

**An-Najah National University  
Faculty of Graduate Studies**

**Assessing Green Practices  
in the Closed- Loop Supply  
Chain in the West Bank**

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**This Thesis is submitted in Partial Fulfillment of the  
Requirements for the Degree of Master in Engineering  
Management, Faculty of Graduate Studies, An-Najah  
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**2018**

# **Assessing Green Practices in the Closed- Loop Supply Chain in the West Bank**

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## **Dedication**

**To my lovely family.**

## **Acknowledgement**

First of all, I would like to express my sincere thanks to Almighty Allah for giving me the ability, chance, and patience to accomplish my goals during my study.

My thanks go to my family for the support they provided me through my entire life and specially, I must acknowledge my parents for their constant encouragement.

To my caring and supportive husband Moneer, thanks a lot for your understanding, patience and encouragement when time got rough. Without your support this research would not have been made possible. I would like to dedicate this master thesis to my parents, my brothers & sisters, my husband.

I would like to express my sincere thanks and my appreciation to my supervisor, Dr. Mohammed Othman for his support, understanding and patience. His constant encouragement, motivation and valuable advices have resulted in the completion of this thesis. I would like also to thank the members and chair of my examinations committee for taking their time reading the thesis and doing their efforts to improve it.

Finally, I would like to extend my thanks to my friends for giving me the chance to spend a great time with them. A Big thanks to all of you and may Allah bless you.

## الإقرار

أنا الموقع أدناه مقدم الرسالة التي تحمل العنوان:

تقييم الممارسات الخضراء لسلاسل الامداد المغلقة في الضفة الغربية

### Assessing Green Practices in the Closed- Loop Supply Chain in the West Bank

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### Declaration

The work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degrees or qualifications.

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**13/02/2018**

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## List of Abbreviations

<b>SCM</b>	Supply Chain Management.
<b>PCBS</b>	Palestinian Central Bureau of Statistics
<b>GDP</b>	Gross Domestic Product.
<b>CLSC</b>	Closed Loop Supply Chain.
<b>GSCM</b>	Green Supply Chain Management
<b>EP</b>	Environmental Performance
<b>EOL</b>	End of Life
<b>WB</b>	West Bank
<b>ISO</b>	International Organization for Standardization
<b>PFI</b>	Palestinian Federation of Industries
<b>SSCM</b>	Sustainable Supply Chain Management
<b>DFE</b>	Design for Environment
<b>GP</b>	Green Purchasing
<b>GM</b>	Green Manufacturing
<b>MEnA</b>	Ministry of Environmental Affairs
<b>PEnA</b>	Palestinian Environmental Authority
<b>NGOs</b>	Non-Governmental Organizations
<b>GMP</b>	Good Manufacturing Practice
<b>SPSS</b>	Statistical Package for the Social Science
<b>RL</b>	Reverse Logistics
<b>SMEs</b>	Small and Medium-Sized Manufacturing Enterprises

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**Abstract**

Despite the fact that environmental issues have become critical concerns all over the world, manufacturing companies are constantly under pressure to develop environmentally responsible and friendly practices. Consequently, environmental pollution issues must be addressed with Supply Chain Management (hereinafter referred to as ‘SCM’). Thus, the implementation of Closed Loop Supply Chain (hereinafter referred to as ‘CLSC’) practices can be a powerful way to differentiate a company from its competitors and enhance environmental performance. With increased green awareness and the requirement to meet the terms with environmental policy, CLSC is becoming increasingly important for manufacturers.

Thus, the current study aims to explore and assess the extent of implementing CLSC practices in Palestinian manufacturing companies from two industrial sectors (food and pharmaceutical industries) in the West Bank (hereinafter referred to as ‘WB’). An exploratory research inquiry using structured questionnaires with semi-structured interviews is used. This research discusses the current trends of CLSC practices in these companies based on findings of ten semi-structured interviews and questionnaires submitted to 113 companies. The result of this study

indicates that the average implementation of CLSC is 58.2% which is considered as a moderate level. It has been found that the preferable practice toward the environment is the "green manufacturing" and "reverse logistics". On the other hand, the least used were “green culture of the company ” practices. Furthermore, the results of hypotheses testing show that there is a statistically significant relationship between CLSC practices and environmental performance. Furthermore, it constructs a model that represents the best practices of CLSC to improve environmental performance.

Also, this study identifies the factors that could affect CLSC implementation by supporting or hindering and the advantages of CLSC implementation from the point of view of the targeted companies. The results of the descriptive analysis show that the main driver of CLSC is "Governmental pressure", the main barrier of CLSC is "change resistance of the employees" and the main expected benefit is "Achieving competitive advantage ". Finally, the findings of this research are expected to provide useful information for future research directions.

## **Chapter One**

### **Introduction**

#### **1.1 Overview**

In this chapter, research problem, research objectives, research questions and hypotheses are presented. In addition, thesis structure is outlined at the end of this chapter.

#### **1.2 Background**

In order to survive in today's ever challenging business environment, companies have to cope with the increasingly customer demand expectations and the emerging markets (Ramezani et al., 2014). Changes in environmental awareness over the last few years, including legal requirements, pressure from customers, the need for waste management, reuse of materials and packaging, product recovery, and changes in product projects, have influenced supply chain management (hereinafter referred to 'SCM') (Scur & Barbosa, 2017). SCM has traditionally been viewed as a process where raw materials are converted into final products, and then delivered to the customer (Angel & Chirchir, 2013).

Business managers should find a way for companies to survive in the hyper-competitive global business environment. The public concern towards the disruption of climate system, the biodiversity loss and its uncontrollable consequences has urged the companies to take green action

(Caniels et al., 2013). More and more researchers attained their attention to pollution prevention and minimization. Sustainability has gained popularity in last two decades, however, the green supply chain has been known back to the industrial revolution (Solvang et al., 2007). Companies are aware that they can contribute to sustainable development by managing their operations in such a way as to enhance economic profit and increase competitiveness whilst ensuring environment protection and promoting social responsibility, including consumer interest (Fontaine, 2013). Nowadays, manufacturing companies have been argued as the major industry that produce huge amount of hazardous pollutants, create the waste pollution and harm the life of existence on earth (Rashid et al., 2013). It is evident that manufacturing sector has a major impact towards the natural environment and degrade environment substantially at its various production stages (Olugu et al., 2011). A lot of unfavorable environmental issues have been created while manufacturers doing their business, so, the manufacturing processes deteriorates the environmental and ecosystem by global warming, ozone depletion and deforestation (Tan, 2015). As a result, these challenges and pressures have eventually forced manufacturers to be concerned about the environmental impact during manufacturing and designing their processes to be more environmentally acceptable (Tan, 2015). Furthermore, as the limited available of natural resources were decreased and the increasing of the world population consumption, companies are now getting realized that its SCs have to be restructured to implement Closed-Loop Supply Chain (hereinafter referred



to as ‘CLSC’) practices (Carter & Jennings, 2002). It is essential to have appropriate green actions to “close the loop” in their SC in order to be more environmentally friendly and socially responsible, conserve natural resource, limit using resources, reuse disposed waste materials and reduce pollution towards the product recovery and remanufacturing process (Carter & Jennings, 2002; Ramezani et al., 2014). A majority of logistics literature mainly deals with forward logistics but reverse logistics is still under-researched (Eltayeb & Zailani, 2011). Organizations spend more time and money in adjusting their forward supply chains while ignoring their backward supply chains. If an organization considers forward and reverse supply chains simultaneously, the result network will construct a CLSC (Govindan et al., 2015). Company's responsiveness toward life cycles of products is critical to achieve sustained environmental performance. As life cycles are getting shorter, efficient handling can decrease cost since many materials can be extracted or reused. Therefore, the implementation of CLSC practices can be a powerful way to differentiate a company from its competitors and it can greatly influence the company to success (Tan, 2015).

This study is hereby seeking the empirical justification to investigate the relationship between environmental oriented SC alike close loop and its impact to environmental performance. CLSC will enhance the manufacturing capabilities. Therefore, this research aims to develop a model covering CLSC best practices for the WB food and

pharmaceutical companies. Furthermore, its other goal is to examine and assess the nature of CLSC initiatives undertaken for innovating and improving the environmental performance.

### **1.3 Problem statement**

While environmental issues have become critical concern all over the world, industrial companies are constantly under pressure to develop environmental practices (Seroka-Stolka, 2014). Environmental Quality Authority (2010, p.p 8) considered the industrial sector as a source of various forms of pollution in Palestine which needs to be monitored and rectified. Furthermore, because of the important role and effect of industrial sector in Palestinian society, there is an increasing need of adopting different environmentally-friendly practices. Based on the results of the estimation done by Environment Quality Authority (hereinafter referred to as 'EQA') & PlanBleu (2015) for emissions from 600 industries across Palestine to air, water and land. It has been found that there is significant uncertainty in these estimates, primarily, due to the fact that there has been no source and ambient monitoring of industries in any of the three emission areas.

Food and pharmaceutical sectors are important sectors in Palestinian industry, due to their direct effect on human health and environment as they consume natural resources and generate contaminants. They are still working hard to reduce waste to landfill, reduce greenhouse gas emissions intensity, and use water wisely. There is an increasing need to adopt

environmental practices. More efforts should be spent to adopt green practices and identify the factors affect the adoption of CLSC.

#### **1.4 Research objectives**

This research aims to assess CLSC practices in the food and pharmaceutical industries in the West Bank. It will be achieved through two objectives. The first one explores to what extent Palestinian manufacturing companies are using CLSC practices to increase employees' commitment and awareness to environment. The second identifies the main factors that are enhancing the implementation of CLSC and what obstacles the Palestinian manufacturing organizations are facing and the expected benefits of CLSC practices the viewpoint of these companies.

The research expected outcome is coming up with CLSC best practices model which is intended to give an explanation about the implementation of best practices of CLSC and help firms to understand how they can improve their environmental performance.

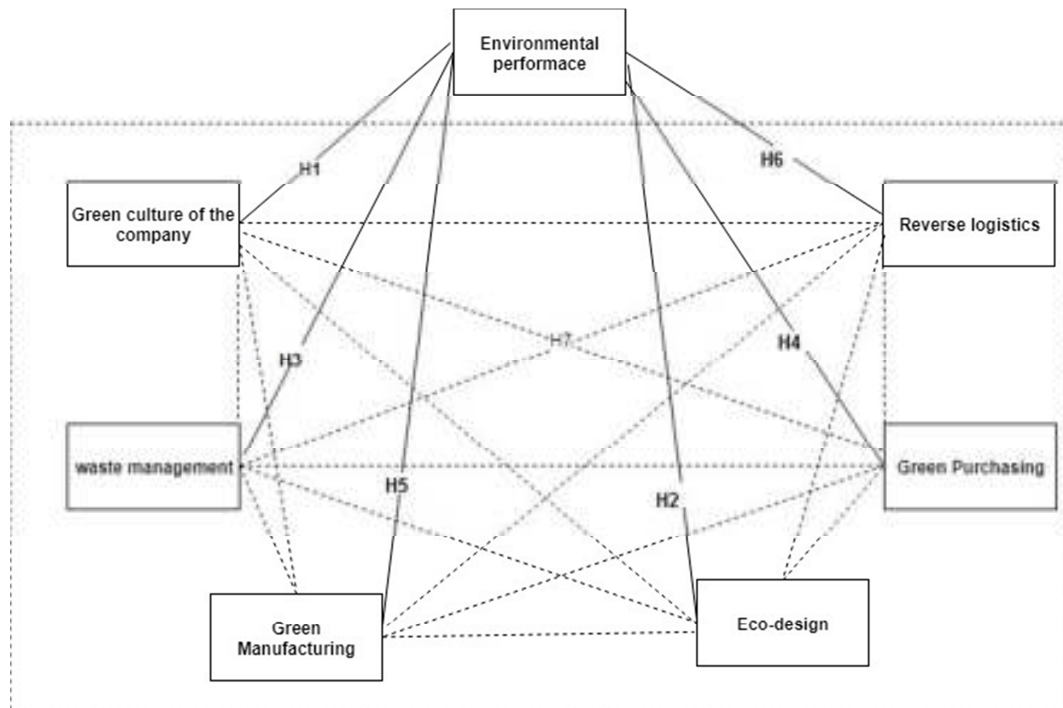
#### **1.5 Research Questions and Hypotheses**

To achieve the research aims of assessing CLSC practices in the West Bank companies, the following hypothesis and questions have been used:

“CLSC practices have a positive impact on Environmental Performance in Palestinian manufacturing organizations.”

Based on the assumption that using CLSC will improve Environmental Performance of the company, the following research sub-hypotheses have been used:

- **H1:** Green culture of the company affects Environmental Performance positively in Palestinian manufacturing organizations.
- **H2:** Eco-design affects Environmental Performance positively in Palestinian manufacturing organizations
- **H3:** Waste management affects Environmental Performance positively in Palestinian manufacturing organizations.
- **H4:** Green purchasing affects Environmental Performance positively in Palestinian manufacturing organizations.
- **H5:** Green manufacturing affects Environmental Performance positively in Palestinian manufacturing organizations.
- **H6:** Reverse logistics affects Environmental Performance positively in Palestinian manufacturing organizations
- **H7:** The components of CLSC practices are interrelated and a strong relation is available between them in Palestinian manufacturing organizations. Figure (1.1) shows the research hypotheses.



**Figure (1.1): Research Hypotheses.**

This research aims to answer the following questions:

1. What are CLSC policy barriers/obstacles in Palestine?
2. What are CLSC drivers in Palestine?
3. What are the main factors that influence the green practices in CLSC?

## 1.6 Thesis Structure

This thesis includes six chapters. The first chapter introduces the thesis subject through a brief background overview. It also includes the research problem and the objectives of the research, research questions and limitations. The second chapter reviews the related literatures related to the field CLSC. The third chapter presents the methodology that has been

followed in this research. The fourth chapter presents the results and findings that illustrate the analytical results of qualitative and quantitative data and the hypotheses testing results. The fifth chapter discusses the results and presents the model development. Finally, the sixth gives brief conclusions on hypotheses' results with a set of recommendations and future research suggestions.

## **Chapter Two**

### **Literature Review**

#### **2.1 Overview**

Both developed and developing countries become more and more concerned about the importance of environmental issues and sustainable development (Sharmin, 2015). The increased awareness for environment has led to establish green concepts into several concerns such as green food, green education, green ethics and philosophy (Firdaus & Udin, 2014). The green movement inculcated business and industry to develop and use green management by adopting environmental friendly practices and products (Prasad, 2013). Green management was clarified by Pane Haden et al. (2009) as the process of using innovation organization-wide to achieve sustainability by continuous learning and development and embracing integrating environmental goals and strategies with the goals and strategies of the organization.

Before 2000, there was little research about the relationship between SCM and environment (Shang et al., 2010). However, environmental issues in SC are significantly growing due to the broader debate initiated on how industry respond to the sustainability challenges (Seitz & Wells, 2006). Also, SC managers faced pressure from stakeholder to integrate the sustainable in SCM that are deemed to be vital for eco-friendly packing, EOL and used product returned to the manufacturers as well as the

environmental-friendly handlings of returns, recycling and so on according to (Zailani et al., 2012).

Several businesses are shifting their operations towards more sustainable and environmentally friendly products, in order to gain competitive advantage and improve their environmental performance (Köker, 2009). Moreover, most of the research designed SC focused on operational performance metrics and neglected the environmental performance (Paksoy et al., 2011). Also, Eltayeb et al, (2011) researched the extent of the green SC practices among the ISO 14001 certified companies in Malaysia and reverse logistics was found a positive effect on cost reductions but no significant relationship on environmental performance.

Furthermore, a survey was performed for 400 manufacturing firms in Malaysia, the results also were found the aligns with the notation that business benefits was expected to have a significant effect on sustainable SCM practices, from economic and social aspects (Zailani et al., 2012). It is clear that, there is a gap in the literature concerning the impact of environmental performance improvements on CLSC practices (Tan, 2015). In addition, the previous literature indicates that there is a lack of knowledge among practitioners regarding how to measure environmental performance in SCM (Bjorklund et al., 2012). Cuthbertson and Piotrowicz (2008) findings suggest that environmental criteria are increasingly in order to sustain the business. Also, greater importance was given to



environmental factors that act to indicate business performances and act to influence on decision making according to Vasileiou and Morris (2006) findings. Additionally, the findings of Cuthbertson and Piotrowicz (2008) demonstrated that the approaches of performance measurement rarely include the environmental aspects and they insist that environmental SCM performance measurement tools was one of the important issue to be considered in future research.

Reverse logistics concerns the integration of used and returned products into the supply chain as valuable resources (Köker, 2009). However, organizations recognize the opportunities which are obtained from the returned product value, but there is little attention paid to developing a systematic way to do this yet, because of the lack of knowledge about the reverse supply chain and its processes (Stock & Mulki, 2009).

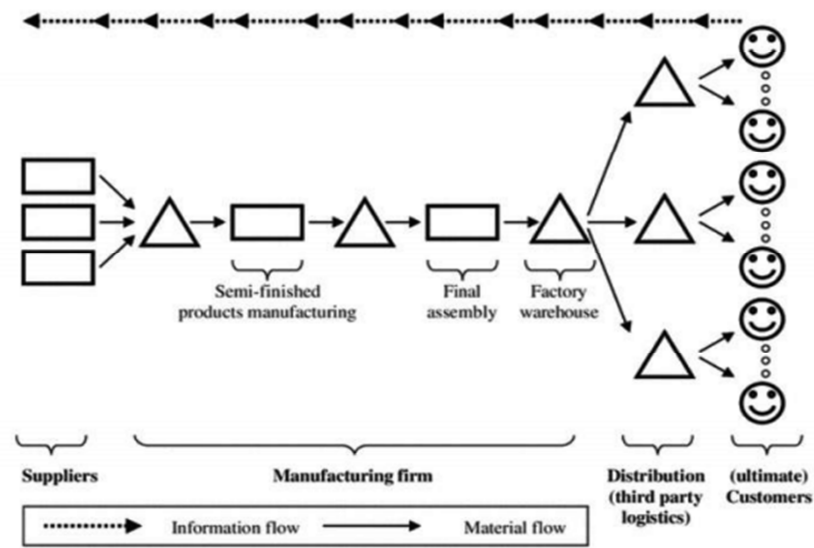
It is clear that sustainability in organization and its environmental performance are critical factors for organization's survival and competitiveness (Lee, 2009). In 1987 the report of the United Nations Commission on Environment and Development established the concept of sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Koroneos & Rokos, 2012, pp. 142).

Sustainability concept has been introduced to many fields such as management, technology, and SC. To improve the sustainability in supply

chains, number of processes can be added, such as product design, product management during use, product life extension and recovery processes at end-of-life products (Battini et al., 2017). Recovery processes include reuse, testing, repairing, disassembling, refurbishing, remanufacturing, recycling and energy recovery, the reverse chain (Linton et al., 2007). The most popular definition for Sustainable Supply Chain Management (hereinafter referred to as 'SSCM') would be one where all consumer products are created, used, and recycled or disposed of in the Closed Loop Method. Closed-Loop Supply Chain Management (hereinafter referred to as 'CLSCM') refers to all forward logistics in the chain as well as the reverse logistics to collect and process returned products and/or parts of products in order to ensure a socioeconomically and ecologically sustainable recovery (Kumar & Kumar, 2013).

## **2.2 Supply Chain Management (SCM)**

The researcher thought that it is better to define SC and SCM briefly before focusing on GSC concept. SC, which represents a network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services to the end customer as shown in Figure 2.1.



**Figure (2.1): Supply Chain Example (Stadtler, 2015).**

Chopra and Meindl (2013) considered SC as a system that includes all parties involved, directly or indirectly, in fulfilling a customer request. SC is a set of activities starts from purchasing raw material until delivering product to customers (Kumar & Kumar, 2013), which is called a forward supply chain network. The supply chain is the flow of materials through procurement, manufacturing, distribution, sales and disposal, together with associated transport and storage (Cooper et al., 1997). SC is a set of firms integrated together that aim to bring products to market (Lambert et al., 1998). Others including Govil and proth (2002) consider SC as a networking perspective and define SC as a global network of organizations that cooperate to improve the flow of materials and information between suppliers and customers at the lowest cost and the highest speed. Govil and Proth (2002) indicate that SC is limited to logistic activities, while most

other authors emphasize the objective of SC as fulfilling customer satisfaction.

Most organizations have only paid attention to what was happening within their “four walls”. Few businesses understood, much less managed, the entire chain of activities that ultimately delivered products to the end user. The result was disjointed and often ineffective supply chains (Handfield, 2011). SCM can be seen as the active management of SC activities to maximize customer value and achieve a sustainable competitive advantage. It strikes to develop and run supply chains in the most effective and efficient ways. SC activities cover everything from product development, sourcing, production, and logistics, as well as the information systems needed to coordinate these activities (Azzarone, 2016). SCM aims to design, manage material or product, information and financial flows to obtain customer requirements at low costs and gain supply chain profitability. According to Mentzer et al. (2001, pp. 18) SCM as "the systemic, strategic coordination of the traditional business functions and tactics across these businesses functions within a particular organization and across businesses within the supply chain for the purposes of improving the long-term performance of the individual organizations and the supply chain as a whole". Also, the global supply chain forum defines SCM as "the integration of business processes from end-user through original suppliers that provides products, services and information that add value to customers" (Lambert et al., 1998, pp. 504).

