

**THE IMPACT OF ADOPTING SUSTAINABLE SUPPLY CHAIN MANAGEMENT
PRACTICES ON THE PERFORMANCE OF PUBLIC SECTOR ORGANISATIONS IN
ZAMBIA: A CASE STUDY OF ZAMBIA AIR FORCE (ZAF)**

BY

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A Dissertation Submitted to the University of Zambia in Partial Fulfilment of the Requirements
for the Award of Master of Business Administration in Management Strategy

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LUSAKA

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DECLARATION

I, **Namaipo Nambela**, do hereby declare that this research Project is my original work and has not, wholly or in part, been presented for an award of a diploma or degree in any other University.

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APPROVAL

This dissertation by **Namaipo Nambela** approved as a fulfillment of the requirements for the award of the degree of Master of Business Administration in Management Strategy

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ABSTRACT

Sustainable Supply Chain Management involves integrating environmentally and financially viable practices such as recycling, refurbishing, waste management etc. into the complete supply chain lifecycle, from product design and development, to material selection, (including raw material extraction or agricultural production), manufacturing, packaging, transportation, warehousing, distribution, consumption, return and disposal.

Zambia Air Force through the procurement department procures a wide range of equipment which include aircrafts, aircraft spares and other technical equipment through the supply chain but there is no form of disposal for this equipment when they reach their end of life. Currently the aircrafts and spares that have reached their end of life are just parked and spares are kept in the storage rooms once the end of life is reached. Therefore, the problem has to do with lack of recycling or reuse of these spares which creates a breeding ground for environmental pollution and the focus of this study is to independently assess the impact of adopting sustainable supply chain management practices on the performance of public sector organisations in Zambia, with particular case study of Zambia Air Force (ZAF). This study adopted a descriptive (qualitative) survey design to assess the impact of adopting sustainable Supply Chain Management practices on the performance of public sector organisations. The findings of the study showed that sustainable supply chain management is achievable in ZAF. The study concluded that leadership is a significant factor in Sustainable supply chain management practices being implemented by public sector organisations, and if senior managers are supportive of sustainability and incorporate Sustainable supply chain management practices into planning, strategies and goal setting, then the purchasing team will implement Sustainable supply chain management practices. The study recommended that Zambia Air Force should make use of identified main drivers of adopting sustainable supply chain management practices, continuously improve sustainable supply chain management practices and should endeavor to overcome the challenges of implementing sustainability in its supply chains.

KEY WORDS: *Sustainability, Performance, Practices and Supply Chain Management*

DEDICATION

This work is dedicated to my family especially to my parents; Peggy and Moses Sinkala for the strong foundation they have given me. For being the greatest source of inspiration, I owe you my success Mum and Dad.

It is also dedicated to my husband Matthew and the entire family. I sincerely thank all of you for your continuous love and support.

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LIST OF ABBREVIATIONS

CIPS	Chartered Institute of Procurement and Supply
CSCMP	Council of Supply Chain Professionals
CSV	Creating Social Value
GSCM	Green Supply Chain Management
SC	Supply Chain
SCM	Supply Chain Management
SPSS	Statistical Package for Social Sciences
SSC	Sustainable Supply Chain
SSCF	Sustainable Supply Chain Foundation
SSCM	Sustainable Supply Chain Management
SSCP	Sustainable Supply Chain Practices
UK	United Kingdom
UN	United Nations
UNESCO	United Nations Economic and Social Council
UNGC	United Nations Global Compact
UNGCA	United Nations Global Compact Accenture

CHAPTER ONE

INTRODUCTION AND BACKGROUND

1.1 Introduction

This chapter contains the background of the study, statement of the problem, objectives of the study, research questions, and significance of the study and scope of the study.

1.2 Background of the Study

Many organisations globally are striving to procure products and services that are less harmful to local and global environments. Both public and private sector organisations are implementing supply chain management (SCM) practices that include environmental (and social) consideration otherwise known as sustainable supply chain management (SSCM). These activities are part of a broader movement toward more sustainable forms of production, consumption and waste disposal. Thus, ‘sustainability’ is the ability of an activity to be maintained at a similar level into the future: taking a longer-term view when making decisions, to ensure that meeting our own needs does not compromise the needs of others both today and for future generations’ (BSI Sustainable Procurement Guide, BIP 2203). Sustainable development meets the needs of people today without compromising the ability of people in the future to meet their needs (CIPS, 2014). Sustainability integrates social, environmental, and economic systems.

Organisations are extending their commitment to responsible business practices to their value chains. They do so not only because of the inherent social and environmental risks and because of the governance challenges the supply chain poses, but also because of the many rewards supply chain sustainability can deliver. Indeed, sustainable supply chain management can be a strong driver of value and success – for business as much as for society. By spreading good business practices around the globe, it has enormous potential to contribute to markets that are more inclusive and advance sustainable development in the spirit of public sector organisation’s mission.

Eco-efficiency and remanufacturing processes are now important assets to achieve best practice (Srivastava, 2007). Global market demands and governmental pressures are pushing businesses to become more sustainable (Guide and Srivastava, 1998) even claim that ‘increasing

government regulation and stronger public mandates for environmental accountability have brought these issues into the executive suites, and onto strategic planning agendas.’

New and Payne (1995) describe supply chain management as the chain linking each element of the manufacturing and supply process from raw materials through to the end user, encompassing several organisational boundaries. According to the definition, supply chain management encompasses the entire value chain and addresses materials and supply management from the extraction of raw materials to its end of useful life. Baatz (1995) further expands supply chain management to include recycling or re-use.

