dimensions, and Firm Practices and Supply Chain Practices” is fully supported.

This result is consistent with some of previous studies (Sandberg and Abrahamsson, 2010; Singh, 2013; Kumar et al., 2015), as the organizational dimensions top management support and centralization are related to and affect the supply chain practices. Thus, it is very critical to notice that importance of top management to support the development of the SC practices. This upgrading of the coordination between a specific firm and its associated partners, such as its suppliers and consumers, needs a wise and professional management to incorporate the practices of its SC in the production system efficiently and effectively. It has been proved that coordination mechanism of SC is more efficient and effective in case of decentralization control, and the centralization decisions for practices and functions of SC management would not be realistic in most cases (Singh, 2013).

The SEM analyses the impact of Organizational Dimensions on Firm Practices and Supply Chain Practices. It could be observed that there is a positive significant impact of Top Management Support, and Centralization on Firm Practices and Supply Chain Practices (P-value > 0.05, r > 0).

Through the previous findings of the research, it recommends the following:

1. Companies must build and establish the components of internal integration first before undertaking external integration processes and building internal integration depending on the company having organizational capabilities that enhance internal integration processes throughout the supply chain.
2. The need for top management support to pay attention to supply chain and to make intensive and continuous efforts to support and enhance efforts aimed at enriching and enhancing the role of supply chain in companies.
3. Companies' top management allocate budgets for the development of the administrative systems, policies and processes followed, spreading the philosophy of using modern technological technologies and spreading a culture of change among employees.

9.2.3 Testing the Relationship between Technological Dimensions and Firm Practices and Supply Chain Practices

This section investigates the relationship between Technological Dimensions: Perceived Compatibility, Perceived Complexity, IT Infrastructure, and Firm Practices and Supply Chain Practices. When conducting correlation, it was found that there is a significant positive relationship between Perceived Compatibility, Perceived

Complexity, IT Infrastructure, and Firm Practices and Supply Chain Practices (P-value < 0.05, r > 0). Moreover, the regression model for the effect of Technological Dimensions - Perceived Compatibility, Perceived Complexity, and IT Infrastructure-on Firm Practices and Supply Chain Practices shows that there is a significant positive effect of Perceived Compatibility, Perceived Complexity, and IT Infrastructure on Firm Practices and Supply Chain Practices (P-value < 0.05, β > 0).

Therefore, the third hypothesis, "There is a significant relationship between Technological Dimensions, and Firm Practices and Supply Chain Practices" is fully supported.

This result is consistent with some of previous studies (Chou et al., 2012; Balasubramanian 2012; Gimenez et al., 2012; Dashore and Sohani, 2013; Hwang et al., 2016; Zhang et al., 2017), as the technological dimensions Complexity, Compatibility and IT Infrastructure are related to and affect the supply chain practices. It is found that compatibility of the technological capabilities in the SC practices enhances the competitive advantage and usage of those practices. Moreover, the reduction of complexity to increase the efficiency of supply chain practices could be done by incorporating appropriate technology in the SCM. In addition, it is noticed that a good solid technology infrastructure creates an increasing of the capacity of the partners of the supply chain; a firm with existing, good technology infrastructure has the ability to enhance the process and the strategy of its Supply chain.

The SEM analyses of the impact of Technological Dimensions on Firm Practices and Supply Chain Practices. It could be observed that there is a positive significant impact of Perceived Compatibility, Perceived Complexity, and IT Infrastructure on Firm Practices and Supply Chain Practices (P-value < 0.05, r > 0).

Through the previous findings of the research, it recommends the following:

1. Focusing efforts on creating a technological infrastructure, with attention to the quality of the technology that is prepared for work.
2. Enhancing the style of work teams and workshops related to modern technology in order to enhance the ability to use and deal with it.

3. The need to expand by relying on modern information technology, and to continue to keep pace with progress and development due to its significant role in achieving a sustainable competitive advantage.
4. Creating an integrated information system, which is based on the fundamentals of software to connect members of the supply chain in the short term, and this links all members of the supply chain as well as linking the external customer and receiving orders from him.

9.2.4 Testing the Relationship between Drivers, Barriers, Firm Practices and Supply Chain Practices and the Green Supply Chain Adoption

This section investigates the relationship between Drivers, Barriers, Firm Practices and Supply Chain Practices, and the Green Supply Chain Adoption. When conducting correlation, it was found that there is a significant positive relationship between Drivers, Barriers, Firm Practices and Supply Chain Practices, and the Green Supply Chain Adoption (P-value < 0.05, $r > 0$). Moreover, the regression model for the effect of Drivers, Barriers, and Firm Practices and Supply Chain Practices on the Green Supply Chain Adoption shows that there is a significant positive effect of Drivers, Barriers and Firm Practices and Supply Chain Practices and the Green Supply Chain Adoption (P-value < 0.05, $\beta > 0$).

Therefore, the fourth hypothesis, “There is a significant relationship between Drivers, Barriers and Firm Practices and Supply Chain Practices and the Green Supply Chain Adoption” is fully supported.