### **2.3 Green Supply Chain Management (GSCM)**

As awareness increased about the negative impact of SC on environment and health, green awareness practices increased, GSCM has attracted considerable scholarly interest; GSCM is considered as an environmental innovation (Chin et al., 2015). Consequently, organizations develop environmental management strategies in response to the changes of environmental requirements and their impacts on supply chain operations (Chin et al., 2015). Environmental Supply Chain Management is defined as " the set of supply chain management policies held, actions taken and relationships formed in response to concerns related to the natural environment with regard to the design, acquisition, production, distribution, use, re-use and disposal of firm's goods and services"(Zsidisin & Siferd, 2001, pp. 69).While Srivastava (2007) considered GSCM as integrating the environmental practices into SCM, with all parts such as producing designs, sourcing material, manufacturing processes and delivering the final product to the end user. According to Zhu et al. (2008, pp. 264), GSCM “ranges from green purchasing (hereinafter referred to as ‘GP’) to integrated life-cycle management supply chains flowing from supplier to manufacturer, customer, and closing the loop with reverse logistics”. GSCM has caused organizations to consider closing the supply chain loop, in order to achieve environmentally friendly manufacturing, competitive advantage and higher profits (Zhu et al., 2008). Furthermore, Dawei et al. (2015) reached to conclusion that green supply chain

management can be known as environmental SCM or sustainable supply chain management(SSCM). The main objective is to achieve optimal allocation of resources, increase economic benefits and improve environmental consistency in the product life cycle as so as to enhance the coordinated development of environmental, social and economic performance. Lorentz et al. (2011, pp. 874) defined GSCM as “Integrating environmental thinking into CLSCM.”GSCM is defined according to Hervani et al. (2005) as:

Green Supply Chain Management (GSCM) = Green Purchasing +Green Manufacturing /Materials Management + Green Distribution/Marketing + Reverse Logistics. As Figure 2.3 shows this equation graphically, where reverse logistics “closes the loop” of a traditional supply chain which includes reusing, remanufacturing, and/or recycling of materials into new materials or other products. The idea is to minimize or eliminate waste (energy, emissions, chemical/ hazardous, solid wastes).

The motivation directed to the GSCM have prompted organizations to adopt in its chain the concept of closed loop, where the salvage value over the entire life cycle of a product come from operation and control returns from different types and volumes over time (Beamon, 2008).

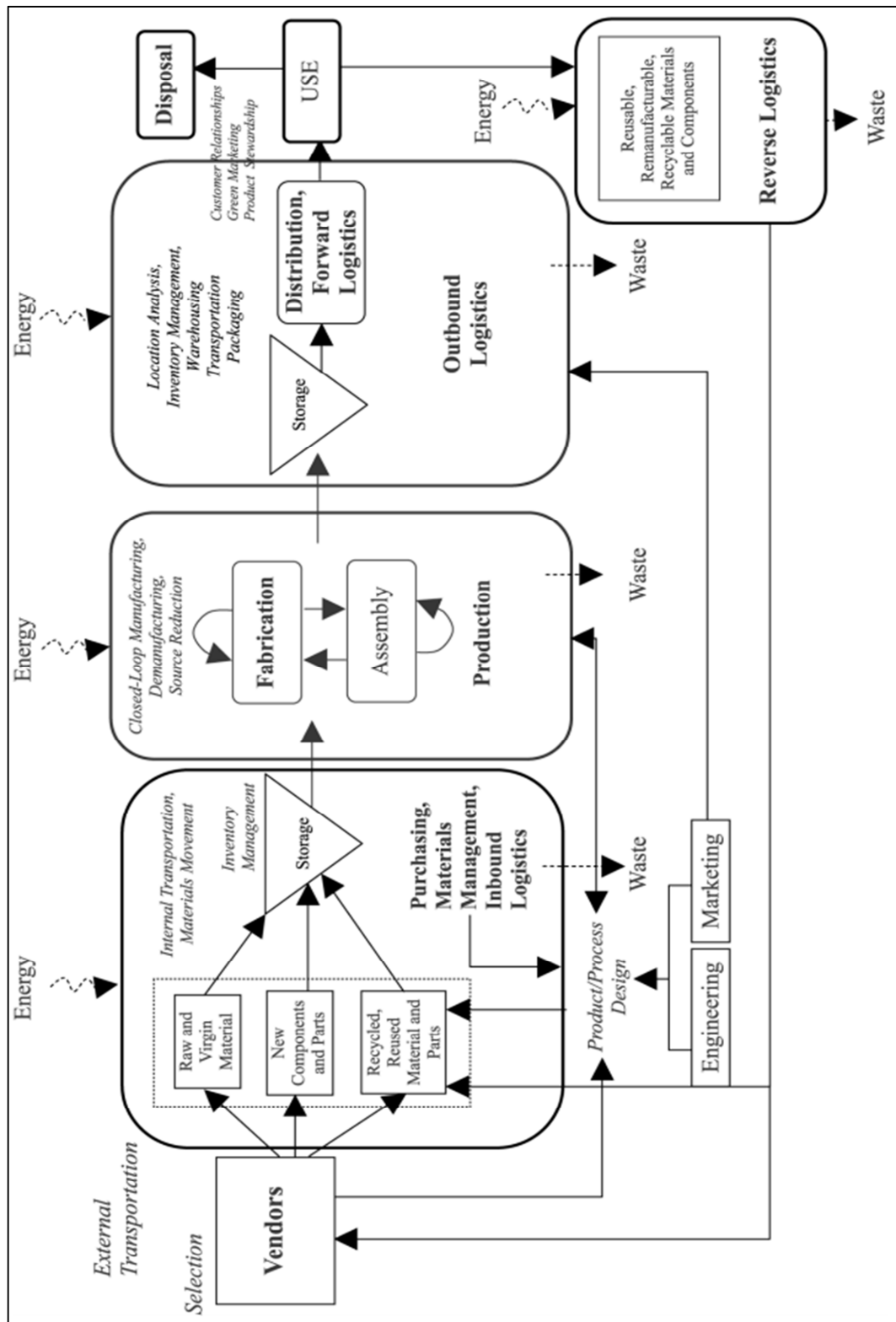


Figure (2.3): Graph of the GSCM (source: Hervani et al., 2005).

## **2.4 Closed Loop Supply Chain Management**

Over the past years, Closed Loop Supply Chain Management (hereinafter referred to as 'CLSCM') has gained considerable attention in industry and academia (Kumar & Kumar, 2013; Souza, 2013). The scarcity of resources and excessive emission of pollutant agents became a topic of concern for supply chains and population worldwide, a solution offered for this problem was to close the loop (Zabarain & Meneses, 2016).

CLSC is a supply chain network which "includes the returns processes and the manufacturer has the intent of capturing additional value and further integrating all supply chain activities" (Guide & Van Wassenhove, 2003, pp. 3). CLSC as extended SC is consist of forward and reverse supply chain, it comprehends the series of activities needed to retrieve a used product from end user and either dispose or reuse it. CLSC concept starts from the assumption "...development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (Shand et al., 2017, pp. 62).

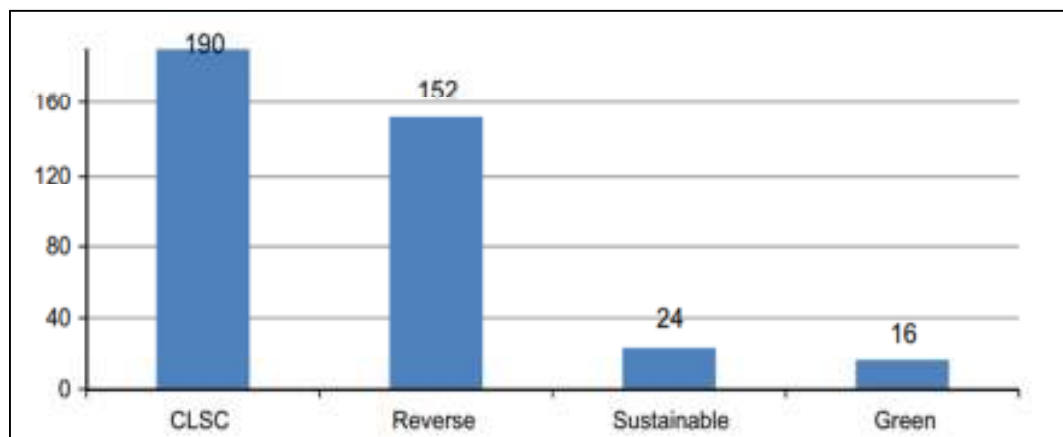
The Bruntland Commission published its report in 1987, *Our Common Future*, in an effort to link the issues of economic development and environmental stability (Emas, 2015). The Brundtland report illustrates that the economic development should be possible without harming the environment and consuming natural resources (Dubinski, 2013). The definition itself is rather informal and does not provide one with sufficient handles to measure sustainability, a popular way of understanding the



concept of sustainability is to take it from three perspectives: people (social impact), planet (environmental impact) and profit (economic impact) (Koroneos & Rokos, 2012). Sustainability now has been divided into three dimensions that need to be measured separately (social, environmental and economic) (Azzarone, 2016). CLSCM is defined according to Miemczyk et al. (2016, pp. 2) as "the design, control and operation of a system to maximize value creation over the entire life cycle of a product with dynamic recovery of value from different types and volumes of returns over time" . CLSC refers to the complete loop from raw material to final customers, back for the reprocessing operations, and then once again back to the customer (Quariguasi Frota Neto et al., 2010). A traditional CLSC consists of collection, inspection/separation, reprocessing, disposal and redistribution activities. CLSC's differ with respect to some features and parameters such as product acquisition, returns volume, return timing and quality, test, sort, grade, reconditioning, distribution and selling (Braz et al., 2017).

There are many researches being conducted in the CLSC modeling. (Beamon, 2008) defined a CLSC model with focus of handling wastes, also, Sheu et al. (2005) proposed a conceptual framework where in this model; the forward and reverse material flows and their interrelationships were defined. Kumar and Malegeant (2006) treated reverse supply chain and closed-loop supply chain as equivalent and conducted five main groups of activities which are: collection, inspection/separation, reprocessing,

disposal, and re-distribution. Solvang et al., (2007) proposed a CLSC model, where the primary material flow starts from raw material supplier and ends at consumer. However, for the products which have no utility value, they will be dissembled in the direct treatment process and the utilizable material/parts go back to the chain. Quariguasi Frota Neto et al. (2010) proposed useful extensions for existing CLSC optimization models ensuring that CLSC's are at the same time sustainable supply chains. The most previous studies in CLSC are focusing on network design, planning and optimization such as (Kannan et al., 2010; Schultmann et al., 2006; Yang et al., 2009 & Guide et al., 2009). As we notice from Figure 2.2, 190 out of 382 were focused on closed-loop supply chain topic. The most of these papers concern about CLSC concept describing different supply networks how actors should behave in terms of organizational policies, the categorizations of different studies are analyzed and a portion of each is illustrated in Fig.2.2. It shows the percentage of various categorization portions from all papers (Govindan et al., 2014).



**Figure (2.4): The main fields of the papers in the study (382 papers: 2007–2013) (Govindan et al., 2014).**

## 2.5 Sustainability

Sustainability is considered as the backbone of current and future economic development (Solvang et al., 2007). The sustainability according to Veleva and Ellenbecker (2001, pp. 519) is “the creation of goods and services using processes and systems that are non-polluting; conserving of energy and natural resources; economically viable; safe and healthful for employees, communities and consumers; and socially and creatively rewarding for all working people”. Supply chain sustainability is the management of environmental, social, and economic impacts of products and services (Holt & Ghobadian, 2009). Sustainable supply chain management was introduced because of consumer awareness and environmental regulation.

CLSC management is an important part of Sustainable Supply Chain (hereinafter referred to as ‘SSCM’ (Kumar & Kumar, 2013). It can be seen as the implementation of SSCM at the company level by taking in account the society uses and reuses both efficiently and effectively all value that has been put into products. In the long term, reuse of products in whatever way will be beneficial in both environmental and socio-economic respect (Guide & Van Wassenhove, 2003). The evolution of sustainability and SCM is showed below in Figure 2.4, that illustrates the evolution courses of sustainability and supply chain management were not merged until the earlier 1990s (Solvang et al., 2007). It was then when policy makers, environmentalists, researchers, industrial practitioners, and general public

realized the needs and importance of reclaiming the value of the products after first useful lifecycles (Solvang et al., 2007).

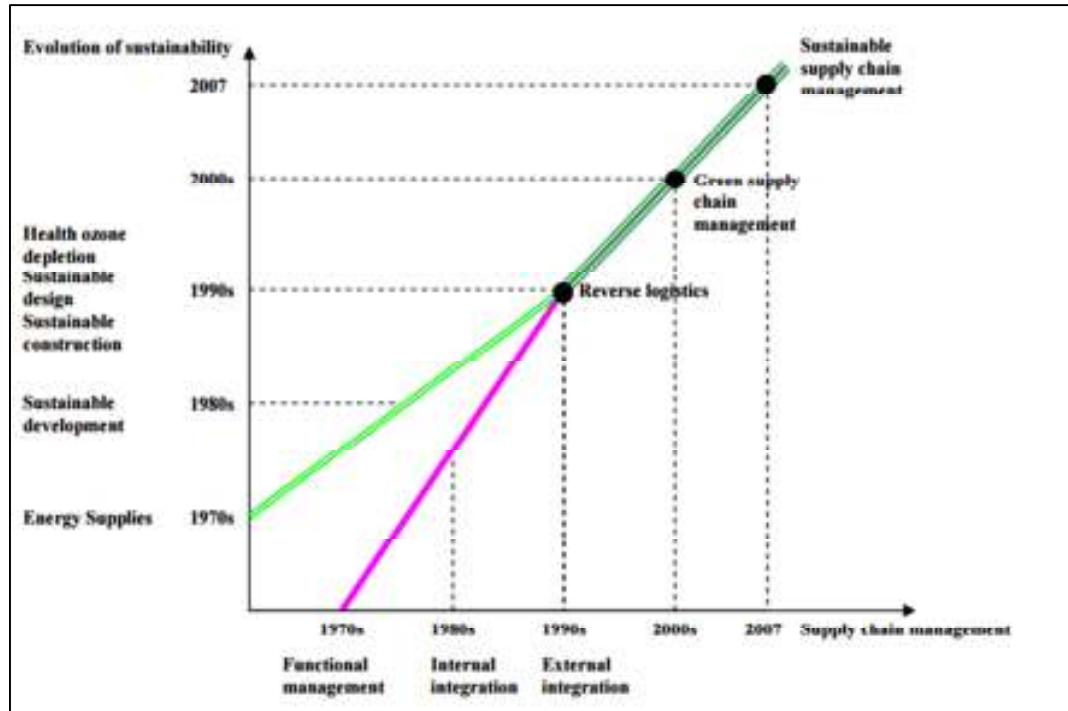


Figure (2.5): Sustainability merges with supply chain management (Solvang et al., 2007).

## 2.6 Green Practices in CLSC

The literature suggests many green practices, for planning purposes of this study, the following practices were considered: eco-design; green manufacturing; green purchasing; reverse logistics; waste management and organizational culture (Govindan et al., 2015; Islam et al. 2017; Kumar & Kumar, 2013; Srivastava, 2007; Zhu et al., 2008). The green practices have relative importance amongst each other, a fact that influences the consolidation of green supply chain management and thus spread the concept of closed loop (Seuring & Muller, 2008).

Green practices have emerged as an effective management tool and philosophy for proactive and leading manufacturing organizations (Zhu et al., 2008). Prescriptive models for measures of green practices implementation with a focus on green purchasing and green practices have been developed. Handfield et al. (2002) developed a decision model to measure environmental practice of suppliers using a multi-attribute utility theory approach. Kainumaa and Tawarab (2006) proposed the multiple attribute utility theory method for assessing a SC including re-use and recycling throughout the life cycle of products and services. Using the tool of life-cycle assessment, Faruk et al. (2002) put forward aspects to measure green practices implementation, that is, material acquisition, use, preproduction, production, distribution and disposal. Sarkis (2003) developed a strategic decision framework for green practices implementation to evaluate alternatives adopted by companies that will affect their external relationships with suppliers and customers. Sheu et al. (2005) developed a linear multi-objective programming model which optimized the operations of both forward and reverse logistics in a given GSC. These models and frameworks included and defined a variety of characteristics, attributes, and scales for green practices implementation, yet none attempted to rigorously validate these scales.

Empirically, Carter et al. (1998) developed and validated a scale to measure environmental purchasing, and compared the activities between US and German purchasing managers. They put forward six key factors

related to green purchasing, including top management support, middle management support, firm's mission, department goals, training for personnel to buy environmentally friendly input, and evaluation of purchasing management on green purchasing. Using confirmatory factor analysis, they empirically demonstrated that middle management support and department goals are related to green purchasing, while the relationship between training for personnel and green purchasing was only supported in US firms. Their measurement scale was thus limited to green purchasing and activities surrounding its management. Furthermore, Tan (2015) examined the effect of CLSC practices on environmental performance between Germany and Malaysia manufacturing companies, an online survey is administered to manufacturing companies and a comparison was drawn between these two countries. Also, a study was carried out to establish the relationship of GSCM practices and the SC performance of pharmaceutical companies in Nairobi, Kenya (Angel & Chirchir, 2013). Zailani et al. (2012) carried out a study on GSCM research in Malaysia to analyze the impact of internal and external forces on environmental performance.

### **2.6.1 Eco-design**

Eco-design or design for environment (hereinafter referred to as 'DFE') is considered as a helpful tool for firms to improve their environmental performance and help them close the supply chain loop by addressing product functionality while simultaneously minimizing life-

cycle environmental impacts (Zhu et al., 2008). Pioneering firms have realized that making product returns profitable relies on good product design (Krikke et al., 2004). Eco-design (which would include design for disassembly, design for recycling, and design for other reverse logistics practices) is necessary for effective product management and reverse logistics practices (Zhu et al., 2008). Also, eco- design is concerned with the development of products that are more durable and energy efficient; products that avoid the use of toxic material and can be easily disassembled for recycling (Gottberg et al., 2006). DFE defined by Gungor & Gupta (1999, p.820) as: “... A systematic consideration of design performance with respect to environmental, health and safety objectives over the full product and process life cycle”. Eco-design aims to get environmental improvements from the process of the product (Vachon & Klassen, 2006). The organization of environmental concerns from product design based on life cycle, favor the processes applied to the product after it reaches its end of traditional life (Beamon, 2008). For Zhu et al. (2008), eco-design should consider the product functionality while minimizing environmental impacts in the life cycle. The green design of product could be used to analyze the product impact on environment during its life cycle. This approach is referred to as a cradle to grave approach, which is a quantitative process for evaluating the total environmental impact of a product over its life cycle (Mann et al., 1996). Also, Billatos and Basaly (1997, pp. 39) proposed a definition for DFE as “a design process that must be considered for conserving and reusing the earth’s scarce resources; where energy and

material consumption is optimized, minimal waste is generated and output waste streams from any process can be used as the raw material (inputs) of another”. According to Giudice et al. (2006, pp. 16) “DFE can be defined as a methodology directed at the systematic reduction or elimination of the environmental impacts implicated in the whole life cycle of a product from the extraction of raw materials to disposal.”. In their survey, Karlsson and Luttrupp (2006, pp. 1292 ) said: “eco-design focuses on the integration of environmental considerations in product development”. According to Giudice et al. (2006), Jeswiet and Hauschild (2005) and Lagerstedt et al. (2003), design for environment ability, environmental conscious design, design for environment, eco-design, clean design, life cycle engineering, life cycle design and green design have the same meaning and can be used as synonyms.

Pigosso et al. (2013) stated that eco-design is a proactive environmental management approach integrates environmental issues into product development and related processes such as manufacturing, marketing, and procurement. According to Boothroyd et al., (2002), studies show that 80% of the costs and environmental impacts of a product are defined at the design stage through product specifications, packaging, and market positioning. Therefore, the design stage is the mechanism through which an efficient product with appropriate pricing and environmental performance is obtained (Rebitzer, 2002).



### **2.6.2 Green purchasing**

Green purchasing (hereinafter referred to as ‘GP’) is related to the increasingly environmental awareness, the decisions will impact the purchase of materials that are either recyclable or reusable or have already been recycled (Zhu et al., 2008). GP according to Zsidisin and Siferd (2001) is a set of sustainable procurement policies, actions taken, and relationships formed in response to environmental concerns related to the acquisition of raw materials, including selection, evaluation and development of suppliers; operations thereof; input distribution; packaging; recycling; reuse; reduction of resources; and disposal of the company's products. Also, GP is defined as an environmentally conscious purchasing initiative that tries to guarantee that purchased products or materials meet environmental objectives set by the purchasing organization, such as reducing the sources of wastages, reinforcing recycling, reuse, resource reduction, and substitution of materials (Khidir Eltayeb et al., 2010). GP has emerged as an important component of environmental and supply chain strategies for a number of companies. According to Mostafa (2007) green purchasing behavior is the consumption of products which are:

- Benevolent/ beneficial to the environment;
- Recyclable/ conservable; or
- Sensitive/responsive to ecological concerns.