According to Srivastava (2007), Sustainable Supply Chain Management (SSCM) is defined as integrating environmental thinking into supply chain management, including product design, material sourcing and selection, manufacturing processes, delivery of the final product to the consumers, and end-of-life management of the product after its useful life.

Carter and Rogers (2008) defined SSCM as the strategic, transparent integration and achievement of an organisation’s social, environmental and economic goals in the systemic coordination of key inter-organisational business process for improving the long-term economic performance of the individual company and its supply chain.

Sustainable Supply Chain Management involves integrating environmentally and financially viable practices such as recycling, refurbishing, waste management etc. into the complete supply chain lifecycle, from product design and development, to material selection, (including raw material extraction or agricultural production), manufacturing, packaging, transportation, warehousing, distribution, consumption, return and disposal. All supply chains can be optimised using sustainable practices. Sustainability in the supply chain encapsulates a number of different priorities: environmental stewardship, conservation of resources, reduction of carbon footprint, financial savings and viability and social responsibility.

The age of the ‘triple bottom line’ is upon us where the assumption is that profit should no longer be at the expense of people (the social dimension) or planet (the environmental dimension).The planet’s resources are in decline and the climate is changing, placing increasing pressures on

companies to reduce carbon emissions, recycle or re-use, and to develop green technologies. Sustainable development is here to stay and only shows signs of gaining even greater momentum for the foreseeable future.

Sustainability, in each of the three dimensions, presents a risk to organisations that are unprepared but also an opportunity for those companies who are prepared to embrace the challenge. But, organisations cannot tackle sustainability by themselves: implementing sustainability requires systemic change, including new supply models. Zambia Air Force is not an exception to this phenomenon.

Environmental degradation, global poverty, lack of human rights, far-reaching health deficits and corporate governance resulted in sustainable supply chain management (SSCM) to emerge as key enabler that could push organisation to focus on alleviating environmental issues, providing economic and social benefits (Kovacs, 2014). Developing sustainable business practices is not only critical to the future of a company, but also for the benefit of future generations. Sustainable practices are leading organisations to sustainable growth, both profitably and responsibly.

1.3 Statement of the Problem

Zambia Air Force through the procurement department procures a wide range of equipment which include aircrafts, aircraft spares and other technical equipment through the supply chain but there is no form of disposal for this equipment when they reach their end of life. Currently the aircrafts and spares that have reached the end of life are just parked and spares are kept in the storage rooms once the end of life is reached. The problem has to do with lack of recycling or reuse of these spares which creates a breeding ground for environmental pollution; therefore the focus of this study is to independently assess the impact of adopting sustainable supply chain management practices on the performance of public sector organisations in Zambia, with particular case study of Zambia Air Force (ZAF). Furthermore, there is no known study that has focused on examining the impact of adopting sustainable SCM, in particular sustainable SCM on public sector organisation performance in Zambia.

1.4 Objectives of the Study

1.4.1 Main Objective

The overall objective of this study was to assess the impact of adopting sustainable Supply Chain Management practices on the performance of public sector organisations in Zambia.

1.4.2 Specific Research Objectives

The specific research objectives of this study were as follows:

- a. To establish sustainable supply chain management practices adopted by public sector organisations in Zambia.
- b. To identify the main drivers of adopting sustainable supply chain management practices in public sector organisations in Zambia.
- c. To determine the challenges of implementing sustainability in public sector supply chains in Zambia.

1.5 Research Questions

The research questions of the study were as follows:

- d. What are the sustainable supply chain management practices adopted by public sector organisations in Zambia?
- e. What are the main drivers of adopting sustainable supply chain management practices in public sector organisations in Zambia?
- f. What are the challenges of implementing sustainability in public sector supply chains in Zambia

1.6 Significance of the Study

The results from the study can be instrumental to the Zambia Air Force (ZAF) and other public sector organisations in linking their sustainable supply chain performance to their competitiveness.

The study will also add to the existing body of knowledge on sustainability and recommended areas for further research and analysis by academicians in the future in order to draw important conclusions by supply chain students and practitioners. This area has not been widely looked into

and therefore researchers and academicians in institutions of higher learning will use this study to gather information and gain insight on the issues of sustainability practice in supply chain management and its contribution to the economy.

1.7 Scope of the Study

The study focused on Zambia Air Force (ZAF) as a public sector body whose supply chain is almost global in terms of aviation products and services.

1.8 Location of the Study

The study was conducted at Zambia Air Force Headquarters, Zambia Air Force Central Equipment Depot and Zambia Air Force Lusaka base. The sites were conveniently sampled because the researcher was based in Lusaka and accessibility to the participants was easy. In Addition, data collection was not going to be costly because the participants resided in the same area. A research site is an area where participants are going to answer to research questions reside (Cresswell, 2007).

1.9 Conclusion

The chapter discussed the background of the study, statement of the problem, main and specific research objectives, research questions, significance of the study, scope of the study and the location of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter focused on literature review conducted by the researcher. It included a review of various studies carried out previously regarding sustainability issues and the effect they have had on the performance of organisations with a specific interest on public sector organisations. The subsections of this chapter include a broader view of the main drivers of adopting sustainable supply chain management, sustainable supply chain management practices adopted by public sector organisations and the challenges of implementing sustainability in public sector supply chains at Global, African, Regional and Local level.

2.2 Supply Chain Management

Supply Chain Management is a network of facilities that produce raw materials, transform them into intermediate goods and then final products, and deliver the products to customers through a distribution system. It spans procurement, manufacturing and distribution (Lee and Billington 1995) the basic objective of supply chain management is to “optimise performance of the chain to add as much value as possible for the least cost possible”. In other words, it aims to link all the supply chain agents to jointly cooperate within the firm as a way to maximise productivity in the supply chain and deliver the most benefits to all related parties (Finch 2006).