This result is consistent with some of previous studies (Emmet and Sood, 2010; Green et al., 2012; Chowdhury et al., 2016; Ogunlela, 2018), as drivers and barriers are related to and affect the supply chain practices. The adoption of GSC consists of factors that drive the different manufacturing industries to minimize the wastes and harmful emissions that are combined with different steps of their SC management. Thus, a good firm and SC practices create an efficient adoption of GSC (Zhao et al., 2017).

The SEM analyses of the impact of Drivers, Barriers, and Firm Practices and Supply Chain Practices on the Green Supply Chain Adoption. It could be observed that there is a positive significant impact of Drivers, and Firm Practices and Supply Chain Practices on the Green Supply Chain Adoption ($P\text{-value} < 0.05$, $r > 0$), while there is an insignificant effect of Barriers on the Green Supply Chain Adoption ($P\text{-value} > 0.05$).

Through the previous findings of the research, there is need for the organization to management support through motivations and training programs that contribute to the sustainability of the supply chain. Also, there is need for the organization to avoid the barriers that affect the supply chain as follows:

1. Lack of Government Support
2. Complexity
3. Practices of Suppliers
4. Fear of Failure
5. Lack of new technology
6. Lack of Materials
7. Lack of Environmental Knowledge
8. Lack of awareness about reverse logistics
9. Perception of "out-of-responsibility" zone
10. Financial Constraints
11. High cost of hazardous
12. Cost of switching to new system
13. Lack of training courses
14. Lack of customer awareness
15. Lack of top management involvement
16. Poor supplier commitment

Through the previous findings of the research regarding firm practices, it recommends the following:

1. Supply Chain Partners should work to create collaboration, integration and resource sharing across the supply chain to enhance supply chain capabilities and improve performance.
2. Supply chain managers should consider integrating supply chain operations through advanced automated information systems to achieve both supply

chain efficiency and effectiveness and increase the supply chain's ability to use internal and external resources to coordinate supply chain and operational activities.

3. Supply chain managers should consider the integration of supply chain operations by strengthening trust, commitment and information exchange between supply chain partners and work to increase alignment between the organization and its supply chain partners in operational processes and work procedures, thus facilitating supply chain capabilities.
4. Supply chain managers should work to blend the organizational culture of their organizations with their supply chain partners, which is reflected in the increased capacity of the supply chain to generate cost savings associated with purchasing and production, improving material handling from suppliers, and ensuring improved competitiveness of supply chain participants in the market.

9.2.5 Testing the Relationship between Green Supply Chain Adoption and Supplier Relationship Management

This section investigates the relationship between Green Supply Chain Adoption and Supplier Relationship Management. When conducting a correlation, it was found that there is a significant positive relationship between Green Supply Chain Adoption and Supplier Relationship Management (P-value < 0.05, $r > 0$). Moreover, the regression model for the effect of Green Supply Chain Adoption on Supplier Relationship Management shows that there is a significant positive effect of Green Supply Chain Adoption on Supplier Relationship Management (P-value < 0.05, $\beta > 0$).

Therefore, the fifth hypothesis, “There is a significant relationship between Green Supply Chain Adoption and Supplier Relationship Management” is fully supported.

This result is consistent with some of previous studies (Vachon and Klassen, 2006; Yu et al., 2014), as the empirical analysis thus shows that there is a strong, multi-faceted connection between the characteristics of the Supplier Relationship Management and the GSC practice, while the relationship between Customer Relationship Management characteristics and GSC practices appears to be confined to a single significant variable, which is technological integration (Vachon and Klassen, 2006). Suppliers are recognized as the main group in supply chains, since they can promote environmental policies of companies and help strengthen the environmental standards of the supply chain (Yu et al., 2014).

The SEM analyses of the impact of Green Supply Chain Adoption on Supplier Relationship Management. It could be observed that there is a positive significant impact of Green Supply Chain Adoption on Supplier Relationship Management (P-value < 0.05, $r > 0$).

9.2.6 Testing the Relationship between Green Supply Chain Adoption and Customer Relationship Management

This section investigates the relationship between Green Supply Chain Adoption and Customer Relationship Management. When conducting correlation, it was found that there is a significant positive relationship between Green Supply Chain Adoption and Customer Relationship Management (P-value < 0.05, $r > 0$). Moreover, the regression model for the effect of Green Supply Chain Adoption on Customer Relationship Management shows that there is a significant positive effect of Green Supply Chain Adoption on Customer Relationship Management (P-value < 0.05, $\beta > 0$).

Therefore, the sixth hypothesis, “There is a significant relationship between Green Supply Chain Adoption and Customer Relationship Management” is fully supported.

This result is consistent with some of previous studies (Christmann and Taylor, 2001; Emmet and Sood, 2010; Green et al. 2012; Yu et al., 2014; Laari et al., 2016; Suryanto et al., 2018), as GSCM with Customer Relationship Management is defined as environmentally sustainable collaboration between a company and its customers to meet customers' environmental requirements. It concentrates on Customer Relationship Management side of the SC. Past research set out specific avenues for producers to collaborate on the environmental side with their consumers. For successful implementation of GSCM practices, it is necessary to establish close and long-term relationships with Customer Relationship Management (Christmann and Taylor, 2001). In addition, the suppliers and customers are main parties at both Supplier Relationship Management and Consumer Relationship Management. Such parties have given the SC an important process, particularly for companies with a strategic plan. Since each focal organization acts as a buyer to its suppliers and as a supplier to its customers, environmental engagement and monitoring in the SC will include both Supplier Relationship Management and Consumer Relationship Management (Laari et al., 2016).