### 2.6.3 Green manufacturing

Green manufacturing (hereinafter referred to as ‘GM’) has attracted a lot of attention, due to increasing awareness of environment protection. GM is a modern manufacturing mode; it gives a comprehensive consideration of the environment influence and resources efficiency, by minimizing the environmental impact and maximizing the resource utilization (Li et al., 2016). Ninlawan et al. (2010) defined GM as the production processes using raw materials with relatively low environmental impact that are considerably efficient and generate moderate or no residue or pollution. According to Kimario (2017, pp. 4), GM is " a system that integrates product and process design issues with issues of manufacturing planning and control in such a manner as to identify, quantify, assess, and manage the flow of environmental waste with the goal of reducing and ultimately minimizing environmental impact while also trying to maximize resource efficiency". According to Rehman and Shrivastava (2013) GM is used to describe manufacturing practices that do not harm the environment during the manufacturing process emphasizing the use of processes that do not pollute the environment or harm consumers, employees, or any members of the community. GM involves not just the use of environmentally friendly raw materials, use of environmental design of products, but it include also eco-friendly packing, distribution, and destruction or reuse after the lifetime of the Product (Singh et al., 2014). GM sometimes known as sustainable manufacturing, specifically aims to

eliminate / reduce wastes that negatively affect the environment (Carley et al., 2014).

#### **2.6.4 Waste Management**

Waste management has become an issue of critical importance due to the complexity of waste streams and the steadily increasing produced volumes (Achillas et al., 2013). Human activities have generated waste, poor management of waste led to contamination of water, soil and atmosphere and to a major impact on public health (Giusti, 2009). De Brito and Dekker (2004) described waste management as collecting and processing waste in an efficient and effective way. They emphasized that the exact definition of the waste plays important role to differentiate between waste management and reverse logistics. Waste could be explained as goods, which cannot be used in any other application or with no value to extract, but reverse logistics emphasized on those streams where there is some value to be recovered. The purpose of the minimization of waste was not only for environmental, but economic reasons. However, waste means greater economic loss (Sarkis et al., 2011). The minimization and prevention of wastes, the increased use of recycled materials in production (Jofre & Morioka, 2005). Also, Srivastava (2007) stated that waste management consists of three actions: prevention, pollution reduction, and final disposal.

Waste management is complex and includes a set of actions executed directly or indirectly in the stages of planning, collection, transport,

transshipment, and processing of waste, and residues (De Souza Melaré et al., 2017). Muchiri (2011) illustrated that the waste management may also involve source reduction the recycle and re-use waste management programs focuses on management of waste after it has been created. On the other hand, source reduction focuses on the prevention the reduction of wastage during production stage rather than managing it after it has been generated with the aim of efficiently utilizing resources by examining how business is conducted, how materials are used, and what products are purchased. Source reduction obtains measures such as; using reusable instead of disposable materials, eliminating certain items, repair and maintenance of equipment, using durable products, using recycled products.

#### **2.6.5 Reverse logistics**

Reverse logistics becomes a major issue of concern due to its strategic importance in relieving environmental problems and generating economic benefits for business organizations (Eltayeb & Zailani, 2011). According to Govindan et al., (2015, pp.603), reverse logistics is “The process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in-process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal”. Companies by this process become more environmentally efficient through recycling, reusing and reducing the material using in manufacturing. Traditionally, during the

life cycle of the product, the process of return may occurs at any point because of a wide range of reasons, in order that, the organization should opt for the effective option to benefit the condition of returned one to maximize profitability (Guide & Wassnhoove, 2009). Benjamin et al. (2012) proposed that reverse logistics focuses on four activities: reuse, product update, material recovery and waste management. Eltayeb and Zailani (2011) proposed that reverse logistics are affected by four main drivers: regulations, customer pressures, social responsibility and expected business benefits.

#### **2.6.6 Organizational culture**

Organizational culture is the most important human factor in greening the organizations (Harris & Crane, 2002). It involves the attitudes, beliefs, experiences, and values of the organization, obtained through social learning, that control the way individuals and groups in the organization react with one another and with parties outside it (Serrat, 2017). According to Harris and Crane (2002), the organizational culture is seen as the set of assumptions, values, symbols and organizational artifacts that reflect the desire of being environmentally organization. Johnson and Walck (2004) stated that company could integrate environmental dimension in the set of values that form an organizational culture effectively using five steps as follows:

1. Top management recognizes and spreads the environmental dimension as a new value of a company.

2. Top management recognizes and spreads how environmental practices can influence the routines of a company.
3. Top management shows how the environmental values have to support the various phases of environmental management system.
4. There are systems for training, performance appraisals, and rewards focused on employees' EP.
5. Employees incorporate the ecological dimension as a new organizational value.

All level of employees should understand the environmental values in the organization; if top management didn't clarify environmental goals and environmental responsibilities employee participation in environmental work will be decreased. As a result, top management should broadcast environmental programs, initiatives, and goals again and again to all employees (Daily & Huang, 2001; Govindarajulu & Daily, 2004; Ramus, 2001). Also, top management has to provide employees with a feedback of EP in order to maintain correct values, and should reinforce them through education and training (Ferna'ndez et al., 2003), On the other hand, top management should define penalties for environmental regulations and rules violation, so disciplinary actions (warning, fining, suspension, warnings, suspensions for lapses etc.) are taken against an employee who violates environmental rules (Mandip; 2012; Renwick et al., 2008; Renwick et al., 2012). Paille and Mejia Morelos (2014, pp.126) contend

that “if employees are aware that becoming greener is an important objective of their employer, and the employer demonstrates its interest in creating, developing and maintaining high-quality relationships in the long term, individuals might be more prone to reciprocate by performing pro-environmental behaviors on the job”.

## **2.7 Drivers, Obstacles and Advantages of CLSC**

Recently, the awareness of environmental issues has increased, due to this, problems such as the natural resource usage, air emissions and solid waste disposal have become the one of the main concerns for companies, which have started to think how to reduce the effect their process, have into the environment. Thus, companies started to implement CLSC practices.

### **2.7.1 Drivers**

The trend toward contributing sustainability with the SC initiates is a result of some key drivers (Alzawawi, 2014). Eltayeb and Zailani (2011) searched for the key drivers and they found out that there is a relation between the trend of greening and SC. This adoption can lead to four outcomes, which are outlined into environmental, cost reduction, economical and intangible outcomes (Alzawawi, 2014).

The drivers are those things that could induce company to go all out for the implementation of CLSC. There are many drivers to encourage manufacturers to implement CLSC practices in their process. One of the drivers is the identification of business opportunities related to the residual

value of end of life (EOL) products such as reduce raw material costs, manufacturing cost, distribution cost, after sales services cost, and disposal cost as well. Furthermore, CLSC practices may also able to create new profit opportunities by opening new markets and protecting market share as well (Flapper et al., 2005). Also, pressure from stakeholders, such as government regulators, non-governmental organizations and global competition, are becoming drivers for companies to adopt a certain level of commitment to green and sustainable practices (Hassini et al., 2012) as CLSC practices. Companies are required to be more flexible and respond quickly to market changes to gain competitive advantage (Lee et al., 2004). Which is another driver to apply CLCS, as consumers are becoming more and more aware of the environment; the environmental issues have emerged as a source of competitive advantage (Rao & Holt, 2005).

### **2.7.2 Obstacles**

It is not so easy making sustainable firm, there are some obstacles that are facing the integration of these eco- friendly systems to the SC processes (Alzawawi, 2014). According to Scur and Barbosa (2017), the main obstacle to implement green practices is high cost. Lack of technology, involvement and support and financial concerns are the obstacles according (Govindan et al., 2014). While, Yacob et al. (2012) divided the obstacles into internal (human resource, organizational structure, and management style) and external (Financial resources, lack of awareness about RL, environmental legislations, problems with industrial



infrastructure and problems with product quality). Furthermore, closed loop oriented will lead firms to design and develop products using nonhazardous materials at a higher price in order to minimize waste disposal, guide firms to invest in technology, establish environmental management systems and train employees, thus increasing the corresponding costs (Liu and Chang, 2017).

A research done by Alvarez-Gil et al., (2007) reveals that more than 80% of the studies they have done states that government regulation is one of the major pressures. Zhu et al., (2005) defines government regulations as one of the strongest drivers for organization's environmental determinations. Human barriers which include lack of qualified staff and training programs, resistance to change, lack of understanding, and the inability to plan are also considered major barriers (Al Zaabi et al., 2013).

In addition, Revell et al., (2010) mentioned some barriers for adopting SSCM: namely, lack of understanding, lack of tools and resources, resistance due to perceived time cost and resources required, and disbelief of the business benefits. Herren and Hadley (2010) analyzed the barriers to implement environmental systems in SMEs such as, lack of clear direction from the organizational leaders, incentive systems that failed to reward sustainability initiatives, ambiguous information, and competing objectives from the central government.

Al Zaabi et al., (2013) illustrated the lack of knowledge and information concerning the approach of sustainability, lack of motivation

towards employees was important barriers. Another barrier according to Alzawawi (2014) is poor organizational structure.

Zailani et al. (2012) claimed that SC managers faced pressure from stakeholder to integrate the sustainable in SCM that are considered to be vital for eco-friendly packing and used product returned to the manufacturers. Also, scholars faced a challenging issue to improve their manufacturing capabilities and as companies develop proficiencies and capabilities for greener production, research should carry on to better comprehend the potential link between SC systems and environmental performance (Haj Mohammad et al., 2013).

### **2.7.3 Advantages**

Many researchers discussed what organization could benefit from using green practices. Closed-loop oriented firms place strategic emphasis on reducing, reusing, remanufacturing, recycling materials/end-of-life products throughout the SC (Bowe et al, 2001). The literature suggests that waste reduction and recycling initiatives have “the best direct potential” to make the use of materials more efficient and achieve cost reduction by limiting the purchase of raw materials and reducing the cost of waste disposal, thus improving both the environmental and economic performance (Liu & Chang, 2017). Also, Al\_Bayaty and Joshi ( 2014) illustrated a list of expected benefits generated by green efforts, including enhanced public relations, increase brand loyalty by consumers, enhanced brand image, reduce energy cost increased revenue increased market share

improve productivity improve quality reduced service related cost reduced uncertainty, reduced packaging cost reduced manufacturing cost and reduced raw material or component cost.

Green practices help the firms to gain a competitive advantage and help them to attract new customers (Infosysblogs, 2013). Furthermore, Azzarone (2015) demonstrated the advantages of CLSC are different; it can be distinguished to three categories of value:

- Sourcing value (profit): it refers to all types of direct cost reductions and savings that can be obtained from CLSC practices such as lower material costs, fewer manufacturing costs and fewer energy costs. Through reprocessing strategies, product returns can be sold in secondary markets thus generating additional revenues for the firm or they can be used internally and reduce supply costs.
- Environmental value: reduced raw materials and natural resources consumption, waste reduction, increase emissions from manufacturing.
- Customer value (social profit): it refers to increased customer loyalty and obtains customer satisfaction, since an effective recollection system translates into a better service offered to them. Higher sales deriving from eco-behavior valuation from the customers. Peters et al. (2011) noted that proactive or sustainability strategies provide

competitive advantages in terms of avoiding eventually higher costs of adoption of SSCM practices.

## **2.8 Environmental Performance**

Environmental performance (hereinafter referred to as ‘EP’) is defined according to Shih et al. (2006) as the environmental impact that enterprise's activity has on the natural milieu, which includes resource reduction, reduction of solid or liquid wastes, reduction of emissions, decrease of frequency of environmental accidents, decrease of consumption for hazardous material, and improved employee and community health (Geyer & Jackson, 2004; Zhu & Sarkis, 2004). Gallego-Alvarez et al., (2014) defined EP as the commitment of organizations to protect their natural environment by maintaining the quality of water, air, soil, etc. EP means to carry out measures that provide the protection of environmental factors "air, water, soil, ecosystems (Bran et al., 2011). Thus, there are several components of environmental performance as Epstein and Roy (1997) illustrated such as minimization of pollutants, waste reduction, energy conservation, conserving resources, marketing of safe products and reporting potential risks, among others.

## **2.9 Overview of Palestinian Industrial sector**

Palestinian National Authority created the Ministry of Environmental Affairs (hereinafter referred to as ‘MEnA’) in December 1996. MEnA, now called the Palestinian Environmental Authority

(hereinafter referred to as 'PEnA'), is responsible for developing regulations, strategies, management plans and monitoring programs, which aim sound use and conservation of the environment in Palestine by promoting environmental awareness programs and activities. MEnA is acting as the central representative authoritative body responsible for all environmental issues in the Palestinian Territories. Also, its stated policy is to actively involve other ministries, institutions, Non-Governmental Organizations (NGOs) and the private sector in the decision making process (MEnA, 2015).

One of the main sectors under MEnA supervision is the Industrial sector. The industrial sector is the main pillar of economy and the establishment of the future Palestinian state (MEnA, 2015). The industrial sector is considered to be a source of various forms of environment pollution in Palestine by producing hazardous chemical pollutants and solid, liquid and gaseous waste. Its situation needs to be assessed, monitored and rectified (Environmental Quality Authority, 2010). Industries with long-term cumulative pollution problems, including such high-pollution industries such as the oil industry, chemical industry and steel industry are more willing to take the initiative to disclose environmental information than lower-pollution industries such as service industries (Shih et al., 2006). The fact that industries are major consumer of natural resources like air, water, land minerals, plants and animals made its impact so great. Therefore, it affects the environment and become the basic

cause of for pollution and ecological imbalances. The table below indicates the industries effecting natural resources (Shaikh, 2012):

**Table (2.1): Food, and Pharmaceutical industries effect on natural resources**

No	Industry	Natural Resources used	Products	Impact /Effects
1	Pharmaceutical	Plants and animals	Medicines	Flora and fauna Bio-diversity
2	Paper	Plants and trees	Paper	Forest
3	Food products	Planets and animals, water	Human consumption product	Air, water pollution

Palestine has many industrial zones and industrial activities. Some industries emit smoke and hazardous and toxic gases in huge quantities. Thus, the level of greenhouse gases in the atmosphere has increased (European Environment Agency, 2014). EQA & PlanBleu (2015) have done a first estimation for emissions from 600 industries across Palestine to the air, water and land. Based on their results, it has been found that there is significant uncertainty in these estimates primarily due to the fact that there has been no source and/or ambient monitoring of industries in any of the three emission areas. In the first stages of this study, a meeting with a committee from EQA was conducted to decide which industries to target in this research. They recommended covering two industries(food and pharmaceuticals industries) due to their direct effect on human health and environment. Therefore, the targeted sample will cover companies from these two industries.

## **2.10 Food and Pharmaceutical Industries in Palestine**

Statistical Yearbook of Palestine 2017 (PCBS, 2017) shows the 19,367 enterprises engaged in the industrial sector, with more than 98,776 employed persons in this sector in Palestine for the year 2016. The value of the output of enterprises in industrial activities was 4,191.8\$ million; intermediate consumption totaled \$2,415.1 million; and the value added was \$1,776,600 million. The majority of the industrial enterprises are private, family-owned small enterprises employing fewer than 10 workers. The number of large industrial enterprises in Palestine is still very limited (USAID & PFI, 2009).

Industrial sector includes Food, pharmaceuticals, beverages, construction, stone and marble, chemicals, metals and engineering, textiles, garments and leather, paper, printing and packaging, handicrafts, plastic and rubber, and furniture. Food sector is the fastest growing sector in the Palestinian economy due to the investment encouragement law facilitated limitations on new businesses in 1998. This sector became very attractive for investment. It includes; processed meat and olive oil, dairy products, nuts, spices, beverages, desserts, food industry (Paltrade, 2015). Table 2-2 shows some general information about the two selected sectors (USAID and PFI, 2009).

**Table (2.2): General Information about the Selected Sectors**

	No. of firms	Total investment (million)	GDP%	No. of employees	Market share%	Employee productivity(\$)
Pharmaceuticals	6	90	<1	1200	55	44000
Food and Beverage	224	480	4.8	8000	50	28000

The pharmaceutical industry in Palestine was developed after the border closure with the rest of the Arab world as a result of 1967 events. It started with small laboratories to manufacture with just nine pharmacists in the WB to cover the local consumption starting to manufacture simple syrups. Twenty-five years later, annual sales for the six largest manufacturers, in the West Bank, amount to more than \$25 million total annual value of Pharmaceutical supply in the Palestinian market (Paltrade, 2015). The domestic manufacturers according to statistics in 2010 shows that it covers 50 % of the market share by the value produced. There are 4 manufacturers that are good Manufacturing Practice (hereinafter referred to as ‘GMP’) certified (Palestinian National Authority, 2011)

Industrial sector suffers from a number of obstacles and challenges. The Israeli occupation has a great effect on this industry through political instability and restrictions on movement; it forces control land and water crossings, use repressive tactics that harmfully prevent any development of the industrial sector and pursued a policy of closing the border crossings, and external ports which control the entry of raw materials. Also, the Israeli



occupation imposes heavy taxes on Palestinian products such as production tax as well as customs duty on raw material resulting in higher Production costs and low profits. Finally, there is a lack of competition with the Israeli products, especially in light of openness of the global economy (PBF, 2014).

The emergence of the Palestinian family character of the industry and the small size industrial enterprises weakens their ability to cope with local and regional changes that 87% of Palestinian industrial enterprises are individual institutions, and 90% of them employing fewer than five workers (Mas, 2005).

Industry faced mainly a lot of problems as a result of the absence of a banking system capable of financing the establishment of new industries or development-based industries through the years of occupation and thus deprived the industrial sector of an important source and a key to its development. Therefore, our industrial facilities relied on self-financing that more than 90 % of the existing industrial installations suffered from a lack of volume of investments in the industrial sector and small established industrial facilities size (Abu Zarifa, 2006). It is clear that the selected industries suffer from the difficult local market. This has forced the incompatible illegal products to leave the market or encouraged small companies to merge with others or form a strategic relationship with them to enhance their competitiveness in the market (Paltrade, 2015).

## **2.11 Summary**

At the end of this chapter, the researcher shows a wide range of details about supply chain management and green practices in CLSC, as well as the drivers, obstacles and advantages of green practices. The research highlights the Palestinian industrial sector, where the fact that industries are major consumer of natural resource and basic cause of pollution. Therefore, food and pharmaceutical are targeted sectors. On the other hand, there is awareness on green practices in CLSC in various countries and organizations around the world; it doesn't apply in Palestine where no studies have been carried out on CLSC in food and pharmaceutical industry in Palestine. It is therefore clear that there is a need to find out the green practices in CLSC and their effect on food and pharmaceutical in Palestine. The following chapter will represent the research methodology.

## **Chapter Three**

### **Research Methodology**

This chapter provides an overview of the methodological approaches, and the research design used in this research, this chapter discusses research tools, research reliability and validity.

#### **3.1 Research Design**

Jaikumar (2014) defined the research design as a master plan or a blueprint for the research project that is used to specify the procedures and methods for collecting and analyzing the data in a research study. Depending on the purpose of research, a researcher can choose out of three types of researches (Bhattacharjee, 2012):

- Exploratory research: is particularly useful when the precise nature of the problem is not clear. Researchers try to clarify their understanding of a problem by finding out "what is happening; to seek new insights; to ask questions and to assess phenomena in a new light" (Saunders et al., 2009, pp. 139; Robson 2002, pp. 59).
- Descriptive research: is undertaken in order to describe an accurate profile of persons, events or situations. It is necessary to clarify the picture of the phenomena you are interested in before data collection process. This kind of research could be an extension, or a forerunner

to, a part of exploratory research or, more often, a piece of explanatory research (Saunders et al., 2009; Robson 2002).

- Explanatory research Studies: emphasis on studying a situation or a problem in order to explain the relationships between variables (Saunders et al., 2009).

This research aims to investigate the impact of the integration between green practices in CLSC and environmental activities on the environmental performance of a firm. As shown in the literature chapter, it is evident that this theme is still not well explored among the scholars. Therefore, this research will provide a model intended to give an explanation about the implementation of best practices of CLSC. In order to identify and analyze best practices related to CLSC, an exploratory research inquiry has been used in this research.

### **3.2 Research Approach**

The research approach will give the researcher the opportunity to consider how each approach may contribute to the research design by realizing and explaining a specific phenomenon. It may also allow the researcher to design an approach depending on the research purpose, the nature of the research, the problem area, research questions, and research hypothesis which best satisfies the research's requirements in order to reach the desired results (Creswell, 2003; Alhamadni et al., 2006).

Selecting a research method is a crucial decision; the researcher needs to study approaches to know which will meet the objectives of the study. Johnson and Christensen (2010) identified research paradigm as a set of shared practices and techniques which is shared by a community of researchers and which determine your research procedures. In general, there are three major research paradigms: quantitative research, qualitative research and mixed research.