Adoption of Supply chain management practices in industries has steadily increased since the 1980s. A number of definitions are proposed and the concept is discussed from many perspectives. However Cousins *et al.* (2006); Sachan and Datta (2005); Storey *et al.* (2006) provided excellent review on supply chain management literature. These papers define the concept, principals, nature, and development of SCM and indicate that there is an intense research being conducted around the world in this field they critically assessed developments in the theory and practice of supply management.

Gunasekaran and McGaughey (2003) extended the scope of SCM beyond material management, partnership, information technology to the Total Quality Management (TQM) areas like

management commitment, organisational structure, training and behavioural issues. As firms' survival lies on integration, a good understanding of the integration process is a key aspect in SCM.

Mouritsen *et al.* (2003) discussed that basic hypothesis “the more integration (wider the scope) – the better the management of the chain” is not always true and proved that it depends very much on the “environment” of the supply chain and the power relations between the participants in the supply chain. Authors proposed a set of management techniques and tools to analyse successful SCM strategies. It is also observed that research is not limited to hypothesis testing and data analysis, but more advanced techniques like simulation, artificial neural network, and fuzzy logic are also used for optimization and decision making in SCM. Koh and Tan (2006) used the principles of fuzzy logic for analysing and monitoring performance of suppliers based on the criteria of product quality and delivery time whereas Chiu and Lin (2004) showed how the concepts of collaborative agents and artificial neural networks (ANNs) can work together to enable collaborative supply chain planning (SCP). It appears from literature review that researchers have studied supply chain management from a system perspective, or the systemic natures of interactions between the participants of supply chain are observed

2.2.1 Evolution of SCM:

In the 1950s and 1960s, most manufacturers emphasised mass production to minimise unit production cost as the primary operations strategy, with little product or process flexibility. In the 1970s, material requirements planning (MRP) was developed and managers realised the impact of huge work in progress (WIP) inventories on manufacturing cost, quality, product development, and delivery lead-time. The intense global competition of the 1980s forced world-class organisations to offer low-cost, high-quality, and reliable products with greater design flexibility.

Manufacturers utilised Just-In-Time (JIT) and other management programs to improve manufacturing efficiency and cycle time. The evolution of SCM continued into the 1990s as organisations further extended best practices in managing corporate resources to include strategic suppliers and the logistics function. Many manufacturers and retailers are embracing the concept of SCM to improve efficiency and effectiveness across the supply chain. The following table explain the evolution of supply chain management.

Table 1: Evolution eras of supply chain management (Jain et. al. 2010)

S/No.	Era	Description
1	Creation Era	The term supply chain management was first coined by an American industry consultant in the early 1980s. However the concept of supply chain in management, was of great importance long before in the early 20th century, especially by the creation of the assembly line.
2	Integration Era	This era of supply chain management studies was highlighted with the development of Electronic Data Interchange (EDI) systems in the 1960s and developed through the 1990s by the introduction of Enterprise Resource Planning (ERP) systems.
3	Globalisation Era	This era is characterised by the globalisation of supply chain management in organisations with the goal of increasing competitive advantage, creating more value-added, and reducing costs through global sourcing
4	Specialisation Era Phase One-Outsourced Manufacturing & Distribution	In the 1990s industries began to focus on “core competencies” and adopted a specialisation model. Companies abandoned vertical integration, sold off non-core operations, and outsourced those functions to other companies.
5	Specialisation Era Phase Two- Supply Chain Management as A Service	Specialisation within the supply chain began in the 1980s with the inception of transportation brokerages, warehouse management, and non-asset based carriers and has matured beyond transportation and logistics into aspects of supply planning, collaboration, execution and performance management.
6	Supply Chain Management 2.0 (SCM 2.0)	Web 2.0 is defined as a trend in the use of the World Wide Web that is meant to increase creativity, information sharing, and collaboration among users.

2.2.2 Definitions and key ideas of SCM:

Researchers found that the lack of commonly accepted definition of supply chain management and the problems associated with supply chain activities makes the understanding of supply chain management difficult. Let us try to understand what SCM is? There are numerous definitions of SCM; few definitions discussed here would give an understanding of SCM.

Table 2: supply chain concepts

Authors	Definition of SCM	Key ideas
Scott and Brook, (1991)	The chain linking each element of the manufacturing and supply process from raw materials to the end user, encompassing several organisational boundaries.	Highlights the significance of coordination among constituent members.
Ellaram, (1991)	The integration of the processes, systems, and organisations that control the movement of goods from the supplier to a satisfied customer without waste.	Highlights the necessity of integration among the organisations, physical movement and the waste reduction principal of JIT.
Lee and Billington, (1992)	Networks of manufacturing and distribution sites that procure raw materials, transform them into intermediate and finished products, and distribute them to customers.	Attempts to show conventional functions of supply chain.
Christopher, (1992,1998)	The management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole.	Signifies the importance of relationships, customer focus and cost reduction
Ellrarn Cooper, (1993)	An integrating philosophy to manage the total flow of a distribution channel from supplier to ultimate customer.	Identifies the importance of integration within supply chain
Berry et al., (1994)	SCM aims at building trust, exchanging information on market needs, developing new products, and reducing the supplier base to particular original equipment manufacturer so as to release management resources for developing meaningful, long term relationship.	Highlights the importance of supplier relationships in achieving supply chain objectives
Cox et al., (1995)	The functions within and outside a company that enable value chain to make and provide products to the customer.	Attempts to identify strategic partners within supply chain.
Saunders, (1997)	Supply Chain is the total chain of exchange from original source of raw material, through various firms involved in extracting and processing raw materials, manufacturing, assembling, distributing, and retailing to end customers.	Network of firms interacting to deliver product or service to the end customer, linking flows from raw material supply to final delivery.
Patricia et al., (1996)	The physical network that begins with the supplier and ends with the customer.	Traces all the organisations with within a supply chain including all tiers of suppliers and distribution.
Monczka and Morgan, (1997)	Integrated SCM is about going from the external customer and then managing all the processes that are needed to provide the customer with value in a horizontal way.	Highlights the necessity of flat organisational structure and customer focus.