From the SEM analysis of the impact of Green Supply Chain Adoption on Consumer Relationship Management, it could be observed that there is a positive significant impact of Green Supply Chain Adoption on Consumer Relationship Management (P-value < 0.052, $r > 0$).

Through the previous findings of the research, the following is recommended:

1. Working on having a clear and specific strategy regarding the implementation of the supply chain management system in the company, ensuring that that strategy is in line with the visionary mission of the company, in addition to the acceptance of this strategy by the employees and officials of that organization.
2. The company's management, when designing its supply chain, should adopt an efficient model if it aims to achieve profit and reduce costs, and adopt the creative chain model if it aims to achieve a rapid response to product demands.
3. Emphasizing the necessity of building long-term relationships with suppliers and the trend towards establishing partnerships.
4. Emphasizing the company's management of the necessity to approve the communication and information system in building partnerships with suppliers, intermediaries and distributors that contribute to their selection and continuous contact with them.
5. Promoting interest in implementing supply chain management practices, which have a significant impact on improving the performance of operations by reducing costs and improving quality leading to increased profitability, as well as increasing flexibility and speed of delivery, thus increasing customer satisfaction and thus increasing sales and market share.

Also, the following points could be applied concerning upstream process:

1. Companies adopt the strategic approach to integrate supply chain practices, based on establishing a long-term relationship with suppliers, effective communication, and partnership with suppliers because

efficiency in the integration of supply chain practices is the main key to the long-term success of the organization.

2. Companies work to take advantage of suppliers' ability to provide important information that can help the company develop specifications and quality of its products.
3. Companies work to own the elements that support the flexibility of their vein, especially if there is more than one qualified supplier to provide the company with its needs of materials, either with one payment or several separate requests and transferring them after different means as well as good coordination between the company and its suppliers.
4. Decision-makers and those who are responsible for developing strategies work to analyze the characteristics of suppliers in terms of the number of suppliers, their capacity, the volume of investment they have and how to link the information and the nature of the retirement process in order to determine the strengths of the suppliers.
5. Companies work to establish partnership relationships with their suppliers to allow long-term agreements that are characterized by stability, firmness and flexibility against future changes, as mutual trust and cooperation in various issues, such as cooperation in finding solutions to problems is the basis for reaching a partnership relationship.
6. Companies work to build long-term relationships with their suppliers and maintain these relationships by being based on mutual trust and common interests without ignoring the interests of other parties in the supply chain, and that every administrative unit in the particular organization works to strengthen this relationship.
7. When choosing suppliers, companies should achieve harmony between their interests and the interests of their suppliers, because this affects the improvement of the companies' performance.

Regarding downstream process, the following policies could be applied:

1. Companies maintain the relationship with customers by giving customers a greater role in determining the nature of the products and services they want, and companies work on periodic evaluation of the level of satisfaction of their customers, since the nature of the relationship with customers is in a state of change.
2. Emphasizing the need to find flexible systems for companies to respond effectively and quickly to customer orders.
3. Companies give greater attention to the transportation and supply systems used, because of the importance of these systems in the speed of meeting customer orders.

9.3 Research Conclusion

Green Supply Chain Management (GSCM) practices are considered one of the most important environmentally friendly practices. These practices include water efficiency, waste management, energy efficiency, environment conservation, reuse and recycling, toxic substance management and hazardous and optimization of transportation. Green Supply Chain Management is still in its inception and has not been widely embraced yet in emerging economies. Here, the researcher demonstrated the importance and the impact of Technology-Organization-Environment (TOE) dimensions, firm practices and supply chain practices on the supply chain practices and the green supply chain adoption and the Supplier Relationship Management and Customer Relationship Management. Therefore, the main purpose of this research is to develop and understand a framework for different drivers and barriers that affect the green supply chain adoption in the process as well as identifying the role of TOE dimensions in enhancing the process. The researcher tried to provide a critical review and identify gaps in the literature related to green supply chain management, its drivers and barriers, GSCM adoption, and the TOE dimensions, developing an appropriate research methodology to collect and analyze data to address the research question. The researcher also aims to examine how all of the variables of the research are statistically related: Customer Relationship, Supplier Relationship, Supplier Selection, Internal collaboration, Top Management Support, Green Supply Chain Management, Coercive Pressure, Normative Pressure, Mimetic Pressure, Market Pressure, Green purchasing, in addition to the Barrier for GSCM, and Drivers for

GSCM using the statistical tools, and critically discuss findings of current research, compare them to prior findings within the literature.

In order to accomplish the main purpose of the research, the researcher depended on quantitative approaches, which is followed by a questionnaire survey to collect data from 405 employees of the industrial sector represented in the academic and non-academic staff in universities. After that, the results found from the questionnaire were validated using a focus group with top managers in the industrial sector represented in the experts of the sector.