### **3.2.1 The Qualitative versus Quantitative**

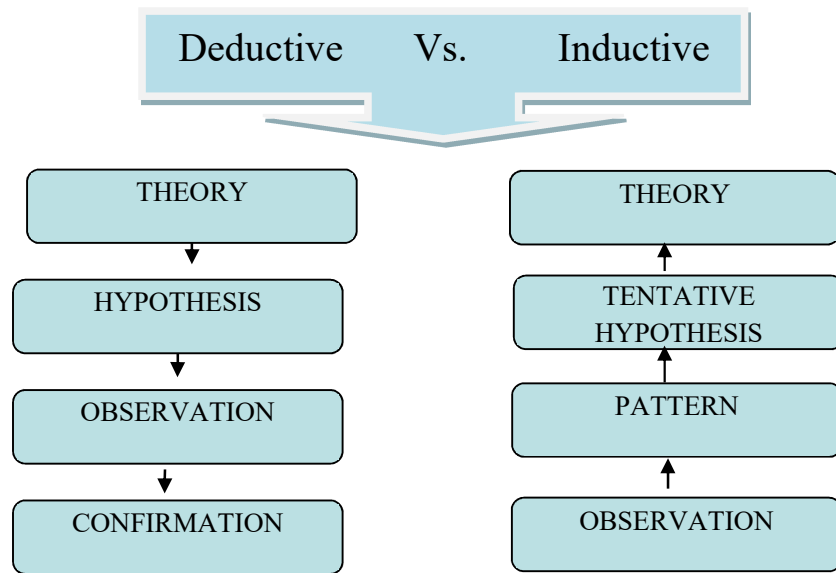
The quantitative research was also defined as "a means for testing objective theories by examining the relationship among variables. These variables, in turn, can be measured on instrument, so that numbered data can be analyzed using statistical procedures" (Creswell, 2009, pp. 4). The quantitative approach uses the numerical values, the closed-end questions, the questionnaire and survey method and it seeks to confirm a hypothesis, while the qualitative approach uses the textual result, the interviews and it seeks to explore phenomena (Creswell, 2009). A quantitative method is used to predict and measure to achieve final action using number and numerical values, while the qualitative one is used to examine intangible things such as value attitude, thoughts and perception, understand how people think about issues, opinion to making decisions (Collis & Hussey, 2003). While mixed research is a type of research that combines quantitative and qualitative approaches together in a single

research, in order to take advantage from the strengths of each approach and minimize their weaknesses (Spratt et al., 2004).

In this research, mixed method approach has been used by collecting both qualitative and quantitative data, to provide a better understanding of research problem than using just one approach (Creswell, 2014). Semi-structured interview and questionnaire have been used as data collection tools.

### **3.2.2 The Deductive versus Inductive**

The deductive approach aims to study and test theories to formulate hypotheses and then test these proposed hypotheses after that the researcher follows the statistical method to describes the result. On the other hand, the inductive approaches depend on collecting empirical data, formulating and then developing theories (Marcoulides, 1998). The deductive approach depends on starting from the more general to the more specific, so it called " top –down" approach, the inductive approach starting in the other way, moving from specific observation to broader generalization and theories, so informally it is called " bottom up" approach, the Figure (3.1) below illustrate these approaches (Aqil Burney, 2006).



**Figure (3.1): Deductive vs. Inductive (Aqil Burney, 2006).**

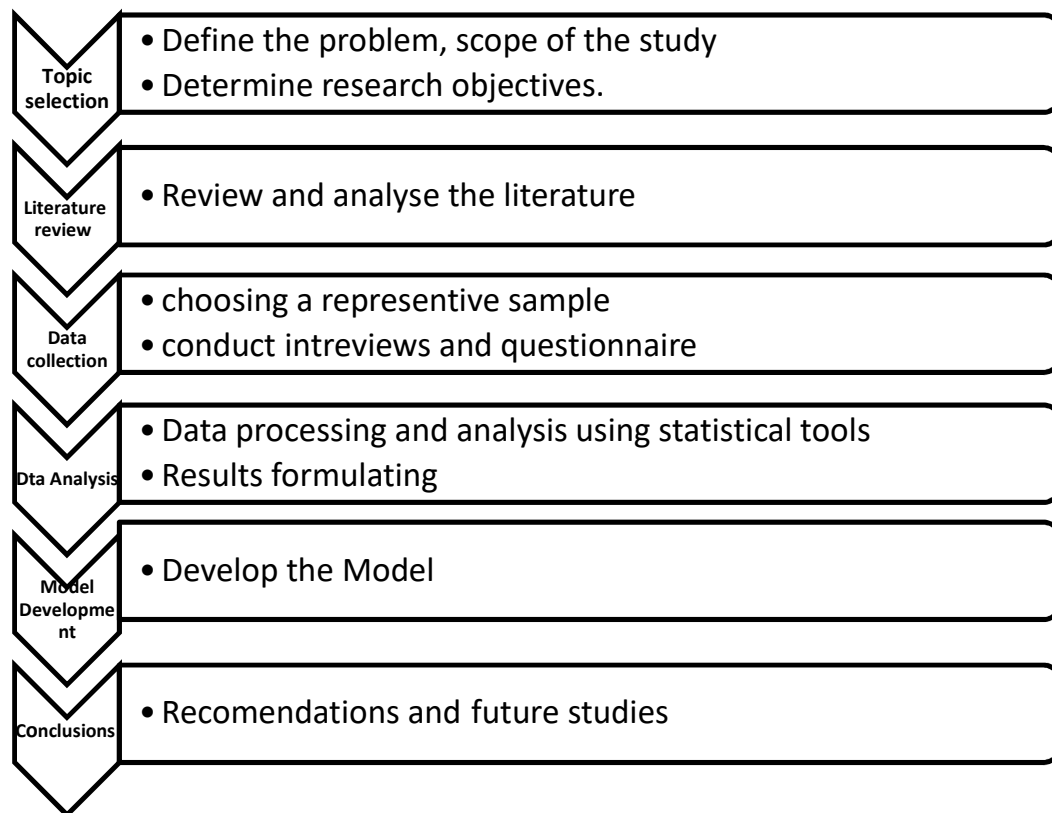
Little information and data are known about assessing CLSC in food and pharmaceutical Palestinian Companies. Also little data is known about factors that influence the spread of CLSC implementation in manufacturing Palestinian Companies. Accordingly, exploratory interviews are conducted and data are collected to formulate results and decisions about how to study this phenomenon. Factors and theories that influence CLSC adoption are chosen from literature and interviews; the researcher depends on those factors and theories to implement the model, to create the research hypotheses to be tested to gather observation and conformations. The researcher uses deductive approach in this research.

### **3.3 Research Roadmap**

The research methodology consists of six phases to be followed to obtain the research goals as shown in figure 3.2. The first phase aims to

define the problem, purpose, objectives and the scope of study. The second phase of the research includes literature review to investigate researches and studies related topic which form the main base for the researcher. A literature review therefore is one of the most significant parts of any academic research (Oliver, 2012). In this research, the researcher reviewed previous studies, the internet sites, books, journal papers, articles and annual reports as a literature sources. The third phase of the research was data collection which started by choosing the representative sample then collecting relevant data through questionnaire and semi-structured interviews with experts to enrich the research. The research hypotheses are set based on the previous literature and interviews. A pilot study is conducted with experts to test if the questionnaire contents are clear and easy to answer, then the questionnaire modified according to expert's notes and recommendations. Then the questionnaire is distributed to the companies and gathered after filling. The fourth phase depends on using statistical tool to analysis the data which is obtained in previous phase; Statistical Package for the Social Science (hereinafter referred to as 'SPSS') is used for this purpose. According to the results comes from data analysis phase, the model can be conducted in the fifth phase. The final phase includes conclusion, recommendations and future studies.





**Figure (3.2): Research Roadmap**

### **3.4 Sampling technique**

During the statistical sampling process, the researcher uses statistical sampling technique in order to get the best choice for the sample.

#### **3.4.1 Research population**

Roxy et al. (2008) defined the population as is the entire pool which a statistical sample is drawn and from which the data are collected and made the conclusions about. The study population consists of manufacturing companies in two industrial sectors (Food and pharmaceuticals industries) in the West Bank in the years 2016/2017. The Palestinian Federation of each industry was contacted to get the names and

number of valid registered manufacturing companies in their federation. Based on the data provided the targeted population includes (151) registered active companies, as shown in Table (3.1).

**Table (3.1): Active companies in food and pharmaceuticals industries.**

No.	Industrial sector	Population
1	Food	147
2	Pharmaceuticals	4
Total		151

### 3.4.2 Sample size

The sample size is important to be determined in survey's situation and other statistical method (Saunders et al., 2009). Thompson formula is used to determine the sample of the population (Thompson, 2012).

$$n = \frac{N * P(1 - P)}{\left[ N - 1 * \left( \frac{d^2}{z^2} \right) \right] + P(1 - P)}$$

Where:

n = sample size

N = the total number of population

d = the percentage error (0.05).

P = proportion of the property offers and neutral (0.5)

z = z value is the upper  $\alpha/2$  of the normal distribution (1.96 for 95% of confidence level).

According to the results of sample size equation above, 108 responses were requested to complete the survey. More than 150 electronic questionnaires have been distributed to the top managers and quality managers of the targeted companies, selected by random stratified method. However, the total number useable returned answers were only 113 questionnaires. This represented a response rate of 74%. In other words, according to Weiten (1989), for research purpose, more than 25% is good representative sample.

### **3.5 Data collection**

The key point of any research project is data collection (Bryman, 2004). In data collection phase, a combination of primary and secondary data has been used to enrich this research. Semi-structured interviews and questionnaires were the source of the primary data, while literature review through books, internet websites, international journals and PFI & PCBS publications were the source of the secondary data. The secondary form of data was used to support and provide additional information to the primary data (Creswell, 2012).

### **3.6 Research tools**

A research tool is a technique to collect data (Bryman, 2004). Most researches involve different methods such as action research, survey research, case study research ethnographic research and experimental

research (Fellows & Liu, 2008). This research is based on survey research tools, and interviews which aimed to gather data in the target companies.

### **3.6.1 Exploratory Interviews**

Welman and Kruger (2001) defined the interview as a method to collect data by visiting the respondents at home or at work, and they are very useful because highly specific data can be obtained in a short time. Interviewing participants is one of the most popular methods to collect data and obtain more information about the issue of interest (Sekaran & Bougie, 2010). Creswell (2012) portrayed qualitative interviews by researcher exchanging views with one or more participants, through asking them general open or ended questions and then recording their answers; it can be done face-to-face, via telephone, or online (Sekaran & Bougie, 2010).

There are three fundamental types of interviews: structured, semi-structured and unstructured (Kumar, 1999; Saunders, 2009). The structured interview questions are manipulated to answer the main research questions. According to (Saunders, 2009) the structured interview depends on predetermined or identical set of questions, but the researcher in the semi-structured interviews will have a list of questions to be covered, although these may vary from interview to another. This means that the researcher has the ability to omit some questions in specific interviews, given a specific organizational context to obtain the objective of the research topic. Finally, the unstructured interviews, which called "in-depth interviews", mean no predetermined list of questions. Although the researcher should

have a clear idea about the topic he wants to explore, they are informal. The selected companies are contacted to check availability to make an interview, after that the researcher scheduled dates to conduct the interviews after confirmation. In this research semi-structured interviews have been chosen to get more information about the CLSC in manufacturing companies. The researcher informed the interviewees about the research objective and the purpose of the interviews, and confirmed confidentiality of all company's information.

### **3.6.2 Interviews analysis**

Ten semi-structured interviews were done to gather more information about CLSC from viewpoint of Palestinian manufacturing companies, as Fugard and Potts (2015) mentioned that the recommended interviews for small projects are (6–10) participants.

Qualitative data resulted from the transcribed interviews have been analyzed by the ‘thematic analysis’ approach. Guest (2012) defined thematic analysis method as the most common way in the analysis of qualitative research. It tightens on setting, examining, and recording themes within data (Braun & Clarke, 2006). Where themes according to Daly and Gliksman (1997, pp. 613) are "patterns across data sets that are important to the description of a phenomenon and are associated to a specific research question". Braun and Clarke (2006) said thematic analysis is performed through six phases as follows:

1. Familiarization with data.
2. Generating initial codes.
3. Searching for themes among codes.
4. Reviewing themes.
5. Defining and naming themes.
6. Producing the final report

These stages were followed in this study, started by reading the texts of interviews several times to become familiar with them, then generating the codes, then collecting the similar codes into issues, then combining the similar issues into themes, and finally defining the themes.

### **3.6.3 Questionnaire Surveys**

The questionnaire survey is the most popular way to gather information from respondents. The questionnaire must reflect the research objectives through the questions and the answers will provide data for further research (Frankfort-Nachmias & Nachmias, 1992; Kumar, 1999). It is designed with closed-end questions method to achieve the research objectives. A five-point Likert scale questionnaire was used to evaluate the presence of certain practices in the targeted organizations; the Likert Scale is an ordered, one dimensional scale from which respondents choose one option that best aligns with their knowledge. It comprised of questionnaire

cover, which contains: purpose of the questionnaire, definition of CLSC and letter of gratitude to participants with promises to use this information only for research purpose. The rest of questionnaire has four major parts. Part one mainly focuses on the demographic information of employees which is needed to understand the nature of participants such as, the participants' gender, age, job title and level of education, in order to explore the diversity of sample within the companies as shown in research population.

Part two consists of several statements about current CLSC practices were adopted by the company. This part used to measure to what extent organizations use the practices to encourage pro-environmental behavior. Respondents were asked this question: ‘To what extent does your organization use the following methods to encourage staff to behave in a pro-environmental way?’ response options grouped into six categories as follows: (1) green culture of the company, (2) reverse logistics, (3) redesigning and wrapping the product, (4) waste management, (5) green purchasing , and (6) green manufacturing. Each item was rated on a five-point Likert scale of 1 (not at all) to 5 (very great extent).

Part three consists of statements that aim to collect information about the (1) drivers, (2) obstacles and (3) expected advantages of adopting CLSC practices from respondent viewpoint. Respondents were asked “From your experience can you please rank the drivers, obstacles and

expected advantages of CLSC”. Each item was rated on a five-point Likert scale of 1 (strongly disagree) to 5 (strongly agree).

Part four illustrates the environmental performance of the company. This section used self-report affirmative outcomes to measure impact of environmental commitment on firm’s environmental performance. Respondents were asked this question: ‘Please evaluate how commitment to environmental sustainability has allowed the company to date, to obtain the following results’. Each item was rated on a five point Likert scale of 1 (much worse) to 5 (much better). In this research, two versions of the questionnaire have been designed. The first version is in English and the second in Arabic (attached at appendix A), to ensure getting highest response rate.

### **3.7 Quality Standards for research tools**

To confirm on the quality of the questionnaire two procedures are performed, ensuring the correctness of their information and making sure of their ability to obtain the research's objectives.

#### **3.7.1 Pilot study**

Pilot study is a scientific tool allowing the researchers to conduct pre-testing on limited scale before doing a full-blown study in order to evaluate feasibility, variability, time and cost (Saunders et al., 2009). Pilot testing is an extremely important part of the research process even though some researchers overlook this test (Bhattacharjee, 2012); pilot study tries



to identify potential practical problems in the research procedure (Van Teijlingen et al., 2001). It aims to improve the questionnaire, in order to check whether the questions are comprehensible so the participants are able to understand them easily. So, the possibility of getting incomplete answers will be reduced (Saunders et al., 2009). A rough draft of survey questions is tried out with a small; non-random of respondents in order to see if it has any ambiguity that has not been noticed by the researcher, moreover, to ensure it obtains the information which is required in the study (Dawson, 2002; Schwester, 2015).

The pilot study in this work was implemented using online questionnaire which was distributed via email to nine experts in order to find out if it is easily understood and to ensure that the questions are clear and easy to answer without any confusion. In addition, a copy of the questionnaire was sent to the supervisor of this research for the same purpose.

The researcher asked the selected evaluators to forward any feedback or comments about the initial questionnaire. Based on the received comments, the questionnaire was revised and modified to be at the final revision (see Appendix-A). The questionnaire was translated from English language to Arabic language (see Appendix-A), to increase the responding rate. According to (Coldwell and Herbst, 2004), it is important to translate the survey questions into the language of respondents, to be clear and easy to answer. To increase the response rate, the researcher conducted pre-

survey phone calls to ask the target firms if they are willing to answer the questionnaire's questions, and when the researcher can send it, whereas the respondents are free to fill in.

### 3.7.2 Validity of the Questionnaire

It is important to check validity of the questionnaire; the term validity refers to the degree to which the research tool measures what is supposed to be measured. To ensure the validity of the questionnaire, it was rated by a jury of experts in the field of engineering at An-Najah National University. The respondents' comments and the jury's suggestions were taken into consideration to modify and improve the questionnaire's content and wordings by omitting, adding or rephrasing items bringing the number of items remained 47 items.

### 3.7.3 Reliability of the Questionnaire

The reliability of the questionnaire as calculated through Cronbach's Alpha formula for the total degree was (0.94), which is excellent for conducting the research, as shown in Table 3.2.

**Table (3.2): Cronbach's Alpha Internal Consistency, source (Cortina, 1993)**

Cronbach's alpha	Internal Consistency
$\alpha \geq 0.9$	Excellent
$0.7 \leq \alpha < 0.9$	Good
$0.6 \leq \alpha < 0.7$	Acceptable
$0.5 \leq \alpha < 0.6$	Poor
$\alpha < 0.5$	Unacceptable

Table 3.3 shows Cronbach's Alpha for the questionnaire domains and total degree of responses. Cronbach's Alpha results for the total degree was (0.989) which is excellent and accepted for the study purpose. Also, the same table shows that Cronbach's Alpha for the company environmental performance was (0.963) which is accepted for the study purpose.

**Table (3.3): Cronbach's Alpha for Measuring the Reliability of the Questionnaire Domains and Total Degree of Responses**

12	Domain	Items	Cornbach's Alpha
<b>Applying green environmental practices in closed loop supply chain</b>			
1.	Green culture of the company	4	0.875
2.	Eco-design	6	0.905
3.	Waste management	4	0.924
4.	Green purchasing	3	0.934
5.	Green manufacturing	5	0.973
6.	Reverse logistics	4	0.991
7.	Drivers for closed loop supply chain	6	0.975
8.	Obstacles of applying closed loop supply chain	6	0.934
9.	Advantages of applying closed loop supply chain	4	0.975
<b>Company environmental performance</b>			
10.	Environmental performance	5	0.963
Total degree		47	0.989

The findings of Norman (2010) shows that, parametric statistics can be used with Likert data, with unequal variances, and with non-normal distributions, with no fear of “coming to the wrong conclusion”. Furthermore, the results give strong support for the robustness of the ANOVA under application of non-normally distributed data (Schmider et al. , 2010). As ANOVA and other tests of central tendency are highly

robust to things like skewness and non-normality, the Pearson correlation is robust with respect to skewness and non-normality ( Norman, 2010).

### **3.8 Statistical procedures**

The statistical procedures:

1. Cronbach's alpha test in order to test reliability of the questionnaire.
2. Means, frequencies, standard and deviations in order to analyze the study sample responses on the questionnaire items.
3. Analysis of Variance (hereinafter referred to as 'ANOVA') test in order to test the hypothesis about the relationship between the independent variables of (green culture of the company, reverse logistics, redesigning and wrapping the product, waste management, green purchasing, green manufacturing, drivers for closed loop supply chain, obstacles of applying closed loop supply chain and advantages of applying closed loop supply chain) and the dependent variable of (the company environmental performance).
4. Pearson correlation to test hypothesis.

### **3.9 Ethical Consideration**

In all research stages, the researcher ensures to adopt ethical consideration, as ethical refers to "the appropriateness of your behavior in relation to the rights of those who become the subject of your work, or are

affected by it.”(Saunders et al., 2009, pp 183-184). So, the researcher ensures that:

- The questionnaire is acceptable to manufacturing companies.
- The questionnaire has no indication to the company name.
- Distributing the questionnaire was according to company policy.

### **3.10 Summary**

An overview of the research methodologies and approaches were given, the research population and the sample were determined. In addition, the research confirms to check on the validity and reliability of the instrument was used. It highlights the research tools, discusses the procedure for data collecting and the ethical considerations.

## **Chapter Four**

### **Data Analysis**

This chapter analyzes and presents the results of the data which is collected from interviews and questionnaires.

#### **4.1 Interviews Analysis**

Ten semi-structured interviews were done with experts working in manufacturing companies ( see Appendix D). Three environmental managers, two Quality assurances, four production manager, and one chief executive officer were interviewed to cover aspects related to sustainability policies/ strategies in the company and the practices that they used to deal with environmental issues. They were confirmed that interview information is confidential and will be only used for scientific research purpose. At last, interviews were transcribed to analyze them.