Tan <i>et al.</i> , (1998)	It is management philosophy that extends traditional intra-enterprise activities by bringing trading partners together with the common goal of optimisation and efficiency.	Focuses on how firms utilize their suppliers' processes, technology and capability to enhance competitive advantage.
Houlihan and Houlihan, (1999)	The integration of various functional areas within an organisation to enhance the flow of goods from immediate strategic suppliers through manufacturing and distribution chain to the end user.	Considers strategically important suppliers and integration among constituent members

According to these definitions, SCM encompasses the entire value chain and addresses materials and supply management from the extraction of raw materials to the end of useful life.

2.2.3 Supply Chain Management - Issues and Challenges:

Successful implementation of SCM is seen as closely dependent upon the need for breaking down barriers not only between internal departments and business processes, but also across companies within the whole supply chain (Vollman *et al.*, 1997). Its success is also associated with the challenging development of a new culture based on empowerment and on-going and shared learning and continuous improvement. Another challenging and difficult feature of SCM is linked with the emergence of the network organisation, which can lead to a complex web of linkages to be coordinated and managed. This can imply difficulties which include lack of common purpose, multiple and hidden goals, power imbalances, culture and procedures, conflict over autonomy and accountability, over-dependence and a continuing lack of openness and opportunistic behaviour (Cox and Townsend, 1998).

2.2.4 Supply chain management objectives:

The main reason and objective of SCM is to provide a strategic weapon to build up and enhance sustainable competitive advantage by cost reduction without compromising customer satisfaction (Mentzer *et al.* 2001). Moreover, the ability to understand the environment pressures that drive the SCM and clearly note the barriers and implement solutions or bridges enables supply chain performance to maintain competitive advantage (Fawcett *et al.*, 2008, 37). The main goal and important aspect of SC is leveraging the expertise, experience, skills and capabilities of the SCP who comprise this competitive network (Mentzer *et al.*, 2001).

2.2.5 Barriers, Bridges and Benefits to effective SCM:

There are a number of hurdles that block the path of firms implementing an integrated SC practices and processes. Fawcett *et al.* (2008) reviewed recent scientific literature on the potential barriers to SCM. They classified the barriers into two categories namely inter-firm rivalry and managerial complexity. They noted the following barriers under inter-firm rivalry category, in order of significance; internal and external turf wars, poor SCM planning, lack of vision of SCM, lack of trust, executive commitment and poor SCM understanding. All these barriers work against agility in SC and management should reduce their impact. However the worst barrier, internal and external turf wars needs urgent attention by SCPs as its negative impact is fast and severe leading to the disruption of the SC. Poor planning and lack of vision are symptoms of failure by SCs, though their effects may be slow to appear their eventual impact is disastrous. Managerial complexity includes misaligned SC processes, structures and major differences in SCPs' business culture (Fawcett *et al.*, 2008). And in the managerial complexity category Fawcett *et al.* (2008) noted the following barriers in order of significance; IT deficiencies, organisational structure/culture, lack SC measurement and lack of alliance guidelines. These problems are both at enterprise level and SC level and hence the need to tackle them at both fronts. The worst barrier is IT deficiencies mean loss in competitive advantage by the whole SC. Fawcett *et al.* (2008) reviewed solutions to the SCM barriers proposed in the scientific literature. They noted the following plausible solutions in order of importance; information transparency, CFT/CF collaboration, collaborative planning, IT architecture/internet, formal performance tracking, adopt strategies SCM vision, attention to human factors, supplier certification/reduction, target segmented customers and shared investment/benefits. Fawcett *et al.* (2008) reviewed key benefits of SCM proposed in literature and noted the following in the order of their importance; increased inventory turnover, increased revenues, SCM cost reduction, product availability, decreased order cycle time, responsiveness, economic value added, capital utilisation, decreased time to market and reducing logistics costs.

2.2.6 Need for Managing Supply Chain:

The next important issue is why the firms should consciously manage the supply chain. Supply chain involves the cost to convey the information, produce components, store them, transport them, and transfer funds and so on. The total cost of supply chain tends to increase due to many

parameters like huge capital cost required for running global businesses, mounting real estate costs and freight charges (Koch, 2006). However the perfect planning in SCM regarding material arrival, production schedule and distribution not only reduces the inventory and inventory cost but also reduces the wasted time and energy (Verma *et al.*, 2006). Supply chain management drastically alters inventory investment across a range of industries, and helps to tackle economic fluctuations (Heng *et al.*, 2005).