The research concluded that the hypothesis as shown in Figure 5-2, which stated that there is a significant relationship between environmental dimensions and firm practices and supply chain practices, is fully supported. The second hypothesis, which stated that there is a significant relationship between organizational dimensions and the firm and supply chain practices, is fully supported. The third hypothesis, which stated that there is a significant relationship between technological dimensions and the firm and supply chain practices, is fully supported. The fourth hypothesis, which stated that there is a significant relationship between drivers, barriers and firm practices and supply chain practices and the green supply chain adoption, is fully supported. The fifth hypothesis, which stated that there is a significant relationship between Green Supply Chain Adoption and Supplier Relationship Management, is fully supported. The sixth hypothesis, which stated that there is a significant relationship between green supply chain adoption and Customer Relationship Management, is fully supported.

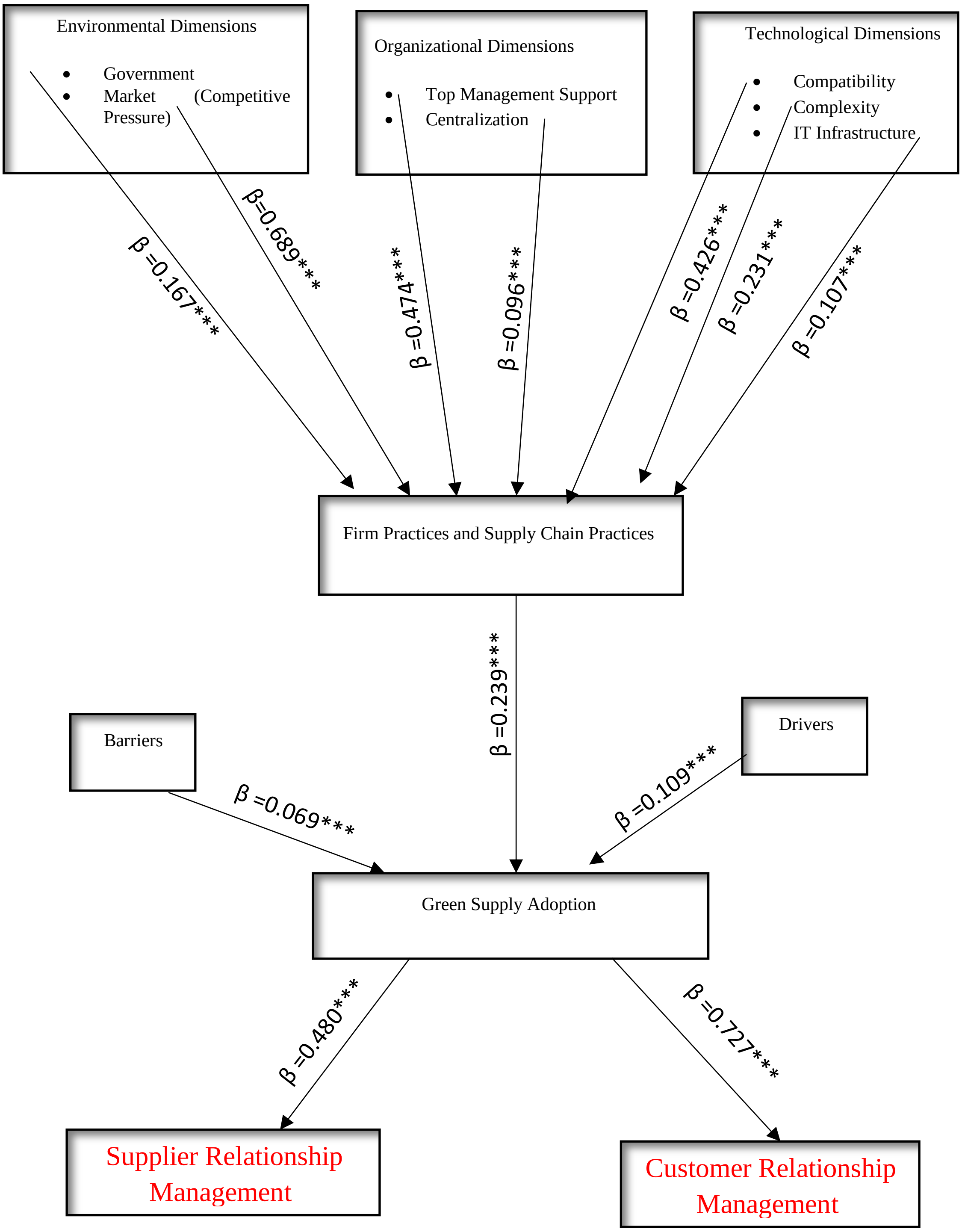

Figure 5- 4: Research Conclusion

9.4 Research Contribution and Originality

Green supply chain management is attracting attention as a way to decrease the adverse environmental effects of industries worldwide. GSCM practices are considered to be environmentally friendly practices, which include water efficiency, energy efficiency, waste management, environment conservation, recycling and reuse, toxic substance management and hazardous and optimization of transportation. However, considering the context of an emerging economy, green supply chain management is still in its inception and has not been widely embraced yet.

In this research, the researcher demonstrated the importance and the impact of Technology-Organization-Environment (TOE) dimensions, firm practices and supply chain practices on the supply chain practices and the green supply chain adoption and Supplier Relationship Management and Customer Relationship Management. This research aims to develop and understand a model for different drivers and barriers that affect the green supply chain adoption in the process, as well as identifying the role of TOE dimensions in enhancing the process. In this research, the researcher tried to provide a critical review and identify gaps in the literature related to GSCM and drivers and barriers to its adoption.