The results from semi-structured interviews were classified into themes. Table 4-1 provides a summary of all used codes, issues discussed and the identified central themes

**Table (4.1): Summary of Identified Codes, Basic Themes, and Central Themes**

Codes	Issues Discussed	Initial/ Central Themes
Technology	Recycling	Environmental Practices
Complains	Reduce chemical effect	
System	Apply ISO14001	
Benefits	Importance and Benefits of Environmental practices	Environmental Management Practices
Gov. regulation	Environmental responsibility	
Financial Situation	Cost	Challenges
Priority	Lack of top Interest management	
Interest	Top management support	Success factors
Good plan	Clear goals and plans for the environment	

The researcher elicits four themes from semi-structure interviews, they are illustrated below:

- Theme 1: Environmental Practices. This theme aims at identifying the major environmental practices done by Palestinian organizations. Most of the interviewees illustrate that their organizations apply some environmental practices such as recycling, waste water management and reducing the chemical effect. The top practice was recycling; were they developed plans to dispose papers or plastic waste either by selling them to other specialized companies who reuse them, or sending them to special places provided by municipality - if available in their city- to manage them.
- Theme 2: Environmental Management Practices. Most of interviewees insisted that if an organization wants to guarantee the

success of their environmental plan, they should have a detailed environmental management system. All of them confirmed that their organizations have done an Environmental Impact Assessment in the early stages of the establishment as a response to governmental regulation. However, many of them have a specialized environmental management system such as ISO 14001 in their organization.

- Theme 3: Challenges; there are many variables that could affect and prevent the implementation of CLSC. All of the interviewees identified the cost of implementing green programs as the main reason to prevent the implementation of CLSC.
- Theme 4: Success factors; all of the interviewees agreed on main two factors that support the success of applying CLSC. From all interviewees' perspective, the main success factor is the top management interest and support. If top management did not support and encourage the new culture most employees will not commit to it. Clear goals and plans for the environmental management have a great effect on the success of CLSC. Clear goals will inform employee about the expected performance and keep them motivated to be part of the bigger plan.

## **4.2 Questionnaire Analysis**

The data collected were analyzed using Statistical Package for the Social Sciences (SPSS-17) to provide answers to the questions of the study.



Many statistical descriptive and tests are used to find out descriptive statistical analysis that help in answering the research question and the hypotheses.

To analyze the findings, the researcher used the following Likert scale to represent the estimation level of sample responses. Likert item rank start from "1" for strongly disagree to "5" strongly agree. To analyze the findings, the average response for each domain is calculated. These responses are classified into five intervals as shown in Table 4.2.

The degrees of these intervals are calculated by subtracting the range of response " 1" which corresponds to strongly disagree from " 5" which corresponds to strongly agree, then dividing the result by the number of interval which is  $5*(5-1/5)=0.8$ .

**Table (4.2): Interval classification**

Degree	Interval	Percentages
Very low	1.0-<1.8	20% -< 36%
Low	1.8-<2.6	36% -< 52%
Moderate	2.6-<3.4	52% -< 68%
High	3.4-<4.2	68% -< 84%
Very high	4.2-5.0	84% -< 100%

#### **4.2.1 Demographic and descriptive statistics**

The total number of participant is 113 companies. The participants are different in terms of personal attributes such as gender, age, job title and academic qualification. The tables below illustrate the distribution of the questionnaire in term of these attributes.

#### 4.2.2 Personal attribute

##### - Gender

As shown in Table 4.3, the analysis of gender distribution shows that manufacturing companies is traditionally male dominated sector. The research sample includes 63 males who from around 75% of the participants, and 50 females who around 25% of the participants. Figure B-1 in appendix B shows the gender distribution.

**Table (4.3): Sample Distribution Attributed to Participants' Gender**

Variable	Class	Frequency	Percentage %
<b>Gender</b>	Male	63	75.0
	Female	50	25.0
<b>Total</b>	113	113	100

##### - Age:

The age is divided into five intervals. Table (4.4) shows the age attribute. Figure B-2 in appendix B shows the age distribution.

**Table (4.4): Sample Distribution Attributed to Participants' Age.**

Variabl	Characteristic of the variable	Frequenc	Percentage %
<b>Age</b>	less than 25 years	16	11.1%
	25-35 years	76	70.3%
	35-45 years	14	12.4%
	45-55 years	3	2.7%
	more than 55	4	3.5%
<b>Total</b>		113	100%

##### - Job title

The distribution of the job title is shown in Table 4.5. Figure B-3 in appendix B shows the job title distribution.

**Table (4.5): Sample Distribution Attributed to Participants' Job Title**

Variable	Characteristic of the variable	Frequency	Percentage %
<b>Job title</b>	General Manager	6	5.3%
	Head of Department	48	42.5%
	Production manager	45	39.8%
	Employee	7	6.2%
	Other	7	6.2%
<b>Total</b>		113	100%

**- Educational level**

The educational level is divided into three levels. Table 4.6 shows these levels. Figure B-4 in appendix B shows the Educational level distribution.

**Table (4.6): Sample Distribution Attributed to Participants' Educational level**

Variable	Characteristic of the variable	Frequency	Percentage%
<b>Scientific qualification</b>	Diploma	2	1.8%
	Bachelor	94	83.2%
	Master	17	15%
<b>Total</b>		113	100%

The result of analysis: personal information data shows that:

1. The highest percent of participants is male who from 75.0% of respondents.
2. The highest percent of participants is (25-35 years) who from 70.3 % of respondents.
3. The highest percent of participants in job title is the Head of department who from 42.5% of respondents.

4. The highest percent of participants in academic qualification is the Bachelor degree who from 83.2% of respondents.

#### 4.2.3 Company Information

Table 4.7 represents the division of companies based on the sector, No. of employees, and product numbers. Figure (B-5),(B-6), and (B-7) in appendix B shows the distribution of these variables.

**Table (4.7): Distribution of the study sample according to study independent variables (Company Information)**

Variable	Class	Frequency	Percentage %
<b>Company sector</b>	Medication	4	3.5%
	Food/ Diary	109	96.5%
<b>Total</b>		113	100%
<b>No. of Employees</b>	Less than 50	6	5.3%
	50-100	81	71.1%
	100-150	5	4.4%
	150-200	4	3.5%
	More than 200	17	15%
		113	100%
<b>No. of products.</b>	Less than 5	5	4.3
	5-10	32	27
	10-15	14	12.2
	15-20	17	14.8
	More than 20	45	39.1
<b>Total</b>		113	100.0%

Table 4.8 illustrates the 60.2% of the manufacturing Palestinian companies has ISO14001certification, and all of these companies commitment about testing raw material before usage.

**Table (4.8): Companies with ISO 14001 or another**

Variable	Class	Frequency	Percentage %
Possessing International certificate quality criteria (ISO14001)	Yes	68	60.2%
	We have another one	45	39.8%
Are company commit in testing raw materials	Yes	113	100.0%

### 4.3 CLSM practices assessment

In order to assess CLSM practices in food and pharmaceutical companies in the West Bank, some questions were given to the respondents to rate the actual practices inside their companies. For example, they answered that following question: **What is the implementation level of green environmental practices in closed loop supply chain in Palestinian manufacturing companies (Green culture of the company, reverse logistics, Eco-design, waste management, green purchasing, green manufacturing)?**, Means, standard deviations and estimation level were analyzed by using descriptive analysis as shown in following tables.

**Table 4.9: Estimated Level of the Implementation of Closed Loop Supply Chain practices in the Palestinian Manufacturing Companies**

Rank.	Domain	Means	Standard Deviations	Percentage %	Estimated Level of the application degree
1	Green culture of the company	2.76	0.86	55.2	Moderate
2	Eco-design	2.78	0.802	55.6	Moderate
3	Waste management	2.89	0.79	57.8	Moderate
4	Green purchasing	2.96	0.81	59.2	Moderate
5	Green manufacturing	3.04	0.92	60.8	Moderate
6	Reverse logistics	3.04	0.96	60.8	Moderate
Mean		2.91	0.86	58.2	Moderate

Based on the result above, the total implementation level of closed loop supply chain in Palestinian manufacturing companies are (2.91) which are considered as a moderate level. The above results show that the top most green environmental practices in closed loop supply chain in Palestinian manufacturing companies is the (Green manufacturing and reverse logistic) which scored (3.04). The lowest percentage was for the domain (green culture of the company) which scored (2.76) and suggests moderate level of estimation.

**Table (4.10): Estimated level of the Green culture of the company**

No.	Item	Means	Standard Deviations	Percentage %	Estimated Level
1	Company administration clarifies information relevant to green practices for all divisions.	2.54	0.876	50.8	Low
2	The company has penalty and fines system for violating green logistic practices.	2.84	0.738	56.8	Moderate
3	The company has budget for supporting green logistic activities	2.46	0.835	49.3	Low
4	The company vision includes environmental concerns	3.20	0.992	64	Moderate
Mean		2.76	0.86	55.2	Moderate

Table 4.10 shows that the total degree of green culture of the company as a component of green environmental practices was (2.76) which suggest moderate level of estimation. The highest mean was given to the item (The company vision includes environmental concerns). On the

other hand, the lowest was for the item (The company has budget for supporting green logistic activities).

**Table (4.11): Estimated Level of the Eco-design**

No.	Item	Means	Standard Deviations	Percentage %	Estimated Level
1	The products cover are designed from environmental friendly material	2.40	0.728	48.0	Low
2	Technology of production of environmental commitment is considered	2.77	0.753	55.4	Moderate
3	Product wrapping is done by recycled and environmentally materials	2.72	0.723	54.4	Moderate
4	The company is able to develop environmentally products to meet the customers' needs.	3.09	1.009	61.8	Moderate
5	The company seeks to use raw materials with no environmental harm	2.75	0.701	55.0	Moderate
6	The company always strives for continuous improvement of its products with less environmental harm	2.92	0.898	58.4	Moderate
Mean		2.78	0.802	55.6	Moderate

Table 4-11 shows that the total degree of Eco-design as a component of green environmental practices was (2.78) which suggest moderate level of estimation. The highest mean was given to the item (The company is able to develop environmentally products to meet the customers' needs). On

the other hand, the lowest mean were for the items (The products cover are designed from environmental friendly material) .

**Table (4.12): Estimated Level of the Waste Management**

No.	Item	Means	Standard Deviations	Percentage %	Estimated Level
1	The company has the ability to get rid of manufacturing wastes in safe ways	2.72	0.67	54.4	Moderate
2	The company practices new methods of designing products with less wastes	2.74	0.68	54.8	Moderate
3	Clean energy is used in order to save environment	3.03	0.89	60.6	Moderate
4	Modern technology which decreases the negative effects on the environment is used	3.08	0.92	61.6	Moderate
Mean		2.89	0.79	57.8	Moderate

Table 4-12 shows that the total degree of waste management as a component of green environmental practices was (2.89) which suggest moderate level of estimation. The highest mean was given to the item (modern technology which decreases the negative effects on the environment is used). On the other hand, the lowest was for the item (The company has the ability to get rid of manufacturing wastes in safe ways).

Gupta and Sharma (1995) demonstrated a strategy which is "source-reduction/pollution-prevention" that focuses on 'preventing' pollution in products as well as manufacturing processes (in the source) rather than



‘removing’ it after it has been created. It is the concept of preventing the creation of waste rather than managing it after it is generated.

**Table (4.13): Estimated Level of the Green Purchasing**

No.	Item	Means	Standard Deviations	Percentage %	Estimated Level
1	The company adopts applying environmental criteria with suppliers	3.22	1.024	64.4	Moderate
2	The company concerns about suppliers ISO 14001 Certificate.	2.89	0.848	57.8	Moderate
3	The company purchases substances with less harm environmental	2.76	0.707	55.2	Moderate
Mean		2.96	0.859	59.2	Moderate

Table 4-13 shows that the total degree of green purchasing as a component of green environmental practices was (2.96) which suggest moderate level of estimation. The highest mean was given to the item (The company adopts applying environmental criteria with suppliers). On the other hand, the lowest was for the item (The company purchases substances with less harm environmental).

**Table (4.14): Estimated Level of the Green Manufacturing**

No.	Item	Means	Standard Deviations	Percentage %	Estimated Level
1	The company concerns about manufacturing products which could be recycled	3.16	0.99	63.2	Moderate
2	The company concerns about consumed power during the production process	3.10	0.994	62.0	Moderate
3	The company applies mechanisms decreasing using substances in filling and wrapping	3.13	0.968	62.6	Moderate
4	Dangerous substances are replaced with environmentally friend ones	3.13	0.949	62.6	Moderate
5	Product life- cycle evaluation is used to evaluate the environmental performance	2.69	0.705	53.8	Moderate
Mean		3.04	0.92	60.8	Moderate

Table 4-14 shows that the total degree of green manufacturing as a component of green environmental practices was (3.04) which suggest moderate level of estimation. The highest mean was given to the item (The company concerns about manufacturing products which could be recycled). On the other hand, the lowest mean was for the item (Product life- cycle evaluation is used to evaluate the environmental performance).

**Table (4.15): Estimated Level of the Reverse Logistics.**

No.	Item	Means	Standard Deviations	Percentage %	Estimated Level
1	Using reverse logistics decreases material consumption	3.05	0.96	61	Moderate
2	The company concerns about the returned products from the markets in order to recycling or safe disposal	3.03	0.95	60.6	Moderate
3	The company concerns about reusing/remanufacturing the substances as possible as it could.	3.03	0.96	60.6	Moderate
4	The company concerns about the perfect use of the product by the consumer	3.06	0.96	61.2	Moderate
Mean		3.04	0.96	60.8	Moderate

Table 4.15 shows that the total degree of reverse logistics in the company as a component of green environmental practices was (3.04) which suggest moderate level of estimation. The highest mean was given to the item (The company concerns about the perfect use of the product by the consumer). On the other hand, the lowest were for the items (The company concerns about reusing/remanufacturing the substances as possible as it could) and (The company concerns about the returned products from the markets in order to recycling or safe disposal).

#### **4.4 Drivers and obstacles and advantages of CLSC practices**

There are many factors that could affect the implementation of CLSC practices either by supporting or preventing CLSC Implementation. Therefore, the second objective of this research aims to provide a clear

picture of variables helping or preventing CLSC implementation from the perspective of Palestinian manufacturing organizations.

#### 4.4.1 Drivers of CLSC

Table 4-16 illustrates the Drivers of CLSC rating, where all of them have a mean rating greater than 2.5 on the five-point scale, but it is worth to mention that the mean rating is very close. The total degree of drivers for closed loop supply chain as a component of green environmental practices was (2.97) which suggest Moderate level of estimation. The highest mean was given to the items (Governmental pressure by imposed regulations on manufacturing companies). On the other hand, the lowest mean was for the item (Society pressure for adopting environmental practices).

**Table (4.16): Descriptive Statistics of the Estimated Level of the (Drivers for Closed Loop Supply Chain**

No.	Item	Means	Standard Deviations	Percentage %	Estimated Level
1	Society pressure for adopting environmental practices	2.84	0.82	56.8	Moderate
2	The company concerns about environment	3.18	1.02	63.6	Moderate
3	Economical benefits such as decreasing cost of production	2.88	0.87	57.6	Moderate
4	Governmental pressure by imposed regulations on manufacturing companies	3.20	1.02	64	Moderate
5	Competitive advantages	2.86	0.85	57.2	Moderate
6	Social responsibility	2.89	0.86	57.8	Moderate
Mean		2.97	0.90	59.5	Moderate

#### 4.4.2 Obstacles of CLSC

Respondents were asked to rate the variables on a five-point scale, with 5 being “Strongly Agree” and 1 being “Strongly Disagree” according to the degree of their agreement about of the obstacles of applying CLSC in Palestinian manufacturing organizations. Table 4-17 presents the mean ratings and the ranking of potential obstacles to the implementation of CLSC Practices.

Based on data analysis, it can be observed that respondents perceived the key factor that contributed most to prevent CLSC practices is " Change resistance by the employees " with the percentage of 63.2%. The second place were for " Difficulty of applying closed loop supply chain inside the company " with the percentage of 63%, followed by" Top administration low support" with the percentage of 58.4% in the third place. As shown in the table (4-17), in fourth place “Misunderstanding policies and environmental concerns at the company" with the percentage of 57.8%. Also, "Low proficiency among company leadership" and " high costs of green products due to search and development procedures" were the lowest mean rating in fifth place with a percentage of 55.2%.

**Table (4.17): Obstacles of Applying Closed Loop Supply Chain**

No.	Obstacles of applying CLSC	Means	Standard Deviations	Percentage %	Estimated Level
1	Misunderstanding policies and environmental concerns at the company	2.89	0.82	57.8	Moderate
2	Top administration low support	2.92	0.86	58.4	Moderate
3	Change resistance by the employees	3.16	0.98	63.2	Moderate
4	Low proficiency among company leadership	2.76	0.83	55.2	Moderate
5	Difficulty of applying closed loop supply chain inside the company	3.15	1.06	63.0	Moderate
6	High costs of green products due to search and development procedures	2.76	0.81	55.2	Moderate
Mean		2.94	0.89	58.8	Moderate

#### 4.4.3 Advantages of CLSC

Respondents were asked to rate potential variables on a five-point scale, with 5 being “Strongly Agree” and 1 being “Strongly Disagree” according to the degree of their agreement about its effect on the implantation of CLSC practices in Palestinian manufacturing organizations. Table (4-18) presents the mean ratings and the ranking of potential positive outcomes of implementing CLSC Practices in a descending order.

**Table (4.18): Advantages of Applying Closed Loop Supply Chain**

No.	Advantages of applying CLSC	Means	standard Deviations	Percentage %	Estimated Level
1	Achieving competitive advantage	3.51	1.34	70.2	High
2	Reinforcing social responsibility towards environment	3.31	1.04	66.2	Moderate
3	Improving company environmental performance	3.30	1.03	66	Moderate
4	Increasing profits and decreasing costs	3.30	1.03	66	Moderate
		3.36	1.11	67.1	Moderate

As shown in Table (4-18), respondents indicated that " Achieving competitive advantage " (70.2%) was the top benefits for their organizations. The next closest one was " Reinforcing social responsibility towards environment " with the percentage of (66.2%). In third place "Improving company environmental performance" and "Increasing profits and decreasing costs" with percentage (66%).

#### **4.5 Environmental performance**

To measure the company environmental performance, the respondents were asked to rate the expected outcome on a five-point scale, with 5 being "Much better" and 1 being "Much worse". Based on the result illustrated in Table (4-19), overall respondents chose "Decreasing loose and substances recycling during the production procedure" as top environmental performance with the percentage of 55.8%. Followed by "Improvement in Product quality "," Improving environmental products",

"Improvement in Company performance and cost is decreased ".Finally, the lowest environmental performance affirmative outcomes were "improvement in company reputation" with percentage of 49.4%.

**Table (4.19): Environmental Performance**

No.	Domain	Means	standard Deviations	Percentage %	Estimated Level
1	Improvement in Company reputation	2.47	0.82	49.4	Low
2	Improvement in Product quality	2.79	0.79	55.8	Moderate
3	Decreasing loose & substances recycling during the production procedure	2.80	0.77	56	Moderate
4	Improving environmental products	2.78	0.75	55.6	Moderate
5	Improvement in Company performance and cost is decreased	2.78	0.81	55.6	Moderate
	Mean	2.72	0.79	54.4	Moderate

#### 4.6 Hypothesis testing

In this study ANOVA test was used to test the research hypothesis. This test is based on assuming the null hypothesis (Ho) of the existence of no significant relationship between the different variables. The null hypothesis is rejected if significance is less than (0.05).



#### 4.6.1 Results of the First Hypotheses

Which is: *There is significant statistical relationship at ( $\alpha= 0.05$ ) between green culture of the company and the company environmental performance.*

To test this hypothesis, ANOVA test was used as shown in following table.

**Table (4.20): ANOVA Test to Determine the Relation between Green Culture of the Company and the Company Environmental Performance**

Model	Sum of Squares	Df	Mean Square	F	Sig.	B	R <sup>2</sup>	R
Regression	53.551	1	53.551	850.294	*0.000	.141	0.885	0.940
Residual	6.991	111	.063			0.937		
Total	60.542	112						

\* The mean difference is significant at the 0.05 level

Table 4-20 shows that calculated (F) is (850.294), the significant value (0.000) and degrees of freedom are (1 and 111) which means that there is significant statistical relationship at ( $\alpha= 0.05$ ) between green culture of the company and the company environmental performance R<sup>2</sup> is (0.885) and correlation coefficient is (0.940) which means high interpretation power between the independent variable (green culture of the company) and dependent one (the company environmental performance). The items of green culture of the company interprets (88.5%) of the company environmental performance. This result is in line with (Dubey et al., 2017) findings, that is demonstrates a link between top manager and environmental performance.

#### 4.6.2 Results of the second Hypotheses

Which is: *There is significant statistical relationship at ( $\alpha= 0.05$ ) between eco design and the company environmental performance.*

To test these hypotheses, ANOVA test was used as shown in following table.