2.2.7 Information Technology and Information Management:

The advent of the Internet and electronic communication has enabled companies to be more responsive to their customers than ever. Sanchez and Perez (2003); Tarn *et al.* (2002); Wieder *et al.* (2006) examined functions, current developments and the rationale for IT integration by analysing the problems of enterprise resource planning (ERP), electronic data interchange (EDI) and presented the solutions of SCM. The rich experience of firms with ERPs tends to deliver higher overall performance, but no evidence was found of a similar effect on supply chain performance. On the contrary EDI adopters perceived more operational benefits, more external pressure and mutual understanding, and fewer technical and organisational difficulties than non-adopters of EDI. Information sharing practices such as vendor-managed inventory (VMI) give manufacturers access to more accurate demand information. Smáros *et al.* (2003) used discrete-event simulation to examine how a manufacturer can combine traditional order data available from non-VMI customers with sales data available from VMI customers in its production and inventory control and what impact this has on the manufacturer's operational efficiency. The key finding was that even for products with stable demand a partial improvement of demand visibility could improve production and inventory control efficiency. Other finding was that the value of visibility greatly depends on the target products' replenishment frequencies and the production planning cycle employed by the manufacturer.

2.2.8 Knowledge Management:

Knowledge is critical for organisations to satisfy customer needs for customised products and services, and speedier and improved service (Davenport and Klahr, 1998). Knowledge indicates a firm's intellectual capital: including work-related experience, expertise, know-how, and best practices, that can be acquired and shared. Global competition and accelerating technological changes, especially in information communication and Internet technologies makes competition

knowledge-based thereby affecting supply chain management across firms (Lang, 2001). Desouza *et al.* (2003) linked the impact of organisational structure in knowledge transfer and utilisation among the different participating functions in the perspective of systems theory. Knowledge management (KM) involves individuals and groups, both within and between firms, managing tacit and explicit knowledge to make better decisions, take actions and deliver results to support the underlying business strategy (Horwitch and Armacost, 2002). Alavi and Leidner, (1999) defined knowledge management as the systematic and organisationally specified process of acquiring, organising, and communicating knowledge so that employees can use it to become more effective and productive in their work. It is observed that establishing internal knowledge management systems for organisation creates opportunities to minimise knowledge isolation in functional departments and creates a greater base for learning.

2.2.9 Customers - Supplier Relationship Issues:

Customer satisfaction is absolute for staying abreast in competitive environment that can be achieved only by quickly responding to customer needs. Efficient consumer response (ECR) is a supply chain management strategy that attempts to address the inefficiencies in the supply chain. Hoffman and Mehra (2000); Harries *et al.* (1999); Sparks and Wagner (2003) discussed efficient consumer response (ECR) as a supply chain strategy by analysing the adoption of ECR strategy in some industries. Jonsson and Zineldin (2003) proposed conceptual model including behavioural dimensions of supplier-dealer relationships and presented hypotheses about how to achieve satisfactory inter-organisational relationships. Lambert and Pohlen (2001) provided a framework for developing supply chain metrics that translates performance into shareholder value. The framework emphasised on managing the interface between customer relationship management and supplier relationship management at each link in the supply chain. It is concluded that long-term relationships between customer and supplier can lead to higher satisfaction.

2.3 Customer relations Issue

A company's customer relations practices can affect its success in managing the supply base as well as its performance (Scott and Westbrook, 1991; Ellram, 1991; Turner, 1993). A key element of successful supply base management involves downstream integration of customers as well as

the management of upstream suppliers. Each entity in the supply chain is a supplier as well as a customer. When a customer driven corporate vision is implemented simultaneously with effective TQM and supply base management practices, it can produce a competitive edge in a number of different ways. These include increases in productivity, reductions in inventory and cycle time, increased customer satisfaction, market share and profits. However, there is little empirical evidence in the literature linking customer relations practices and performance to support the conceptual foundation of customer driven corporate policy.

2.3.1 Issue of Supply chain Design

Manufacturing firm's supply chain design is based on effective integration. Braganza (2002) and Power (2005) examined different perspectives on integration and suggested that integration of several functions at different organisational levels achieve above average financial and performance results. It is observed that current static approaches and theoretical models are ineffective in considering all variables and constraints for designing supply chain. Manson-Jones *et al.* (2000) demonstrated how the "lean" and "agile" paradigms might be integrated. They designed a total performance metric and developed a route map for integration of lean production and agile supply in the total chain. Lalwani *et al.* (2006) suggested that one of the reasons for this might be the difficulty of grasping the full dynamic complexity of the processes and systems encountered. Authors proposed that current developments in systems thinking and continuous system simulation, when applied within the context of an operations management framework, may offer the good design of SC and improve in supply chain performance.

2.3.2 Logistics management:

Many years practitioners and professionals were confused between "logistics" and "supply chain management", the usage of each term varied according to the industry. Lummus *et al.* (2001) examined the historical definitions of both terms, and proposed a hierarchy for the relationship between logistics and supply chain management. Srivastava and Srivastava (2006); Meade and Sarkis (2002) presented a framework to manage product returns in reverse logistics by focusing on product ownership data, average life cycle of products, past sales, forecasted demand and likely impact of environmental policy measures .It is observed that reverse logistics is one of the toughest supply chain challenges. Once the product has been manufactured it is very important that there should be an adequate structure to distribute it to the customers. Neves *et al.* (2001);

Ma and Davidrajuh (2005) proposed distribution channels planning model. Authors explored the use of an iterative approach for designing distribution chain in an agile virtual environment; and proved that quick adaptation to changing market situation and automation of supply chain management processes are essential.

2.3.3 Global Issues:

Shortened product life cycles and increasing global competition has tempted traditional manufacturers to contemplate on their competencies, such as product design and development, and a decision to outsource. Jennings (2002) and Zeng (2003) projected strategic benefits and problems relating to the outsourcing decision. These include issues of cost, quality, flexibility, strategic focus, and diversification, the potential loss of critical skills and knowledge, and appropriation of final product value. A model was developed, structuring the contextual factors: capability, cost, technology, supply and product market conditions, to enable a consideration of the outsourcing decision. Buxey (2005) and Svensson (2001) explored the linkage between firms' outsourcing activities and the occurrence of supply chain disruptions. Blowfield (2005) discussed the experience of employing global social and environmental standards, in terms of a global ethic. It was concluded that strategic development of SCM capabilities such as efficient inbound and outbound transportation, warehousing, inventory control, production support, packaging, purchasing, order processing, and information dissemination enables a manufacturing firm to identify key performance measures.