In addition, the TOE dimensions, developing an appropriate research methodology to collect and analyze data to address the research question, empirically examine how all of the variables of the research are statistically related: Customer Relationship, Supplier Relationship, Supplier Selection, Internal Collaboration, Top Management Support, Green Supply Chain Management, Coercive Pressure, Normative Pressure, Mimetic Pressure, Market Pressure, Green purchasing, Barrier for GSCM, and Drivers for GSCM, using the statistical tools and critically discussing findings of current research. Then, the researcher compares them to prior findings within the literature, highlights the theoretical contributions and practical implications of the study and identifies limitations and areas for future research.

The deduction approach has been utilized in this research as well as the quantitative method, using structured questionnaires that had been collected from 405 respondents. The researcher has obtained a triangulation method to validate the dimensions of the research through qualitative data obtained through interviews then analyzed through making extracts of the interviews that can help in making overall assessment of the responses and help in comparing the responses obtained. In addition, the researcher has obtained focus group to validate the proposed conceptual model. The research indicated that there is a significant relationship between the environmental, organizational and technological dimensions, firm practices and supply chain practices. There is a significant relationship between drivers, barriers and firm practices and supply chain practices and the green supply chain adoption, and there is a significant relationship between Green Supply Chain Adoption and both Supplier Relationship Management and Customer Relationship Management.

9.5 Research Implications

Academic Implication: in this research, the researcher puts on his consideration the academic implication as the research aims to develop and understand a framework for different drivers and barriers that affect the green supply chain adoption in the process, as well as identifying the role of TOE dimensions in enhancing the process. Therefore, other researchers should develop their framework with other factors that could influence the relationship between different drivers and barriers that affect the green supply chain adoption in the process, as well as identifying the role of TOE dimensions in enhancing the process. In addition, the adoption of block chain technology in green supply chain management is at a nascent stage, and more research studies are necessary to extend the knowledge base.

Practical Implication: the study findings have several implications for decision makers. Therefore, the decision makers have to focus on increasing the impact of awareness of the green supply chain adoption in the process.

Managers need to eliminate the barriers and extend the block chain technology application in green supply chain management. Managers need to develop the mission and vision of the company by doing proper alignment of block chain technology with green supply chain management goals. In addition, managers need to make strong collaborations and remove the hesitation and workforce obsolescence barrier by providing the right education and pieces of training.

9.6 Research Recommendation

Based on the results of the current research, it is recommended that firms adopt the concept of GSCM as the global industrialization has increased energy and material consumption and ultimately led to various environmental concerns, such as higher carbon emissions, toxic pollution and chemical spills. Due to the regulatory, competitive and community pressure, firms have to stabilize their environmental and economic performance. Nowadays, firms all over the world in various industries are becoming increasingly concerned about environmental degradation. They have realized that the adoption of green technology in business operations has greater benefits and affects suppliers and customers' relationships within firms (Fritz et al., 2017). To manage environmental pressures from a variety of stakeholders, several firms begin to implement green supply chain management (GSCM). GSCM practices are considered to be environmentally friendly practices, which include water efficiency, energy efficiency, waste management, environment conservation, recycling and reuse, toxic substance management and optimization of transportation (Popovic et al., 2018).

In addition, it is also recommended that governments support and back up the concept of GSCM by enacting laws introducing guidelines and regulations, providing incentives and subsidies as to encourage companies to adopt green operation in order to enhance both the economic and environmental performance of their communities. For example, Egypt has become the first Arab country that issues Green Bond aiming to promote transparency, integrity and disclosure between issuers and stakeholders and ensure the availability of information to assess the organization's environmental impact (Egypt Independent, 2020).

Furthermore, based on the research findings, it can be recommended that policymakers and regulators should put more prominence on raising awareness of green supply chain management practices and the benefits of adopting them. In addition, policy makers in developing countries should build strong environmental institutions and strategies to impel the increasing importance of green environmental practices and bring a positive impact to domestic environmental management.

Moreover, the researcher focuses on the Drivers and the Barriers that mainly affect the Green Supply Chain adoption process, in addition to the TOE dimensions that have an impact on the firm practices and supply chain practices. Hence, it is expected that the outcomes of this research and results from testing the proposed conceptual model can strongly contribute to the academic body of knowledge, fill research gaps in the GSCM practices, research management literature and extend the theories in use (TOE).

The impact of firm size on supply chain practices was understood by controlling the impact of firm ownership, and similarly the impact of firm ownership on supply chain practices was understood by controlling the impact of firm size. The researcher recommends the future researcher to capture the impact of both, such as large foreign vs. large local. Future studies could investigate the combined impact of both size and ownership on supply chain practices.

Future researchers could investigate the relationship of the research in construction or other sectors, as they could utilize the theoretical understanding either directly in their research contexts or as a basis for cumulative theory building and testing. This is important, as theory building and testing is an ongoing process, and can only be strengthened through a series of further refinement and tests across different populations and settings. Researchers in the future could utilize the multi methodology pragmatic approach for conducting a comprehensive investigation in the respective settings in construction or other sectors. In addition, researcher could utilize the pretested and validated survey instrument for empirical investigation in their respective settings. Future researcher could require further refinement and validation of the supply chain practices themes/sub-themes across different countries.