**Table (4.21): ANOVA Test to Determine the Relation between eco-design and the Company Environmental Performance**

Model	Sum of Squares	Df	Mean Square	F	Sig.	B	R2	R
<b>Regression</b>	44.487	1	44.487	312.871	*0.000	0.098	0.738	0.859
<b>Residual</b>	15.854	111	.143			.947		
<b>Total</b>	60.542	112						

\* The mean difference is significant at the 0.05 level

Table 4-21 shows that calculated (F) is (312.871), the significant value (0.000) and degrees of freedom are (1 and 111) which means that there is significant statistical relationship at ( $\alpha= 0.05$ ) between Eco-design and the company environmental performance R2 is (0.738) and correlation coefficient is (0.859) which means high interpretation power between the independent variable (Eco-design and wrapping the product) and dependent one (the company environmental performance). The items of Eco-design interprets (73.8%) of the company environmental performance. This result in line with (Diabat & Govindan, 2011; Kenneth et al., 2012) findings, which proved there is a positive relation between green design and environmental performance.

#### 4.6.3 Results of the Third Hypotheses

Which is: *There is significant statistical relationship at ( $\alpha= 0.05$ ) between waste management and the company environmental performance.*

To test this hypothesis, ANOVA test was used as shown in following table.

**Table (4.22): ANOVA Test to Determine the Relation between Waste Management and the Company Environmental Performance**

Model	Sum of Squares	Df	Mean Square	F	Sig.	B	R2	R
Regression	28.766	1	28.766	100.487	*0.000	.098	0.738	0.859
Residual	31.776	111	0.286			.947		
Total	60.542	112						

\* The mean difference is significant at the 0.05 level

Table 4.22 shows that calculated (F) is (100.487), the significant value (0.000) and degrees of freedom are (1 and 111) which means that there is significant statistical relationship at ( $\alpha= 0.05$ ) between waste management and the company environmental performance R2 is (0.738) and correlation coefficient is (0.859) which means high interpretation power between the independent variable (waste management) and dependent one (the company environmental performance). The items of waste management interprets (73.3%) of the the company environmental performance.

#### 4.6.4 Results of the Fourth Hypotheses

**Which is:** *There is significant statistical relationship at ( $\alpha= 0.05$ ) between green purchasing and the company environmental performance.*

To test this hypothesis, ANOVA test was used as shown in following table.

**Table (4.23): ANOVA Test to Determine the Relation between Green Purchasing and the Company Environmental Performance**

Model	Sum of Squares	Df	Mean Square	F	Sig.	B	R2	R
Regression	26.297	1	26.297	85.236	*0.000	.975	0.434	0.659
Residual	34.245	111	0.309			0.593		
Total	60.542	112						

\* The mean difference is significant at the 0.05 level

Table 4-23 shows that calculated (F) is (85.236), the significant value (0.000) and degrees of freedom are (1 and 111) which means that there is significant statistical relationship at ( $\alpha= 0.05$ ) between green purchasing and the company environmental performance R2 is (0.434) and correlation coefficient is (0.659) which means high interpretation power between the independent variable (green purchasing) and dependent one (the company environmental performance). The items of green purchasing interprets (43.4%) of the the company environmental performance.

#### 4.6.5 Results of the Fifth Hypotheses

**Which is: *There is significant statistical relationship at ( $\alpha= 0.05$ ) between green manufacturing and the company environmental performance.***

To test this hypothesis, ANOVA test was used as shown in following table.

**Table (4.24): ANOVA Test to Determine the Relation between Green Manufacturing and the Company Environmental Performance**

Model	Sum of Squares	Df	Mean Square	F	Sig.	B	R2	R
Regression	24.169	1	24.169	73.758	*0.000	1.126	0.399	0.632
Residual	36.372	111	0.328			.527		
Total	60.542	112						

\* The mean difference is significant at the 0.05 level

Table (4-24) shows that calculated (F) is (75.324), the significant value (0.000\*) and degrees of freedom are (1 and 111) which means that there is significant statistical relationship at ( $\alpha= 0.05$ ) between green manufacturing and the company environmental performance R2 is (0.399) and correlation coefficient is (0.632) which means high interpretation power between the independent variable (green manufacturing) and dependent one (the company environmental performance). The items of green manufacturing interprets (39.9 %) of the the company environmental performance. Although, from the literature all previous study support the relation between green manufacturing and environmental performance.

#### 4.6.6 Results of the six Hypotheses

Which is: *There is significant statistical relationship at ( $\alpha= 0.05$ ) between reverse logistics and the company environmental performance.*

To test this hypothesis, ANOVA test was used as shown in following table.

**Table (4.25): ANOVA Test to Determine the Relation between Reverse Logistics and the Company Environmental Performance**

Model	Sum of Squares	Df	Mean Square	F	Sig.	B	R2	R
Regression	17.075	1	17.075	43.606	*0.000	1.473	0.282	0.531
Residual	43.466	111	0.392			.413		
Total	60.542	112						

\* The mean difference is significant at the 0.05 level

Table (4-24) shows that calculated (F) is (43.606), the significant value (0.000\*) and degrees of freedom are (1 and 111) which means that there is significant statistical relationship at ( $\alpha= 0.05$ ) between reverse logistics and the company environmental performance R2 is (0.282) and correlation coefficient is (0.531). The items of reverse logistics interprets (28.2 %) of the company environmental performance. This result is in link with (Abdallah et al., 2012) findings.

Table 4.26 shows the results of the ANOVA analysis.

**Table (4.26): The Results of the ANOVA Analysis**

<b>No.</b>	<b>Hypotheses</b>	<b>F</b>	<b>Sig</b>	<b>Result</b>
H1	Green culture of the company affects Environmental Performance positively in Palestinian manufacturing organizations	850.294	*0.000	Supported
H2	Eco-design affects Environmental Performance positively in Palestinian manufacturing organizations	312.871	*0.000	Supported
H3	Waste management affects Environmental Performance positively in Palestinian manufacturing organizations	100.487	*0.000	Supported
H4	Green purchasing affects Environmental Performance positively in Palestinian manufacturing organizations.	85.236	*0.000	Supported
H5	Green manufacturing affects Environmental Performance positively in Palestinian manufacturing organizations	73.758	*0.000	Supported
H6	Reverse logistics affects Environmental Performance positively in Palestinian manufacturing organizations	43.606	*0.000	Supported

#### **4.7 Testing Correlation among the CLSC practices**

To describe the correlations among 6 groups of CLSC practices, the Pearson's correlation test was used. Table 4-26 shows the test results which represent the correlation among six CLSC practices: (1) Green culture of the company, (2) Eco-design, (3) Waste management, (4) Green purchasing (5) Green manufacturing and (6) Reverse logistics.

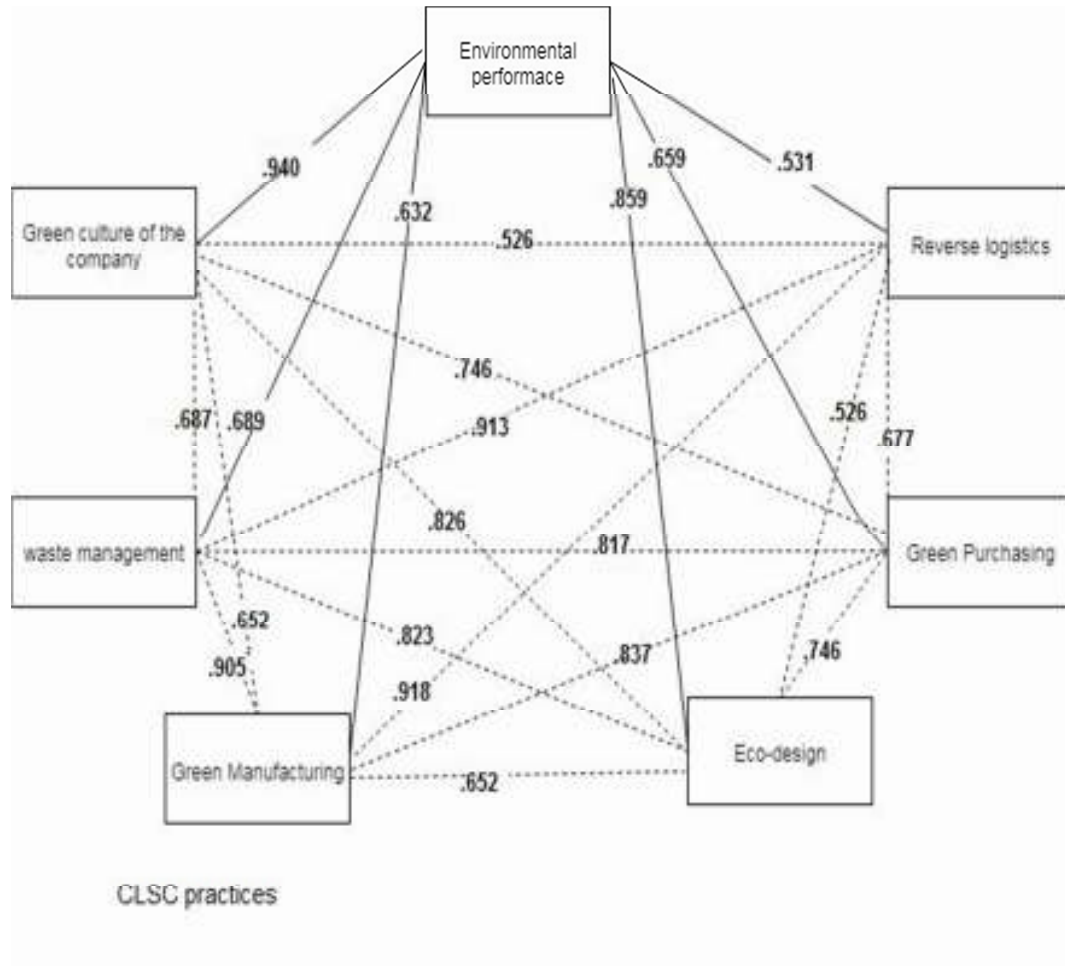
The results of Pearson's correlation coefficient test of the hypotheses show that CLSC green practices have a significant correlation with each other since all of the P-values are below  $\alpha = 0.05$ . These correlations can be described as positively strong since all of the Pearson correlation coefficients is above  $\rho = 0.5$ .



**Table (4.27): Pearson Correlation Matrix between the Study Factors**

		Green culture of the company	Eco- design	Waste management	Green purchasing	Green manufacturing	Reverse logistics
Green culture of the company	Pearson Correlation	1	.826**	.687**	.746**	.652**	.526**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	113	113	113	113	113	113
Eco-design	Pearson Correlation	.826**	1	.823**	.851**	.846**	.720**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	113	113	113	113	113	113
Waste management	Pearson Correlation	.687**	.823**	1	.817**	.905**	.913**
	Sig. (2-tailed)	.000			.000	.000	.000
	N	113	113	113	113	113	113
Green purchasing	Pearson Correlation	.746**	.736**	.817**	1	.837**	.677**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	113	113	113	113	113	113
Green manufacturing	Pearson Correlation	.652**	.851823**	.905**	.837**	1	.918**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	113	113	113	113	113	113
Reverse logistics	Pearson Correlation	.526**	.720**	.913**	.677**	.918**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	113	113	113	113	113	113

**\*\*.** Correlation is significant at the 0.01 level (2-tailed)\*. Correlation is significant at the 0.05 level (2-tailed)



**Figure (4.1): Hypothesis Testing.**

## 4.8 Summary

This chapter has presented the analysis of the qualitative and quantitative data. It has been found that the most prevalent CLSC practice is “Green manufacturing” and “reverse logistics”. In addition, this research has approved the existence of a positive relationship between CLSC and environmental performance. At the end, the top driver was noted as the “governmental pressure”, top barrier “change resistance by the employees” and the most expected advantages was “Achieving competitive advantage”.

## **Chapter Five**

### **Discussion and Model Development**

This chapter presents the discussion of the research results and findings of analysis for the data collected via questionnaire and interviews.

#### **5.1 Discussion**

The ecological issues appearing from manufacturing operations have led to the focus on environmental sustainability in manufacturing, which can be addressed adequately using CLSC (Olugu et al., 2011). The CLSCM companies develop economically and environmentally sustainable industrial systems (Guide et al., 2009). Some studies point out that there is a potentially correlation between CLSC and environmental performance for the company such as Zhu et al. (2008), the organizations concerned achieving environmentally friendly manufacturing, competitive advantage and higher profits via closing the loop of their supply chain.

##### **5.1.1 Discussion of CLSC practices**

This research examined to what extent Palestinian organizations apply green practices in CLSC in their operations. The analysis demonstrates that the preferable practice which increases the awareness toward the environment was "green manufacturing" where the adoption of green manufacturing can produce less waste, fewer resources and energy consumption, little environmental pollution. The literature tends to support

the idea that green manufacturing have positive environmental outcomes which help to increase the environmental performance (Sezen & Çankaya, 2013). Followed by "reverse logistics", which is now becoming a more predominant practice (Icenhour, 2014), as Das (2012) illustrate that there is an increasing interest in RL on the part environmentalists and companies alike. As it has received a great deal of attention in regards to its environmental impact (Abdallah et al., 2012). Besides, it has a huge impact on companies' needs for environmental regulation compliance (Das, 2012). It encompasses a total life-cycle view for products in that it company remanufacturing, recycling, and disposal into the supply chain (Abdallah et al., 2012). The second place applied to "green purchasing", where Zhu and Sarkis (2004) emphasis on the strong link between the green purchasing and the environmental performance. Furthermore, it includes activities aims to make sure that purchased items have desirable environmental attributes such as reusability, recyclability, and absence of hazardous materials (Zhu & Sarkis, 2004).

In the third place, group of "waste management", which makes it possible to know how well the processes are designed for the prevention of waste. Scur and Barbosa (2017) findings demonstrate that the waste management practice is the most used one of the green practices. The fourth place was for "eco-design" group, where this term "eco-design" has been widely used in literature, which is considered a way to minimize the product and process environmental impacts before the manufacturing process is to develop eco-friendly products, it is considered as a proactive

environmental management approach (Scur& Barbosa, 2017). According to Tan (2015), there is a huge pressure on manufacturing companies from customers and government to present eco-design products. But, according to Al Zaabi (2013). SMEs are less focused on Eco-design as it requires additional cost. Finally, the fifth place applied to "green culture of the company", which focuses in top management involvement and support of the environment, and the clarification of information and values of environmental performance throughout the organization. Daily and Huang (2001) emphasized the important role of top management in helping the organization transition to be more smoothly and comprehensively through serving as a champion of change.

### **5.1.2 Discussion of drivers, obstacles, and advantages to implement CLSC**

This section discusses the variables that have been found affecting the implementation of green practices in CLSC either by supporting or preventing. It was questioned what variables could motivate organizations to include green initiatives in SC. The results show that "governmental pressure by imposed regulations on manufacturing companies ", was the top drivers as Rivera and Alex, (2004) illustrates that governmental regulations can be key drivers for companies to implement environmental management practices followed by "the company concerns about environment". And "social responsibility and "economic benefits". On the other hand, the lowest was for the item "society pressure for adopting

friendly environmental practices". As Hervani et al. (2005) argues the pressure to innovate environmental issues come from regulatory pressure, as companies respond in creative ways to environmental regulation by developing strategies to improve their environmental performance.

Interviewees choose society pressure as important motivators; while questionnaires result demonstrate this factor as a lowest one. This result is justified, as most of the questionnaire respondents were managers/production managers more than interviews; managers/production manager have a better idea about the challenges that faces their organization. To implement new strategies you will face obstacles, it was questioned what variables could prevent organizations from implementing green initiatives in SC. The result of the questionnaires show that " change resistance by employee" is the top obstacles; which was consistent with interviews results. The second obstacle was " difficulty of applying CLCS inside the company".

The third obstacle was " top administration low support", followed by "misunderstanding policies and environmental concerns at the company". Furthermore, "high costs of green products due to search and development procedures" as Scur and Barbosa (2017) claimed that it is main obstacles facing companies, and the lowest for the factor" low proficiency among company leadership". Interviewees choose "change resistance" and" difficulty of applying CLCS inside the company" as the main challenges

that faces the organization. The results were in line with the questionnaire results.

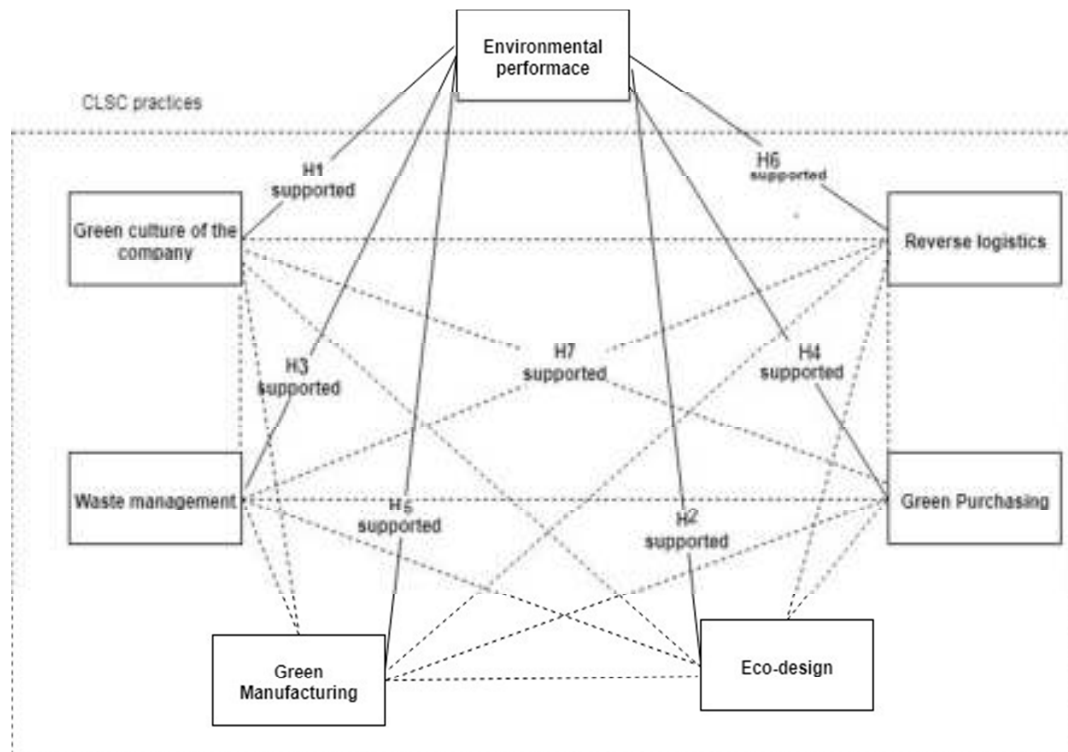
Depending on the literature, there are several advantages of CLSC practices such as achieving competitive advantage, reinforcing social responsibility towards environment, improving company environmental performance and increasing profits and decreasing costs.

### **5.1.3 Hypothesis testing discussion**

The rapid development of manufacturing sector led to the harmful impact on environment, due to the increasing amount of pollutants and hazardous wastes generated, it is recommended that the manufacturers should adopt CLSC practices. Where this adoption will help to improve environmental performance by reducing waste and “green” the production processes to be more environmentally friendly (Tan, 2015). A general hypothesis is based on the assumption that there is a positive relationship between environmental practices and environmental performance (Zhu & Sarkis, 2004; Rao & Holt, 2005; Green et al., 2012).

Based on section 1.4 where all the hypotheses are listed and according to Figure (5-1) H1 to H6 that proposed relationships between 6 CLSC factors (Green culture of the company, Eco-design, Waste management, Green purchasing and Green manufacturing, Reverse logistics) and environmental performance, where the hypothesis are accepted (H1- H7).

Based on the results above, where all the hypotheses according to Figure 5-1, H1 to H6 proposed direct relationships between 6 CLSC factors (Green culture of the company, Eco-design, Waste management, Green purchasing, Green manufacturing and Reverse Logistics) and environmental performance. The 7th hypothesis studied the correlation among 6 CLSC factors to determine how they are interrelated and the relationship between them.



**Figure (5.1): Hypothesis status.**

Based on the results of ANOVA analysis for the hypothesis H1 to H6, the finding analysis approved that there is a statistically significant positive correlation between all of CLSC practices and environmental performance.