2.3.4 Partnership Issues:

As global markets grow increasingly efficient, competition no longer takes place between individual businesses, but between entire value chains. Therefore executives are developing supply chain partnerships/collaboration in an attempt to reduce costs, improve service and to gain competitive advantage. Horvath (2001) proposed that Collaboration through intelligent e-business networks would provide the competitive edge to all the participants in a value chain to prevail and grow. It is found that collaborative partnerships can be achieved both via trust and through electronically mediated exchange. Frankel *et al.* (2002) showed that one of the most common usages of partnerships is in the provision of transport and distribution services. Authors recommended that rather than devoting effort and resources to build an in-house supply chain it can often be much more cost- effective to form a partnership with a shipping company, and

allow them to perform the job of distribution at a lower cost than the enterprise could manage itself.

2.2.5 Environmental issues:

Power (2005) presented a conceptual framework to investigate supplier relations, lean manufacturing, environmental management practices; and their relationship to one another. It is found that efforts to improve a supplier's environmental management practice raise critical issues of transaction costs and efficacy of approach for the buyer. It is recommended that an environmental bias is to be introduced into the decision making process which would allow more environmentally conscious decisions to be made.

2.2.6 Trust & Commitment:

The two fundamentals components of improving the relationship are trust & commitment (De Ruyter *et al.* 2001). The cooperation arises directly from both relationship trust & commitment (Morgan & Hunt 1994). According to past research, trust has two dimensions: "honesty" & "benevolence" (Kumar *et al.* 1995). There are several dimensions of trust in fresh produce supply chain performance such as confidence in preferred trading partner, always keeps promises, always honest, good reputation, trust in preferred trading partner, believe information provided, close personal friendship, trading partner always consider best interests (Batt 2003). Trust is the belief that the partners will act in ways that will bring positive outcomes for the firms & does not want to take unexpected actions that may bring a negative outcome (Anderson and Narus 1990). Trust (Moorman *et al.* 1993) is the willingness to rely on an exchange partner in whom one has confidence. Or trust as a belief, a sentiment or an expectation about an exchange partner and results from the partner's expertise, reliability & intentionality. Trust is the extent to which the buyer believes that the supplier has the necessary expertise to perform the activity effectively & reliably (Ganeshan 1994)

2.4 Performance Measurement in Supply Chain:

Performance measurement is very important as a strategic tool and also provides means to achieve the objectives required, fulfilling a firm's mission/strategy statement. Many firms have been observed to evaluate performance, primarily on the basis of cost and efficiency (Skinner, 1971). This has resulted in most measures focusing on financial data such as return on

investment, return on sales, price variances, sales per employee, productivity and profit per unit production etc. As a result of globalisation and competition the organisations have started adopting innovative business practices and performance improvement initiatives such as TQM, JIT and SCM.

Agarwal and Shankar (2002) proposed an analytic network process (ANP)-based model for analysing the alternatives affecting supply chain performance. It also provides the decision methodology to prioritize these alternatives, so that supply chain performance can be improved. A process-based systematic perspective was employed to build an effective model to measure the holistic performance of complex supply chains. Fuzzy set theory was introduced to address the real situation in judgment and evaluation processes. Fynes *et al.* (2005), Gunasekaran *et al.* (2001) developed a conceptual framework to link up SC relationship dynamics and manufacturing performance and found out the less evidence of SC relationship dynamics on manufacturing performance.

2.4.1 Significance of Performance Evaluation:

Performance evaluation is very important as a strategic tool and also provides means to achieve the objectives required, fulfilling a firm's mission/strategy statement. As highlighted in the earlier section, major task in performance measurement is to identify, evaluate and select the performance measures, which are appropriate to assess inter-organisational performance. A general tendency in many firms has been to evaluate performance, primarily on the basis of cost and efficiency (Skinner, 1971). This has resulted in most measures focusing on financial data such as return on investment, return on sales, price variances, sales per employee, productivity and profit per unit production etc. The literature reviewed so far highlights the importance of managing the design and development of performance measurement systems to ensure that they continue to reflect the environment and objectives of the organisation. The literature also suggests that the factors affecting evolutionary change within organisations, and hence the evolution of performance measures, are many and complex. Effectively measuring and managing of supply chain performance is a complex and difficult task. If performance measurement is to lead to long-term and continuous performance improvement, then different stages of the performance measurement and management processes such as design of measurement systems, their implementation, and identification of appropriate measures to be used are to be successfully

implemented. Organisational support in terms of knowledge sharing, leadership, structure and learning is immensely required for successful implementation.

2.4.2 Performance measures Classification:

De Toni and Tonchia (2001) conceptually classified the performances of the operations into two broad categories of 'Cost performances' and 'Non - Cost performances.

Non-financial performances include measures related to time, flexibility and quality. It is an important move towards a multi criteria approach, which can correspond to the need of holistic and strategic approach. Non- monetary units of measures generally measure the non-cost performances and as far as they influence the economic and financial performances (net income and profitability), the link with them cannot be calculated in a precise manner as for the cost performances. Non-cost measures are divided into three categories, namely quality, time and flexibility related measures. Time element has strategic importance in business and hence

Flexibility (to measure the ability to deal with the dynamic nature of the business) is a performance apart, since it is an ability to change something (for example, the production volume or mix) in relation to all the three performances of cost, time and quality (De Toni and Tonchia, 1998). Gunasekaran *et al.* (2001) outlined six sets of performance metrics. The emphasis is also on the importance of measuring the non-financial aspects and the non-quantifiable and intangible aspects of performance. These parameters and metrics include the measures at strategic, operational and tactical level and these metrics are aligned to the four basic links that constitute the supply chain: plan, source, make and deliver. The measure sets incorporate measures for the issues related to supplier's relations.