Finally, the conceptual framework proposed by this study further clarifies the key factors that influence GSCM, Supplier Relationship Management and Customer Relationship Management, which in turn would aid managers and policymakers in the design and execution of the best green supply chain practices to help enhance green performance, minimize waste and achieve cost savings.

9.7 Research Limitations

As all research studies, this research has several limitations through the study handled. The current research was conducted on companies adopting GSCM in the MENA region without including other countries; accordingly, future research on the phenomenon should include different countries. Moreover, the time limitation to finish the research was a constraint for collecting larger sample size to represent the data under study. In addition, another suggestion is to perform a comparative study between a developed and developing country and then see if the same set of dimensions (Customer Relationship, Supplier Relationship, Supplier Selection, Internal collaboration, Top Management Support, Green Supply Chain Management, Coercive Pressure, Normative Pressure, Mimetic Pressure, Market Pressure, Green purchasing, Barrier for GSCM, and Drivers for GSCM) has a significant impact on GSCM.

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Appendix

Appendix A: Interview Consent Form

Research Title: Developing Integrated Model for Green Supply Chain Adoption. An Empirical Analysis of MENA Developing Countries' Industrial Sectors

Researcher Name: Hana Hanna

Form:

Serial	Description
1	I have read and understood the information provided about this research project in the information sheet dated 31 January, 2018.
2	I have had an opportunity to ask questions and to have them answered.
3	I understand the notes will be taken during the interviews and that they will also be audio-taped and transcribed.
4	I understand that I may withdraw myself or any information that I have provided for this research at any time prior to completion of data collection, without being disadvantaged in any way.
5	If I withdraw, I understand that all relevant information included tapes and transcripts, or parts thereof, will be destroyed.
6	I agree to take part in this research.

Participant's Name: ……………………………………………….

Participant's Signature: ……………………………………………

Participant's Contact Details (if appropriate):

…………………………………………………………………………

…………………………………………………………………………

Date: ………………………………………………………………….

Researcher Contact Details:

Hana Hanna

Email: -------------------------

Appendix B: Interview Design

Interview Guide for GSCM Practices
A PhD research by ____________________,
Research Centre of the University of ____________________
Introduction:

With increasing public concern about the deteriorating impact of industrial activities on the environment, green practices find more and more access into the strategic and operational planning of enterprises. Green supply chain management (GSCM) has emerged as a key approach for enterprises aiming to become environmentally sustainable.

GSCM is seen as a modern concept of management practices attempting to integrate environmental thinking to all stages up and down the supply chain entailing inbound logistics, production, outbound logistics and reverse logistics operations. Such practices entail, for example, assessment and selection of suppliers according to their environmental performance, vendor selection on the base of their green management practices, reducing packaging and waste, or applying green design practices in new product development. Taking part in the interview is entirely voluntary which means that you can withdraw at any time without any consequences. The interview is conducted for purely research reasons and your answers will be used only for that purpose. Your personal data and answers will remain confidential and secure throughout the entire process.

Interview Questions:

1. Can you tell us about your job? How close is it related to GSCM?
2. For how many years has your company been engaged in green practices?
3. Can you describe specifically the green practices your company is engaged in? *For example: Green purchasing, Cooperation with customers, Eco-Design, Investment recovery
4. Do employees receive training/education in sustainability matters?
5. What is the biggest challenge your company has faced internally when implementing GSCM?
6. What is the biggest challenge your company has faced externally when implementing GSCM?
7. What is the major reason your company decided to engage in green practices?
8. What do you find the most enabling about GSCM and why?
9. From a financial perspective: do you feel that GSCM is disadvantageous or advantageous?
10. Can you describe one government policy that encourages companies to implement GSCM?
11. Do you have any solutions or other alternatives to measure performance?
12. Does your company have a department responsible for all those sustainability issues or does every department is responsible for assuring its own sustainability standards?

Appendix C: Questionnaire Design

Dear participant;

Initially, I would like to thank you for your support and participation in this customer opinion survey which is done as part of a Doctor of Philosophy (PhD).

This survey examines various aspects of green supply chain practices and investigating the role of Barrier and Drivers influences in the implementation of Green supply chain management in an organization. Your participation is critical to the success of the study. All responses will be kept confidential and will not traceable to individual respondent. There are no right or wrong answer to the following questions. We are only interested in your assessment of your organization's activities. You will be asked questions concerning the company's current business practice.

If you are unable to complete the questionnaire yourself, please entrust the task to another who is knowledgeable about green supply chain management practices, supply chain integration and performance. The questionnaire should take about 20 minutes to complete. Kindly spare a few minutes from your busy schedule to complete the questionnaire as your participation is of value to this study. Thank you in advance for your cooperation and in case of enquiry.