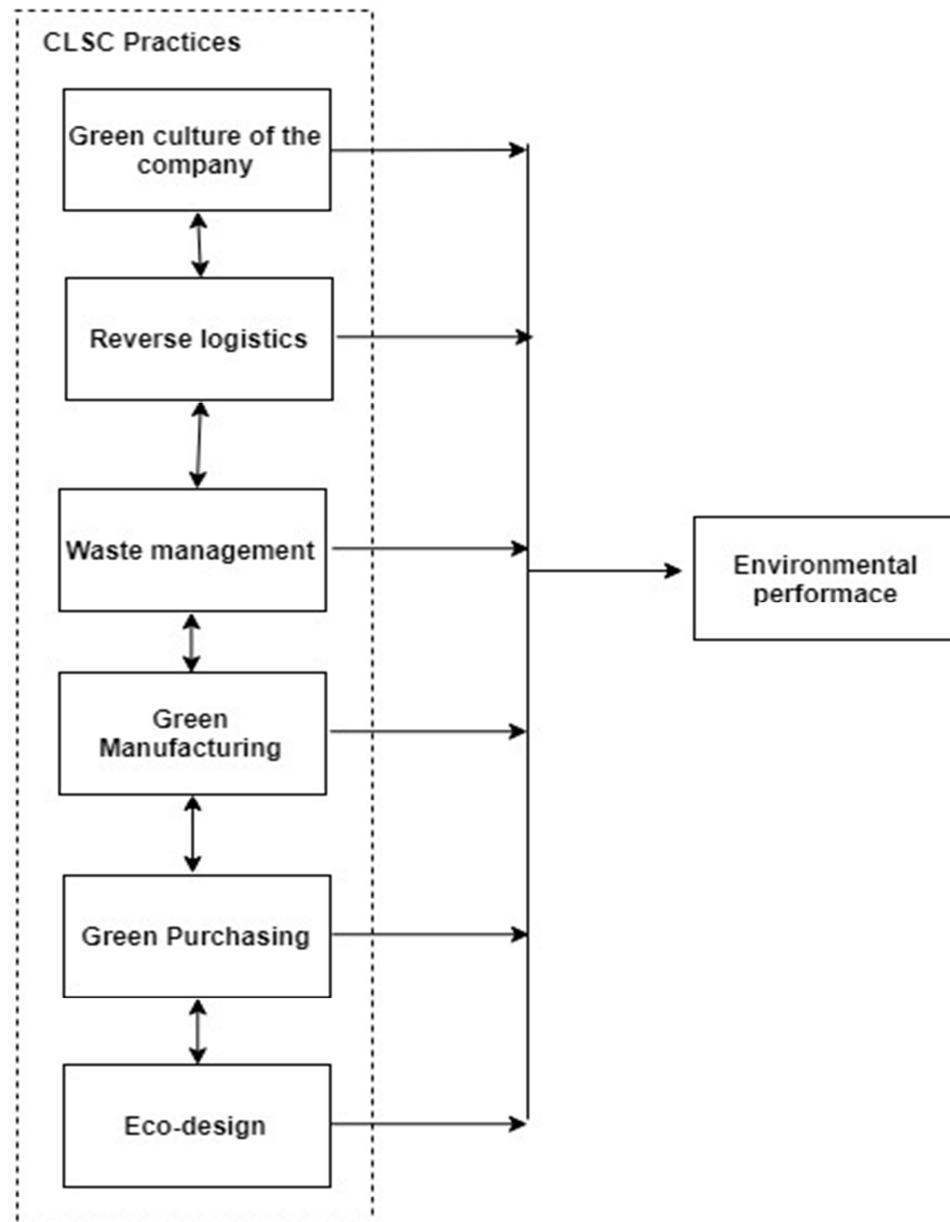
Regarding the 7th hypothesis and considering the result analysis, it has been approved that there is a statistically significant correlation among 6 CLSC factors (Green culture of the company, Eco-design, Waste management, Green purchasing, Green manufacturing and Reverse Logistics). Also, these correlations can be described as positively strong since all of the Pearson correlation coefficients is above  $\rho=0.5$ . Based on this result, managers can understand that focusing on any practices of CLSC practices will help leverage the others which will result in a better environmental performance. Table C-1 illustrates the 7th sub-hypotheses attached in Appendix C. Based on the above, the main research hypothesis is accepted: “CLSC practices have a positive impact on EP in Palestinian manufacturing organizations.”

## **5.2 Model Development**

Due to the fact that manufacturing companies in literature showed as "creator "of environmental problem. They have to do their best to extend its environmental responsibility and work hard to reduce the impacts of waste and pollution throughout the supply chain (Tan, 2015). And as the manufacturing companies benefit from adopting CLSC practices like improvement in company performance, product quality and company reputation; the conceptual model has been developed to be tested in this sector.

It illustrates some CLSC practices for green organizations. The model is intended to be a guide to help managers to apply CLSC in order to

improve the company's environmental performance. As shown in Figure 5-2, the conceptual model includes 6 practices, the first one is “Green culture of the company” followed by “reverse logistics” then "waste management", “green purchasing”, "green manufacturing" and “eco-design”.



**Figure( 5.2): Conceptual Model.**

As the model depicts, "green culture of the company" must first be adopted as a strategic imperative. It is important to guarantee an environmental awareness all over the company, it is important to maintain propitious work atmosphere. Environmental awareness should be spread first in the organization so that each employee become aware of how this concept would change the image of the firm to the better (Alzawawi, 2014). This could be achieved by adding an environment concerns to visions and missions of the companies, increase top management support, interest and commitment toward the environment as well as encouraging top managers to play a guidance role in order to clarify information and values of green practices throughout the organization.

Application of green practices in CLSC is expected to have an impact on environmental performance. "Reverse logistics" will reduce space and time; this is expected to have an impact in reliability and responsiveness, also, "Waste management" solutions will reduce solid wastes and as such affect SCM costs (Angel & Chirchir, 2013).

"Green Manufacturing" will reduce harm environmental impact; as it is a sustainable approach to the design and engineering activities involved in product development and system operation to minimize environmental impact (Deif, 2011). "Green Purchasing" involves a firm assessing the environmental performance of their suppliers that requires the suppliers to undertake measures that ensure environmental quality in their operational systems (Diab et al., 2015). "Eco- design", the design stage is essential to

measure the product's environmental performance, as any changes after this stage can be costly. Zhu et al. (2008) illustrate that the design of products is critical stage as the most effective way to reduce the environmental impact of products through pollution prevention. The main target of eco-designs is to manufacture products, as well as create processes that reduce their impact on the environment (Kim & Chai, 2017). Grote et al. (2007, pp. 4100) state the aim of eco-design as "the reduction of a product's environmental impact without creating a negative trade-off with other design criteria, such as costs and functionality.

## **Chapter Six**

### **Conclusions and Recommendations**

#### **6.1 Chapter overview**

This chapter reviews the research results briefly where the main conclusions are explained. Also, it discusses the contribution of the thesis, and its limitations, suggests recommendations, and includes the suggestions for future studies.

#### **6.2 Conclusions**

Environmental issues have become critical concerns all over the world, so that sustainable development can be achieved by implementing CLSC practices as it is one of the several initiatives taken by manufacturing company. In this research, the main aim is to assess CLSC best practices in Palestinian manufacturing companies which have been done by firstly, exploring to what extent Palestinian manufacturing companies of CLSC practices are using. Secondly, by testing the correlations between CLSC practices and environmental performance, and finding what are the best CLSC practices to enhance environmental performance? The second objective of the research is identifying factors that could affect the implementation of CLSC practices either by supporting or preventing and exploring the expected advantages of CLSC practices from the viewpoint of these companies. This research assumes (6) drivers, (6) obstacles and (4) benefits of CLSC practices. After the analysis,

it has been found that these factors affecting the implementation of CLSC practices. Where the results of the analysis show that:

- The top drivers were “governmental pressure ”, followed closely in order by “the company concerns about environment ”,” social responsibility ”, and "economic benefits". Then “contribution to society” in third place.
- The main obstacles for implementing CLSC practices was “change resistance by the employees ” followed by " difficulty of applying closed loop supply chain inside the company " and "top administration low support". In third place " misunderstanding policies ", and then "low proficiency among company leadership" and " high costs of green products ".
- It has been observed from results that the most expected advantages from the viewpoint of Palestinian manufacturing organizations were "achieving a competitive advantage". Closely followed by "reinforcing social responsibility toward environment", then "improving company environmental performance”. Finally "Increasing profits and decreasing costs".

### **6.3 Research contribution**

This research added a contribution to the literature by assessing and discussing CLSC practices in a developing country context. This study increases awareness on importance of CLSC practices in manufacturing

companies, and also the question arises about how to diffuse these valuable and important CLSC practices among manufacturing companies in the West Bank. This study also associates that CLSC practices with better environmental performance to reduce hazardous wastes, toxic pollutants and material use. Therefore, it may raise the level of green awareness of environmental issue in a firm and thus directly create value to the companies. Moreover, the development of the CLSC research framework would also be a great added benefit to the manufacturers and customers. Research results assist companies in clarifying their strengths and weaknesses to enhance their EP. The core of this study is to investigate the relationship between CLSC main factors and the company environmental performance, which is done by testing a model that represents these relations in the WB manufacturing organizations context. In this study, it points out the positive link between green culture of the company, reverse logistics, eco design and environmental performance. Which is similar to (Daily & Huang 2001; Diabat & Govindan, 2011; Kenneth et al., 2012). Furthermore, this study highlights the main obstacles, drivers, and benefits of CLSC in a developing country context.

#### **6.4 Research Limitations**

There are limitations to this study that should be considered. This study focused on food and pharmaceutical companies in the West Bank only. Also, the study did not include all CLSC practices. The main limitations of this study were lack of cooperation and limitation of time.

The inability to involve Gaza strip or other developing countries was another limitation faced this research inquiry. It would be necessary to replicate this study in other developing to compare the results and find similarities.

## **6.5 Recommendations**

The research introduces the following recommendations to the West Bank manufacturing organizations to improve their environmental performance:

1. Ensure top managers support for CLSC; through clarifying the benefits of CLSC. Top managers should realize the benefits of CLSC and actively participate in its implementation rather than resisting it.
2. Develop an environmental strategy to make tangible improvements, organizations have to include environmental thinking deep into business strategy such as clarifying environmental issues into vision & mission, including environment in long and short term goals, and apply internal and external audit for environmental work.
3. Management commitment in terms of leadership, financial, and resources supports are vital to any initiatives where extra efforts, such as managing returns, are needed. Also, some findings indicated that decentralization is a better approach for more efficient and effective CLSC practices. Therefore a strong leadership in each chain is important. A study on the CLSC system behavior under the



effect of certain leadership style and organization is desirable for better understanding in the CLSC orientation.

4. Performance & assessment on CLSC with remanufacturing is noticeably growing even though is still in its infancy stage. There have been numerous studies claimed that CLSC enhances profitability and reduces environmental impacts, therefore it is necessary to build constructs, framework, models and tools for CLSC performance assessment or measurement. Key indicator of its performance could be related to economical or environmental benefits, or both. Profitability and efficiency should be among economic indicators, while eco-footprint and life-cycle assessment could be the measurement tools for environmental benefits. It is a widely open research opportunities to explore.
5. Raising awareness of importance and role of green practices in CLSC: Many firms have no awareness of the necessity to adopt CLSC. Therefore, efforts are needed to raise the level of green practices awareness among firms in Palestine.
6. Education and Training for Environmental Management involves designing educational programs for sustainability. Education programs involve; product design, waste management, and pollution control. Such programs can help in raising skills and capabilities related to the implementation of environmental initiatives.

7. Designing of appropriate regulations: There is a general lack of appropriate regulations by government as well as business organizations. Most regulations encourage waste minimization but not higher levels of environmental management such as design for environment and green supply chains.

## **6.6 Future Work**

It was found from the literature, that the previous studies in CLSC mainly focusing on many issues like network design, planning and optimization .Others looked at strategic alliance, implications and benefits relating to a CLSC. However, studies which dealt with performance measures, areas and metrics are not available. Also, they considered the traditional supply chain measures which are measures used in the assessment of the performance of a traditional supply chain in the absence of environmental consideration (Olugu et al., 2010). The future studies could conduct the same study in different countries, different industries. Also, they can enhance the model of this study by considering other factors. Furthermore, another interesting aspect for future studies would be how far the results of the study would be different in countries with a different industry structure. Many researches are needed to investigate the relations between the CLSC practices and the environmental performance. Future researches need to improve the used scales by adding or modifying items continuously, based on the feedback that has been gained from experts and from testing the scales in various samples. CLSC open up a

new and interesting set of issues to be addressed by industrial practices. As there a potential meaningful academic research that takes into account the interdisciplinary nature of the problems and the need to develop models and frameworks that take an integrated business process perspective.

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## Appendices

### Appendix A



تقييم مستوى تطبيق ممارسات سلال الإمداد المغلقة

عزيزي/عزيزتي الموظف/ة:

بعد التحية ، أتقدم بجزيل الشكر للمساهمة بجزء من وقتكم وجهدكم لتعبئة هذا الاستبيان، حيث يهدف الى تقييم مستوى تطبيق الممارسات الخضراء في سلاسل الامداد المغلقة في الشركات الصناعية في الضفة الغربية ، استكمالاً لمتطلبات الحصول على درجة الماجستير ، حيث تعرف سلاسل الإمداد المغلقة بأنها مجموعة الأنشطة اللوجستية التي تقوم بها الشركة بدءاً من المواد الخام حتى وصول المنتج الى المستهلك وعودة المنتج مرة أخرى إلى الشركة المصنعة كمرتجعات . وتعرف الأنشطة التي تنفذ لعودة المنتج من المستهلك الى الشركة باللوجستيات العكسية .

وحيث نؤمن أنكم خير مصدر للوصول إلى المعلومات المطلوبة ، نتوجه إليكم وكلنا أمل أن نجد التعاون من قبلكم ، وذلك من خلال الاجابة على أسئلة الاستبيان والتي نتعهد لكم بالمحافظة على عدم إظهار هوية المجيب عنها وعدم استخدامها في أي مجال غير مجال البحث العلمي .

ولكم جزيل الشكر

الباحثة : ميساء زهد

جامعة النجاح الوطنية – ماجستير ادارة هندسية .

الجزء الاول: معلومات عامة

- 1- الجنس : ☐ ذكر ☐ أنثى
- 2- العمر : ☐ اقل من 25 سنة ☐ 25-35 سنة ☐ 35-45 سنة ☐ 45-54 ☐ 55 فأكثر
- 3- المستوى التعليمي : ☐ ثانوي أو اقل ☐ دبلوم ☐ بكالوريوس ☐ ماجستير ☐ دكتوراة
- 4- ما هو المسمى الوظيفي ؟ ☐ مدير عام ☐ رئيس قسم ☐ مدير الانتاج ☐ موظف ☐ غير ذلك ..
- ما عدد سنوات الخبرة ؟ ☐ اقل من 5 سنة ☐ 5-9 سنة ☐ 10-14 سنة ☐ 15-19 سنة ☐ 20 فأكثر

بيانات الشركة

- 5- تعمل الشركة في قطاع : ☐ الادوية ☐ الأغذية
- 6- ما عدد موظفي الشركة :
- ☐ اقل من 50 ☐ 50-100 ☐ 100-150 ☐ 150-200 ☐ اكثر من 200
- 7- ما عدد منتجات الشركة :
- ☐ اقل من 5 ☐ 5-10 ☐ 10-15 ☐ 15-20 ☐ اكثر من 20
- 8- الشركة حاصلة على شهادة جودة في المعايير الدولية:.
- ☐ نعم ☐ لا ☐ قيد الحصول ☐ لدينا شهادات اخرى ☐ لا أعلم
- 9- هل يتم فحص المواد الاولية لمعرفة مدى موافقتها للمواصفات .
- ☐ نعم ☐ لا ☐ احيانا ☐ لا أعلم

الجزء الثاني : من وجهة نظرك ,الى أي درجة يتم تطبيق ممارسات سلاسل الامداد المغلقة في الشركة.

### 11. ثقافة الشركة الخضراء .

الفقرة	درجة كبيرة جدا	درجة كبيرة	درجة متوسطة	درجة قليلة	درجة قليلة جدا
1. توضح ادارة الشركة المعلومات المتعلقة بالممارسات الخضراء لكافة الاقسام					
2. تقر الشركة نظام العقوبات والغرامات جراء الاخلال بالممارسات اللوجستية الخضراء					
3. تخصص الشركة جزءا من ميزانيتها لدعم النشاطات اللوجستية الخضراء					
4. تشمل رسالة الشركة الاهتمام البيئي					

### 12. اعادة تصميم المنتج والتغليف

الفقرة	درجة كبيرة جدا	درجة كبيرة	درجة متوسطة	درجة قليلة	درجة قليلة جدا
1. يتم تصميم اغلفة المنتجات بحيث تكون امنة					
2. يتم مواكبة تكنولوجيا الانتاج لمفهوم الالتزام البيئي					
3. يتم تغليف المنتجات بمواد صديقة للبيئة وقابلة للتدوير					
4. الشركة قادرة على تطوير منتجاتها صديقة البيئة لكي تناسب رغبات المستهلكين المتجددة دون ضرر بيئي					
5. تسعى الشركة لاستخدام مواد اولية في العملية الانتاجية غير مضره للبيئة					
6. تهتم الشركة بالبحث والتطوير للتحسين المستمر لمنتجاتها لجعلها اقل ضرر للبيئة					

## 13. ادارة النفايات

الفقرة	درجة كبيرة جدا	درجة كبيرة	درجة متوسطة	درجة قليلة	درجة قليلة جدا
1. يتوفر للشركة امكانيات للتخلص من النفايات الصناعية بطريقة امنة					
2. تطبق الشركة اساليب حديثة في تصميم المنتجات تقلل من مخلفاتها					
3. تستخدم الشركة طاقة نظيفة من اجل الحفاظ على البيئة.					
4. تحرص الشركة على استخدام التكنولوجيا الحديثة لتقليل الاثر السلبي على البيئة.					

## 14. الشراء الأخضر

الفقرة	درجة كبيرة جدا	درجة كبيرة	درجة متوسطة	درجة قليلة	درجة قليلة جدا
1. تهتم الشركة بشراء المواد الاقل ضررا للبيئة.					
2. تحرص الشركة على معايير بيئية في تقييم المزودين.					
3. تهتم الشركة بامتلاك المزودين لشهادة ISO14001					

## 15. التصنيع الأخضر

إلى أي درجة تحرص الشركة على تبني ممارسات التصنيع الأخضر ؟

الفقرة	درجة كبيرة جدا	درجة كبيرة	درجة متوسطة	درجة قليلة	درجة قليلة جدا
1. تهتم الشركة على انتاج المنتجات التي تحتوي على مكونات يمكن اعادة تدويرها					
2. تهتم الشركة على مراقبة الطاقة المستهلكة أثناء عمليات الإنتاج					
3. تطبق الشركة آليات لتقليل استخدام المواد في التعبئة والتغليف					
4. تستبدل الشركة المواد الخطرة بمواد صديقة للبيئة					
5. تستخدم الشركة تقييم دورة حياة المنتج لتقييم الأداء البيئي					



**16. اللوجستيات العكسية Reverse Logistics**

الفقرة	درجة كبيرة جدا	درجة كبيرة	درجة متوسطة	درجة قليلة	درجة قليلة جدا
1. استخدام اللوجستيات العكسية يقلل من استهلاك المواد.					
2. تهتم الشركة باستعادة المنتجات المرتجعة من السوق لإعادة استخدامها او التخلص منها بالشكل الأمن .					
3. تهتم الشركة باعادة استخدام/تصنيع المواد قدر الامكان					
4. تحرص الشركة على الاستخدام الأمثل للمنتج من قبل المستهلك					

**17. دوافع ممارسة سلاسل الامداد المغلقة CLSC**

الى أي مدى تشجع وتحفز الدوافع الاتية على تطبيق سلاسل الامداد المغلقة في نظام الشركة

الفقرة	درجة كبيرة جدا	درجة كبيرة	درجة متوسطة	درجة قليلة	درجة قليلة جدا
1. ضغط المجتمع على الشركة لتبني ممارسات صديقة للبيئة					
2. اهتمام الشركة بالبيئة					
3. الفوائد الاقتصادية مثل تقليل تكاليف الانتاج					
4. ضغط الحكومة عن طريق القوانين المفروضة للعمل في الشركات الصناعية					
5. الميزة التنافسية					
6. المسؤولية الاجتماعية					

## 18. المعوقات التي تحد من تطبيق سلاسل الامداد المغلقة

الى اي مدى تمنع أو تحد هذه العوامل من تطبيق سلاسل الامداد المغلقة في الشركة؟

الفقرة	درجة كبيرة جدا	درجة كبيرة	درجة متوسطة	درجة قليلة	درجة قليلة جدا
1. عدم فهم السياسات والاهتمامات البيئية في الشركة					
2. قلة دعم الادارة العليا					
3. مقاومة التغيير من قبل الموظفين					
4. قلة كفاءة كوادر الشركة					
5. صعوبة تطبيق سلاسل الامداد المغلقة في الشركة					
6. تكاليف المنتجات الخضراء تكون مرتفعه نتيجة عمليات البحث والتطوير					

## 19. الفوائد والآثار المترتبة على تطبيق سلاسل الامداد المغلقة .

الى اي مدى هذه الفوائد مرتبطة بتطبيق سلاسل الامداد المغلقة ؟

الفقرة	درجة كبيرة جدا	درجة كبيرة	درجة متوسطة	درجة قليلة	درجة قليلة جدا
1. الحصول على ميزة تنافسية					
2. تعزيز المسؤولية الاجتماعية تجاه البيئة					
3. تحسين اداء الشركة بيئيا					
4. زيادة الربح وخفض التكاليف					

## 20. الاداء البيئي للشركة:

الى أي مدى تحسن اداء الشركة بعد التزامها بممارسات سلاسل الامداد المغلقة

الفقرة	درجة كبيرة جدا	درجة كبيرة	درجة متوسطة	درجة قليلة	درجة قليلة جدا
1. تحسن في سمعة الشركة					
2. تحسن في جودة المنتج					
3. تقليل الفاقد وإعادة تدوير المواد أثناء عملية الانتاج					
4. تطوير المنتجات صديقة للبيئة					
5. تحسن أداء الشركة وانخفضت التكاليف					

مع الشكر



## **Questionnaire of**

### **Assessing Green Practices in CLOSED LOOP SUPPLY CHAIN in manufacturing Palestinian organizations in West Bank**

**Dear Sir/Mrs**

The researcher aims in this questionnaire to assess green practices in closed loop supply chain (CLSC) and then introduce a framework which can help the manufacturing companies to develop their services and their competitive advantage. Closed Loop Supply Chain can be defined as the activities start from raw material until the products reached to the end customer and then returned to the company. Green Logistics defined as a form of a logistics but it concern with environmental issues for example, GL could be using alternative source of energy, using the recycled material, reducing waste and safe disposal.