2.5 Supply Chain Management Practices:

SCM practices are defined as a set of activities undertaken in an organisation to promote effective management of its supply chain. Supply base management refers to how firms utilize their suppliers' processes, technologies, and capabilities to enhance competitive advantage (Farley, 1997), and how the manufacturing, logistics, materials, distribution and transportation functions are coordinated within organisations (Lee and Billington, 1992). Many firms have reduced their supply base so they can more effectively manage relationships with strategic suppliers (Tully, 1995). Companies encountering problems due to increased reliance on suppliers

use a variety of approaches to address the problems. They may reverse their downsizing emphasis and bring outsourced products and services back in-house, secure alternative sources of supply, or work with existing suppliers to increase their performance and capabilities (Watts and Hahn, 1993). Supplier development efforts vary in terms of the effort expended by the buying firm and in the variety of tools used. A recent study found that firms often use supplier evaluation or performance measurement to identify specific supplier deficiencies and to develop plans to address them (Krause, 1997). Such efforts may involve the measurement of suppliers' delivery, quality, and cost performance, site visits, certification of suppliers' products and processes, and the setting of performance goals. Practices used to effectively manage the supply base and increase supplier performance include the use of quality assurance programs for monitoring supplier's processes and products, the use of site visits, and the sharing of information with suppliers.

2.6 Sustainable public procurement (SPP)

Encompassing environmental and issues related with social responsibility, is gaining momentum throughout European member states. This is evidenced in a number of policy changes and working initiatives to drive sustainable Change across EU countries. For instance, the majority of European Economic Area (EEA) countries have developed specific National Action Plans (NAPs) on SPP over the last Decade (EC, 2003, 2012). The public sector is responsible for providing a vast range of products and services which have direct implications for sustainable and socially Responsible issues. However, until recently, there have been very limited theoretical and empirical investigations in SPP in academic literature (Preuss, 2009; Walker and Brammer, 2009). additionally, limited research (with a notable exception from Brammer and Walker, 2011) has investigated public body engagement with sustainable public procurement from

a multi-country perspective as the vast majority of extant literature investigated sustainability management and performance issues from a single country perspective. Given the scale and importance of public procurement and the capacity to achieve sustainable and social goals across supply chains (SC) incorporating public and private Organisations, it is important to gain in-depth knowledge on how effective policy initiatives Have been in driving supply chain sustainability management and measurement.

2.7 Sustainable Supply Chain Management Practices

SCM involves the planning and management of all activities involved in sourcing and procurement, conversion, and logistics management activities. It includes coordination and collaboration with channel members such as suppliers, intermediaries, third-party service providers, and customers (CSCMP, 2005).

Seuring and Muller (2008) have defined SSCM as —the management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development, i.e., economic, environmental and social, into account which are derived from customer and stakeholder requirements. Typically, sustainable supply chain management is now considered to be the ‘best way’ to improve efficiency in supply chain (Seuring and Muller 2008).

A focus on supply chain is a step towards the broader adoption and development of sustainability, since the supply chain considers the product from initial processing of raw materials to delivery to the customer. The practical application of sustainable supply chain management has been growing in the recent years. Authors argue that it is important to integrate sustainability issues into the aspects of supply chain management.

There is strong evidence that for achieving sustainability performance, some aspects and practices in the supply chain have to be changed and managed in a different way (Ashby, Leat and Hudson, 2012; Taticchi, Tonelli and Pasqualino 2013).

Seuring (2014) observed that SCM incorporates a variety of concepts such as environmental or green SCM, which involves firms seeking to minimize negative environmental impacts in their supply chains. In addition, it also includes the consideration of social issues in the supply chain such as ensuring employees have decent working conditions or ensuring goods are sourced, manufactured and distributed ethically to the consumers along the supply chain. Moreover, there is also the economic aspect of SCM which may include buying from local suppliers to support local economic regeneration (Seuring, 2014).

A number of views in literature have addressed and brought to the lime light aspects of sustainable supply chain practices such as corporate social responsibility, sustainable supply

network management, supply chain environmental management, green purchasing strategies (Min and Galle, 1997), environmental purchasing (Zsidisin and Siferd, 2001), green marketing, environmental marketing (Sheth and Parvatiyar, 1995), environmental marketing management and environmental product differentiation, reverse logistics, sustainability labeling schemes, environmental management (Hoffman, 2000), Life-cycle assessments and ISO 14000-certifications (ISO, 2007). Other generic aspects connected to sustainable business practices and theories are product returns, source reduction, recycling, material substitution, and reuse of materials, waste disposal, refurbishing, repair and re-manufacturing (Stock, 1998).

Green manufacturing can lead to reduced raw material costs, production efficiency, low environmental and occupational safety expenses as well as improved corporate image. It is designed to minimize the environmental impact in the manufacturing processes of products (Wamalwa, 2014). Firms can effectively practice green manufacturing practices through the use of solar energy, recycling of raw materials and utilize biodegradable energy sources in their manufacturing operations (Amemba et al., 2013). Reverse logistics focuses mainly on the return or take-back products and materials from the point of consumption to the forward supply chain for the purpose of recycling, reuse, remanufacture, repair, refurbishing, or safe disposal of the products and materials (Wamalwa, 2014).