<u>Demographics:</u>

Socio-demographic Information:
Please do not omit any of the questions:

Gender	Male ☐	Female ☐	
Age	Below 25 yrs. ☐	25-35 yrs. ☐	
	Above 45 yrs. ☐	35-45 yrs. ☐	
Work Experience	0-10 ☐	11-20 ☐	
	21-30 ☐	31-40 ☐	
	Over 40 ☐		

Business Description Electronics Component ☐ Industrial Electronics ☐

Consumer Electronics ☐ ICT Product ☐

Others. Please specify ……………………………………….

How long has your organization established GSCM?

Considering it currently ☐ It has been 1 year. ☐

It has been 2 years. ☐ It has been 3 years. ☐

It has been more than 4 years. ☐

Which of the following GSCM practices does your organization use?

Green procurement ☐ Reverse Logistics ☐

Green design ☐ Green Manufacturing ☐

Green distribution ☐ Green logistics ☐

Green Suppliers ☐ Investment recovery ☐

Total quality environmental management (TQEM) ☐

Green marketing, and customer cooperation ☐

Environmentally friendly packaging ☐

What is the number of permanent employees in your organization?

1~299 employee ☐ 300~499 employee ☐ 500~699 employee ☐ 700~899 employee ☐

over 900 employees ☐

Does your company have ISO 14001 certification?

Have ISO 14001 ☐ Do not Have ISO 14001 ☐

Please read carefully each of these statements and kindly do not omit any item.

- **TOE Dimensions**

Statements	**Scale**				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
Competitive pressure					
1. Competitors' adoption of GSCM places pressure on our organization to adopt GSCM.					
2. The overall operational practices in the industry pressure us to adopt GSCM.					
3. Our organization actively keeps track of new practices of GSC by competitors					
4. Training for GSCM is adequately provided by vendors.					
5. Adequacy of technical support during GSCM implementation.					
6. Adequacy of technical support after GSCM implementation.					
Government regulations and support					
7. The availability of government security and protection influence us to use GSCM.					
8. There are adequate financial aids from government (e.g. tax deduction, tariffs, financial subsidy) to adopt GSCM applications.					
Top management support					
9. Top management enthusiastically supports the adoption of GSCM.					
10. Top management has allocated adequate resources for the adoption of GSCM.					
11. Top management is aware of the benefits of GSCM.					
Centralization					
12. All major strategic decisions need to be approved by top					

management.					
13. We have to ask senior management before doing almost any decision.					
14. Even quite small matters have to be referred to someone higher up for a final answer.					
Perceived Compatibility					
15. Adoption of the system is compatible with existing operating practices.					
16. GSCM practices are consistent with our organization’s values and belief.					
17. The system is/will be incompatible with existing hardware and network facilities.					
18. The implementation of the GSCM system is/will be incompatible with existing software applications and database system.					
Perceived Complexity					
19. GSCM is complex to use.					
20. GSCM development is a complex process.					
21. GSCM is hard to learn.					
22. Integrating GSCM into our current work practices will be very difficult.					
IT Infrastructure					
23. Our organization is highly computerized with internal and external network connections that connect the firm with its branches.					
24. The organization has sufficient software and database resources to support the system.					
25. The organization has speedy internet facility.					
26. The organization has a strong backup plan for network failure.					

- **GSCM practices Factors**

Statements	Scale				
	Never	Rarely	Some of the time	Most of the time	Always
	1	**2**	**3**	**4**	**5**
Green purchasing					
1. Eco labelling of products.					
2. Cooperate with suppliers for environmental objectives.					
3. Environmental audit of suppliers' internal management.					
4. Our Suppliers have ISO 14000 certification.					
5. Second-tier supplier environmentally friendly practice evaluation.					
6. Providing design specification to suppliers that include environmental requirements for purchased item.					
Cooperation with customers for environmental requirements					
7. Cooperation with customers for eco-design.					
8. Cooperation with customers for cleaner production.					
9. Cooperation with customers for green packaging.					
10. Cooperation with customers for using less energy during transportation.					
Investment recovery					
11. Sale of excess inventories/materials.					
12. Sale of scrap and used materials.					
13. Sale of excess capital equipment.					
14. Recycling system for used and defective products.					
Eco-design					
15. Design of products for reduced consumption of material/energy.					

Statements	Scale				
	Never	Rarely	Some of the time	Most of the time	Always
	1	**2**	**3**	**4**	**5**
16. Design of products for reuse, recycle, or recovery of materials or component parts.					
17. Design of products to avoid or reduce use of hazardous products.					
Internal environmental management					
18. Investment recovery (sale) of excess inventories/materials.					
19. Sale of scrap and used materials.					
20. Sale of excess capital equipment.					
21. Investment recovery (sale) of excess inventories/materials.					

- **GSCM Adoption Factors**

Statements	Scale				
	Never	Rarely	Some of the time	Most of the time	Always
	1	**2**	**3**	**4**	**5**
Upstream (suppliers)					
1. with regard to our suppliers, we educate and generate awareness.					
2. with regard to our suppliers, we help set up environment-friendly practices.					
3. with regard to our suppliers, we put pressure to implement EMS and ISO 14001.					
4. with regard to our suppliers, we incentivize for conformance to EMS/ISO 14001.					
5. with regard to our suppliers, we urge to supply environment-friendly materials.					