We believe that you are the best source to get the clear picture about the system in your company and to obtain the required information which serves our community. We all hope to find cooperation from you through answering the question contained in this survey.

**Best regards**

**Researcher: Maisa Zuhd**

**Part One: Personal information**

Gender: ☐ Male ☐ Female

Age: ☐ less than 25 years ☐ 25-35 years ☐ 35-45 years  
☐ 45-55 years ☐ more than 55

Academic :

Qualification: ☐ High school or ☐ Diploma ☐ Bachelor  
☐ Less ☐ Master ☐ PhD

Job Title: ☐ Manager ☐ Production manager ☐ Head of Department  
☐ Employee ☐ Other

Experience: ☐ less than 5 years ☐ 5-10 years ☐ 10-15 years  
☐ 15-20 years ☐ more than 20

**Company's Information:**

Your organization sector: ☐ Pharmaceutical industry ☐ Food industry

Number of Employees: ☐ Less than 50 ☐ 50-100 ☐ 100-150  
☐ 150-200 ☐ More than 200

No. of Products: ☐ Less than 5 ☐ 5-10 ☐ 10-15 ☐ 15-20 ☐ More than 20

The company holds a certificate of quality (ISO 14001): ☐ Yes ☐ No  
☐ In progress ☐ We have another one ☐ I don't know

We made tests on raw material to verify the required specification:

☐ Yes ☐ No ☐ sometimes ☐ Idont Know

## **Part Two: Closed loop supply chain practices:**

**Section one: For each item chooses to what extent your organization uses the following methods:**

Closed loop supply chain practices	Level				
	1	2	3	4	5
	Not at all	To a slight degree	To a moderate extent	To a great extent	To a very great extent
<b>Green organizational culture</b>					
1. Company administration clarifies information relevant to green practices for all divisions.					
2. The company has penalty and fines system for violating green logistic practices.					
3. The company has budget for supporting green logistic activities					
4. The company vision includes environmental concerns					
<b>Eco-design</b>					
1. The products cover is designed from environmental friendly material.					
2. Technology of production of environmental commitment is considered					
3. Product wrapping is done by recycled and environmentally friendly materials					
4. The company is able to develop environmental friend products in order to meet the customers' needs without any environment harm					
5. The company seeks to use raw materials with no environmental harm					
6. The company always strives for continuous improvement of its products with less environmental harm					
<b>Waste Management</b>					
1. The company has the ability to get rid of manufacturing wastes in safe ways					
2. The company practices new methods of designing products with less wastes					
3. Clean energy is used in order to save environment					
4. Modern technology which decreases the negative effects on the environment is used					
<b>Green Purchasing</b>					
1. The company purchases substances with less environmental harm					
2. The company adopts applying environmental criteria with suppliers					
3. The company concerns about suppliers ISO 14001 Certificate.					

<b>Green manufacturing</b>					
1.The company concerns about manufacturing products which could be recycled					
2.The company concerns about consumed power during the production process					
3.The company applies mechanisms decreasing using substances in filling and wrapping					
4.Dangerous substances are replaced with environmentally friend ones					
5.Product life- cycle evaluation is used to evaluate the environmental performances					
<b>Reverse logistics</b>					
1.Using reverse logistics decreases material consumption					
2.The company concerns about the returned products from the markets in order to recycling or safe getting rid of					
3. The company concerns about reusing/remanufacturing the substances as possible as it could.					
4.The company concerns about the perfect use of the product by the consumer					

## **Section two: Drivers for closed loop supply chain**

<b>Drivers for closed loop supply chain</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>To what extent do you agree that the following drivers encourage the organization to implement CLSC?</b>	<b>Strongly Disagree</b>	<b>disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
1.Society pressure for adopting friendly environmental practices					
2.The company concerns about environment					
3.Economical benefits such as decreasing cost of production					
4.Governmental pressure by imposed regulations on manufacturing companies					
5.Competitive advantages					
6.Social responsibility					
<b>Obstacles of applying closed loop supply chain</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>From your point of view, to what extent do you agree that the following obstacles limit the organization to implement CLSC?</b>	<b>Strongly Disagree</b>	<b>disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
1.Misunderstanding policies and environmental concerns at the company					
2.top administration low support					
3.Change resistance by the employees					
4.Lwo proficiency among company leadership					
5.Difficulty of applying closed loop supply chain inside the company					
6.High costs of green products due to search and development procedures					
<b>Advantages of applying closed loop supply chain</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>From your point of view, to what extent do you agree that your organization gain from implementing closed loop supply chain practices?</b>	<b>Strongly Disagree</b>	<b>disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
1. Achieving competitive advantage					
2. Reinforcing social responsibility towards environment					
3. Improving company environmental performance					
4. Increasing profits and decreasing costs					

**Section three:** To assess environmental performance in Palestinian manufacturing companies. For each item choose please evaluate how commitment to environmental sustainability has allowed the company to date, to obtain the following results. Please for each item mark in the scale of (1 to 5).

Environmental performance	1	2	3	4	5
To what extent did your company's environmental performance has developed after commitment to environment	<b>Much worse</b>	<b>Somewhat worse</b>	<b>Stayed the same</b>	<b>Somewhat better</b>	<b>Much better</b>
1. improvement in Company reputation					
2. Improvement in Product quality					
3. Decreasing loose and substances recycling during the production procedure					
4. Improving friendly environmental products					
5. improvement in Company performance and cost is decreased					

**Thank you**



## Appendix B

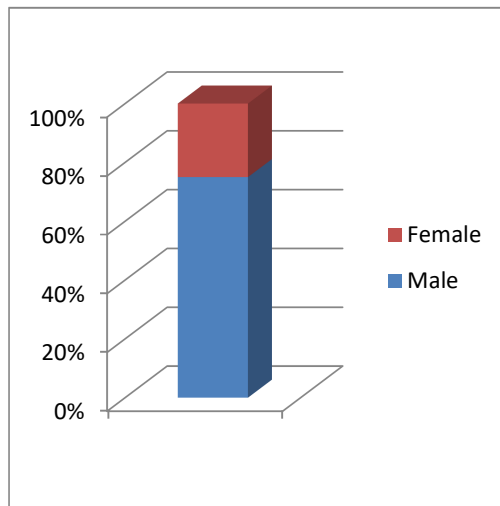


Figure B-1: The Gender Distribution

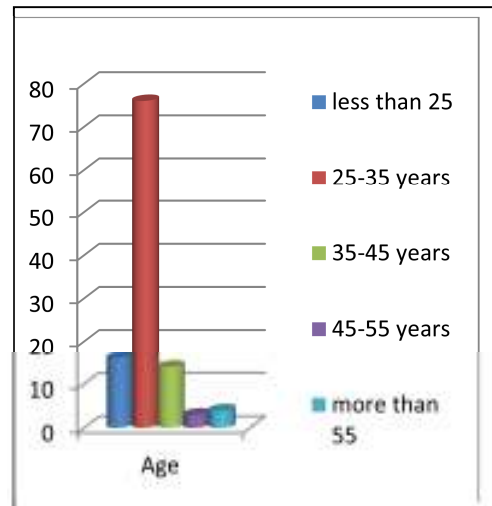


Figure B-2: The Age Distribution

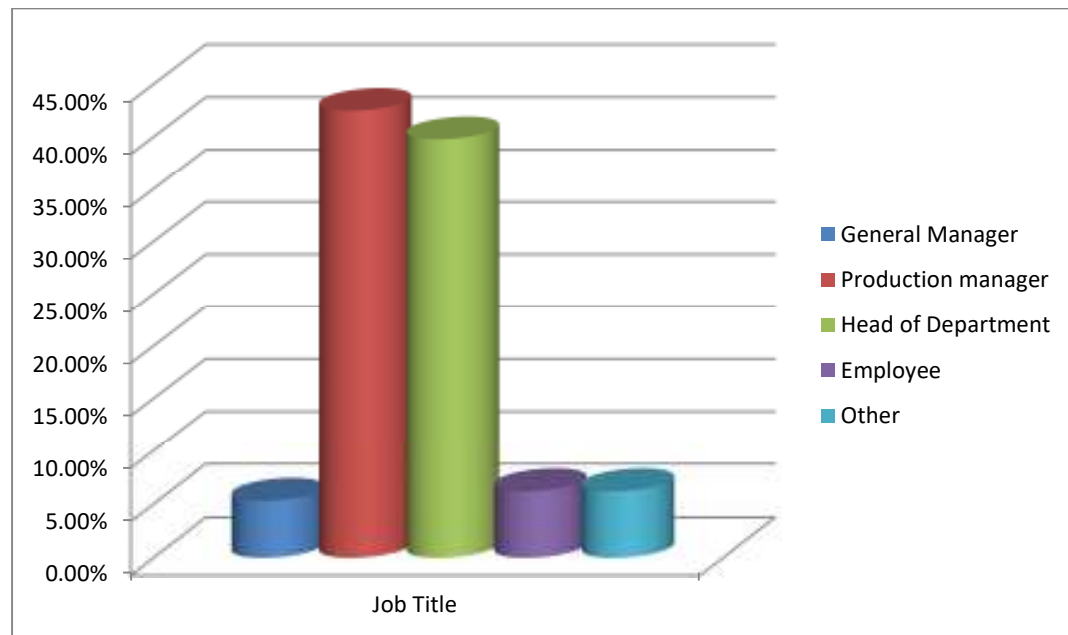


Figure B-3: The Job Title Distribution

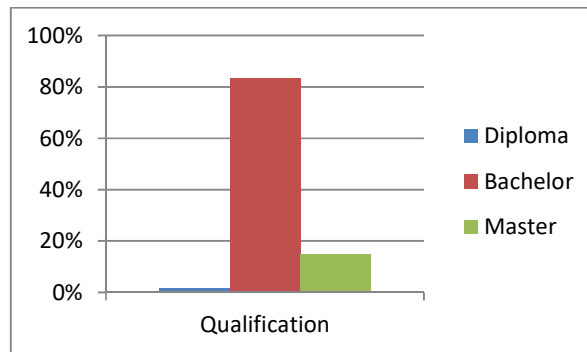
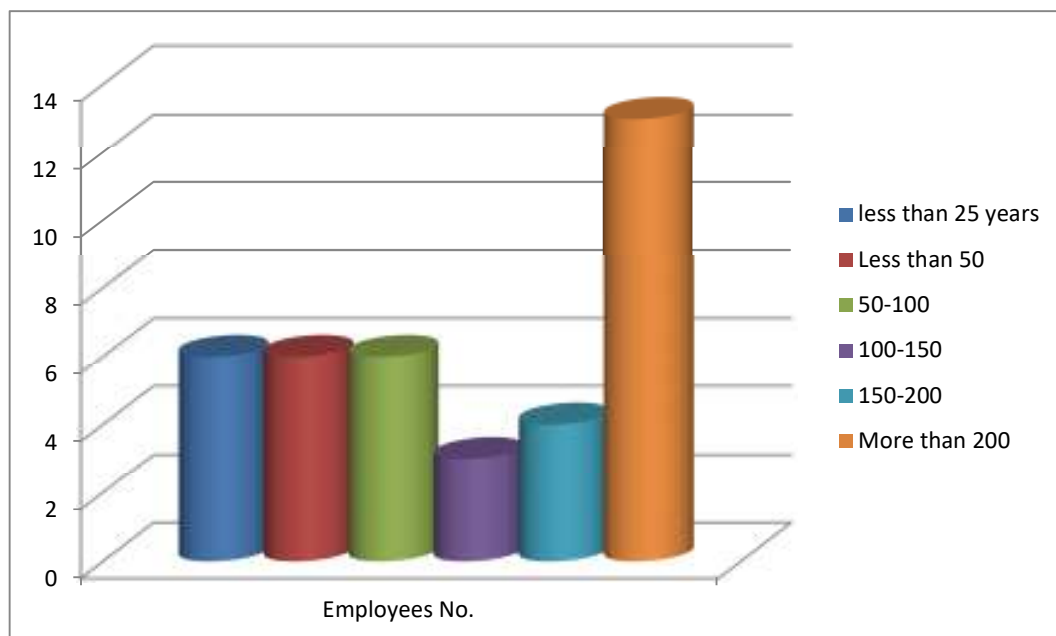
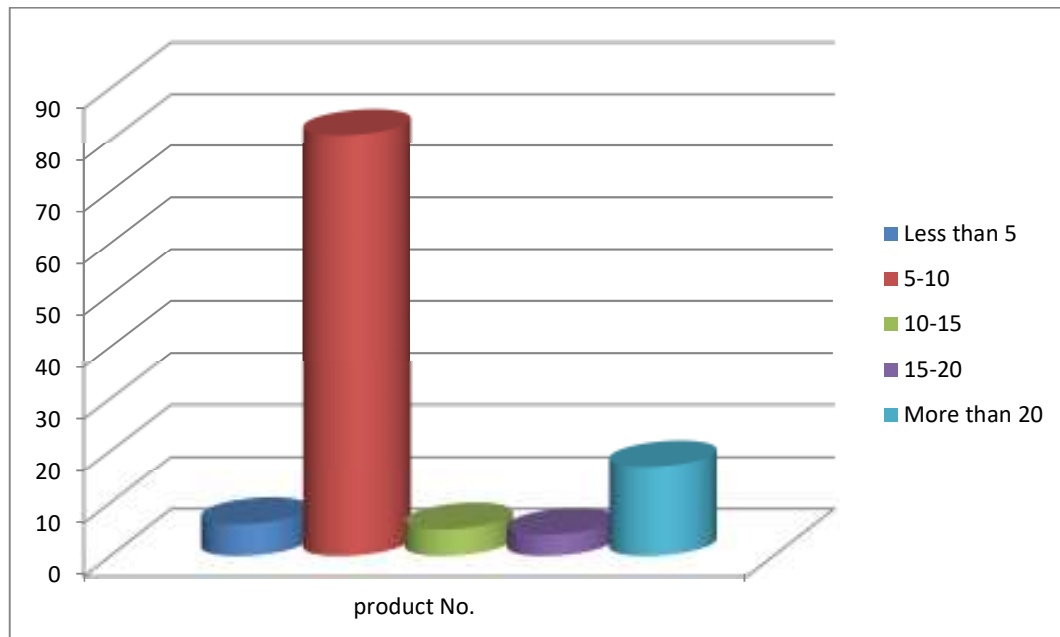


Figure B-4: The qualification level Distribution





## Appendix (C)

Table (C-1): Sub hypotheses obtained from H7.

	GC	RL	ECO	WM	GP	GM
GC		H <sub>127</sub> : RL affects GC positively in PMC	H <sub>137</sub> : ECO affects GC positively in PMC	H <sub>147</sub> : WM affects GC positively in PMC	H <sub>157</sub> : GP affects GC positively in PMC	H <sub>167</sub> : GM affects GC positively in PMC
RL	H <sub>217</sub> : GC affects RL positively in PMC		H <sub>237</sub> : ECO affects RL positively in PMC	H <sub>247</sub> : WM affects RL positively in PMC	H <sub>257</sub> : GP affects RL positively in PMC	H <sub>267</sub> : GM affects RL positively in PMC
ECO	H <sub>317</sub> : GC affects ECO positively in PMC	H <sub>327</sub> : RL affects ECO positively in PMC		H <sub>347</sub> : WM affects GC positively in PMC	H <sub>357</sub> : GP affects ECO positively in PMC	H <sub>367</sub> : GM affects ECO positively in PMC
WM	H <sub>417</sub> : GC affects WM positively in PMC	H <sub>427</sub> : RL affects WM positively in PMC	H <sub>437</sub> : ECO affects WM positively in PMC		H <sub>457</sub> : GP affects WM positively in PMC	H <sub>467</sub> : GM affects WM positively in PMC
GP	H <sub>517</sub> : GC affects GP positively in PMC	H <sub>527</sub> : RL affects GP positively in PMC	H <sub>537</sub> : ECO affects GP positively in PMC	H <sub>547</sub> : WM affects GP positively in PMC		H <sub>567</sub> : GM affects GP positively in PMC
GM	H <sub>617</sub> : GC affects GM positively in PMC	H <sub>627</sub> : RL affects GM positively in PMC	H <sub>637</sub> : ECO affects GM positively in PMC	H <sub>647</sub> : WM affects GM positively in PMC	H <sub>657</sub> : GP affects GM positively in PMC	

The filled cells represent the supported Hypotheses.

## Appendix (D)

Table (D-1): Characteristics of the companies and role of the interviewee:

No.	Company sector	Company	Interviewee Job role	Experience (years)
1	Pharmaceutical	Company A	Quality assurance	13
2		Company B	Environmental manager	7
3		Company C	Production manager	9
4	Food	Company D	Chief executive	12
5		Company E	Environmental manager	6
6		Company F	Environmental manager	4
7		Company G	Quality assurance	7
8		Company H	Production manager	8
9		Company I	Production manager	11
10		Company J	Production manager	9

جامعة النجاح الوطنية

كلية الدراسات العليا

## تقييم الممارسات الخضراء لسلاسل الامداد المغلقة في الضفة الغربية

إعداد

ميساء طلعت زهد

إشراف

د. محمد عثمان

قدمت هذه الأطروحة استكمالاً لمتطلبات الحصول على درجة الماجستير في إدارة  
هندسية بكلية الدراسات العليا، جامعة النجاح الوطنية، نابلس، فلسطين.

2018

ب

تقييم الممارسات الخضراء لسلاسل

الإمداد المغلقة في الضفة الغربية

إعداد

ميساء طلعت زهد

إشراف

د. محمد عثمان

الملخص

في السنوات الأخيرة، أصبحت القضايا البيئية من القضايا الحاسمة في جميع أنحاء العالم، ومع تزايد الضغوطات التي تتعرض لها الشركات المصنعة من أجل استحداث ممارسات مسؤولة بيئياً ومراعية للبيئة. وبذلك بدأت الشركات تعطي أهمية كبيرة لمعالجة قضايا التلوث البيئي ضمن سلاسل الإمداد عن طريق تبني الممارسات والمنتجات صديقة البيئة، ومن أهم الممارسات التي تعتبر نهجا قويا لتمييز الشركات عن منافسيها ولتعزيز الأداء البيئي الممارسات الخضراء لسلاسل الإمداد المغلقة. تهدف هذه الدراسة إلى استكشاف وتقييم مدى تنفيذ الممارسات الخضراء لسلاسل الإمداد المغلقة في الشركات الصناعية الفلسطينية في قطاعين (الصناعات الغذائية والدوائية) في الضفة الغربية. لتحقيق ذلك تم استخدام البحث الاستكشافي باستخدام الاستبيانات و المقابلات. ويناقش هذا البحث الاتجاهات الحالية من الممارسات الخضراء في هذه الشركات بناء على نتائج 10 مقابلة والاستبيانات المقدمة من 113 شركة. ونتيجة لهذا البحث يشير إلى أن التنفيذ الإجمالي لهذه الممارسات يبلغ 58.2 في المائة، وهو ما يعتبر مستوى متوسط. وقد تبين أن الممارسة المفضلة تجاه البيئة هي "التصنيع الأخضر واللوجستيات العكسية". ومن ناحية أخرى، كانت الممارسة الأقل استخداما هي "الثقافة الخضراء للشركة". وعلاوة على ذلك، تبين نتائج اختبار الفرضيات وجود علاقة ذات دلالة إحصائية بين الممارسات الخضراء لسلاسل الإمداد المغلقة وأداء الشركة البيئي. وتقدم هذه الدراسة أيضا نموذجا يمثل أفضل ممارسات سلاسل الإمداد المغلقة والأداء البيئي وبالإضافة إلى ذلك تحدد هذه الدراسة أيضا المتغيرات التي يمكن أن تؤثر على تنفيذ ممارسات سلاسل الإمداد المغلقة بدعمها أو منعها من وجهة نظر الشركات المستهدفة. وبيّنت هذه الدراسة بعض مزايا تنفيذ

ج

الممارسات من وجهه نظرهم. أظهرت نتائج التحليل الوصفي أن المحرك الرئيسي لتطبيق سلاسل الإمداد المغلقة هو "ضغط الحكومة"، أما الحاجز الرئيسي لتطبيق سلاسل الإمداد المغلقة هو "مقاومة الموظفين للتغيير" بينما كانت الفائدة الرئيسية " تعزيز الميزة التنافسية".

وأخيرا، من المتوقع أن توفر نتائج هذا البحث معلومات مفيدة للاتجاهات البحثية في المستقبل.