Statements	Scale				
	Never	Rarely	Some of the time	Most of the time	Always
	1	**2**	**3**	**4**	**5**
6. with regard to our suppliers, we audit supplier performance to conformance.					
7. with regard to our suppliers, we select based on environment-related criteria.					
8. In packaging, storage, and distribution of raw materials and finished goods, we focus on use of recyclable packaging materials.					
9. In packaging, storage, and distribution of raw materials and finished goods, we focus on use of alternative transport mechanisms.					
10. In packaging, storage, and distribution of raw materials and finished goods, we focus on achieve economies of scale in transportation.					
Downstream (consumers)					
11. We adopt GSCM practices under pressure from consumers.					
12. In packaging, storage, and distribution of raw materials and finished goods, we focus on use of environment-friendly packaging.					
13. In packaging, storage, and distribution of raw materials and finished goods, we focus on use of environment-friendly storage.					
14. In packaging, storage, and distribution of raw materials and finished goods, we focus on use of alternative transport mechanisms.					
15. In packaging, storage, and distribution of raw materials and finished goods, we focus on achieve economies of scale in transportation.					
16. Our customers are environment-conscious.					

Statements	Scale				
	Never	Rarely	Some of the time	Most of the time	Always
	1	**2**	**3**	**4**	**5**
17. Our customers corporate in return handling.					
18. By adopting GSCM practices, we have achieved increase in sales of products.					
19. By adopting GSCM practices, we have achieved increase in market share.					
20. By adopting GSCM practices, we have achieved penetration of new markets.					
21. By adopting GSCM practices, we have achieved acquisition of new customers.					

- **In your opinion what is the most important Barrier for GSCM?**

	No Extent	Small Extent	Moderate Extent	Great Extent	Very Great Extent
1. Increased cost of adoption.					
2. Focus on short term profitability.					
3. Lack of money.					
4. Lack of integration.					
5. No support from government.					
6. Resistance from suppliers.					
7. Poor supplier commitment.					
8. Lack of partner trust.					
9. Lack of top management commitment.					
10. Lack of training.					

11. Lack of education.					
12. Lack of human resources capability.					
13. Lack of knowledge.					
14. Lack of resources.					
15. No capability.					
16. Outdated auditing standards.					
17. Poor demand forecasting.					
18. No information sharing.					
19. No technology sharing.					
20. Lack of awareness.					

- **In your opinion what is the most important Drivers for GSCM?**

	No Extent	Small Extent	Moderate Extent	Great Extent	Very Great Extent
1. External pressure.					
2. Incentives and support by various agencies.					
3. Demand of customer and other stakeholders.					
4. Awareness.					
5. Top management commitment and support.					
6. Sharing resources.					
7. Capacity building and development.					
8. Monitoring & auditing supply chain partners.					
9. Competitive and marketing advantage.					
10. Information sharing.					
11. Trust and commitment among partners.					

12. Knowing and solving supply chain partners' problems.					
13. Cost reduction.					
14. Long term Partnership.					

Thank you for completing the survey

Appendix D: Focus Group Consent Form

Research Title: Developing Integrated Model for Green Supply Chain Adoption. An Empirical Analysis of MENA Developing Countries' Industrial Sectors

Researcher Name: Hana Hanna

Form:

Serial	Description
1	I have read and understood the information provided about this research project in the information sheet dated 31 January, 2018.
2	I have had an opportunity to ask questions and to have them answered.
3	I understand the notes will be taken during the focus group and that they will also be audio-taped and transcribed.
4	I understand that I may withdraw myself or any information that I have provided for this research at any time prior to completion of data collection, without being disadvantaged in any way.
5	If I withdraw, I understand that all relevant information included tapes and transcripts, or parts thereof, will be destroyed.
6	I agree to take part in this research.

Participant's Name: ……………………………………………….

Participant's Signature: ……………………………………………

Participant's Contact Details (if appropriate):

…………………………………………………………………………

…………………………………………………………………………

Date: ………………………………………………………………….

Researcher Contact Details:

Hana Hanna

Email: -------------------------

Appendix E: Focus Group Design

Focus Group for Green Supply Chain Adoption Validation
A PhD research by ____________________,
Research Centre of the University of ____________________

Introduction:

With increasing public concern about the deteriorating impact of industrial activities on the environment, green practices find more and more access into the strategic and operational planning of enterprises. Green supply chain management (GSCM) has emerged as a key approach for enterprises aiming to become environmentally sustainable.

GSCM is seen as a modern concept of management practices attempting to integrate environmental thinking to all stages up and down the supply chain entailing inbound logistics, production, outbound logistics and reverse logistics operations. Such practices entail, for example, assessment and selection of suppliers according to their environmental performance, vendor selection on the base of their green management practices, reducing packaging and waste, or applying green design practices in new product development. Taking part in the focus group is entirely voluntary which means that you can withdraw at any time without any consequences. The focus group is conducted for purely research reasons and your answers will be used only for that purpose. Your personal data and answers will remain confidential and secure throughout the entire process.

Focus Group Questions:

1. What are the barriers of green supply chain adoption in the developing countries of the MENA region?
2. Could you please rank the barriers you listed above in terms of their importance to green supply chain adoption?
3. What are the drivers of green supply chain adoption in the developing countries of the MENA region?
4. Could you please rank the drivers you listed above in terms of their importance to green supply chain adoption?