2.8 Sustainable Supply Chain Management Practices on the Performance of Public Sector Organisations from Global context to Local

The policy environment regarding SP influences variation in SP practice, The policy context concerning public procurement in the UK is based on a set of guiding principles, including transparency, competitiveness, accountability, efficiency, legality, and integrity, that have the ultimate aim of supporting the delivery of “best value for money” in public procurement (HM Treasury, 2000).

“Best value for money” is defined as “the optimum combination of whole life cost and quality (Or fitness for purpose) to meet the customer’s requirements” (HM Treasury, 2000). Regarding “value for money” the review of public sector efficiency (Gershon, 2004) sought to identify opportunities to deliver “sustainable efficiencies in the use of resources within both central government and the wider public sector” and highlighted that significant savings in procurement were expected to be obtained through: seeking to communicate and manage likely aggregate

public sector demand in a strategic way with the supply sector and further professionalization of the procurement function within the public sector.

Consistent with a focus on “sustainable efficiencies” through a focus on whole life costing, “best value of money” gives scope to public bodies to take social and environmental policy objectives into account in their procurement activities. This was recognized by the UK Government in its 2005 Sustainable Development Strategy, and an SP Task Force was established in 2005 to develop SP guidance.

The UK Government stated its goal to be amongst the leaders in the EU on SP by 2009 (DEFRA, 2007). Public procurement in the EU is guided by national policy frameworks, coupled with an overarching EU policy framework that is designed to open up the EU’s public procurement market to competition, outlawing “buy national” policies and promoting the free movement of goods and services. One study examined the state of development

Sustainable supply of national action plans regarding green or Spin the EU (Steureretal., 2007). Of the 27 EU member states, their analysis showed that only a third of governments had adopted an action plan concerning SP by April 2007, with further five countries having a draft policy concerning SP that had not yet been adopted. Countries with relatively well-developed plans included The Netherlands, Denmark, and the UK, while countries still in the early stages of developing national action plans included Germany, Greece, the Slovak Republic, and Malta. The emphasis of SP policy in the EU is environmental rather than social in character. For example, in Italy there is a mandate that 30 per cent of goods purchased by public administration comply with ecological criteria. Denmark, France, The Netherlands, and the UK have public procurement policies specifically for wood and paper products and in Belgium there is an initiative to ensure that 50 per cent of government vehicles comply with specific environmental criteria.

SP policy frameworks in the USA have, alongside environmental purchasing, a particular emphasis on avoiding discrimination and providing equal opportunities, in line with the constitution (McCrudden, 2004). These issues have most clearly been crystallised in the development of federal policies that promote procurement from women and minority owned businesses with some emphasis on purchasing from indigenous peoples. Non-discrimination also shaped US policies regarding overseas procurement, placing pressure on the UK Government to

stop religious discrimination in Northern Ireland, and upon the South African government to end apartheid (McCrudden, 2004).

Canadian federal government procurement policies emphasise similar economically oriented aspects of purchasing as those found in Europe including mandates concerning promotion of competition and value for money. However, in addition to these, Canadian public procurement policies include foci on non-discrimination and ensuring procurement opportunities from Aboriginal businesses. The Canadian federal government founded the Office of Greening Government Operations (OGGO) in 2005, which developed its Policy on Green Procurement in 2006. Through this policy, all government bodies are required to formulate green procurement targets and all personnel responsible for procurement need to be trained in green procurement. The OGGO provides purchasers with a decision making toolkit and a checklist on their web site to encourage them to consider sustainability.

In Japan, a law on green purchasing was passed in 2001 that compelled all government bodies to develop and implement green purchasing policy (European Coalition for Corporate Justice, 2007).

In South Africa, public procurement was seen as an important policy lever in the post-apartheid world. Specifically, the black economic empowerment initiative encourages the public sector to buy from black-owned businesses in order to redress the economic advantages of white-owned businesses attributable to apartheid (Department of Trade and Industry South Africa, 2003).

In Zambia the government through ZEMA are trying to implement sustainable supply chain management and hence trying to introduce environmental friendly materials and reducing materials such as plastics and is encouraging re-cycling of materials. To summarise, a range of aspects of sustainability are the subject of explicit procurement policies around the world. The environmental aspects of sustainability seem well represented in policy frameworks within Europe. In other countries, local issues often relating to historical concerns, such as the need to empower minority groups within society, are an important part of the procurement policy landscape.

2.8.1 Case Studies

Case study research is used to validate the framework. Convenience sampling was used to select the companies for case studies. Convenience sampling is a non-probability sampling technique where subjects are selected based on their easy accessibility. The necessary information required from the five companies selected was accessible and readily available. All the companies selected have exercised substantial effort in managing supply chain that is sustainable. Case studies were conducted in order to investigate various sustainable supply chain management practices and the environmental and operations results derived out of this. The studies are mostly based on published documents such as reports and publications. A description of the cases is given below:

2.8.2 Eastman Chemical Company

Eastman Chemical Company is focused on continual improvement and value creation in all aspects of the supply chain such as, measuring supplier performance, developing alternative methods of supply, develop supplier solution, improve packaging, use renewable material, design and optimize supply chain network, develop customer solutions and manage investment recovery. Eastman tracks a variety of environmental measures and expanded the environmental performance matrices and included green- house gas intensity reduction goal in addition to energy efficiency goal and TRI (Toxic Release Inventory) releases and reportable releases. Eastman's energy policy has balanced the need for affordable energy supplies with the need to reduce the amount of energy needed to make their products. Eastman's integrated manufacturing process results in very efficient operations, allowing heat from one chemical process to be used for heat within a different chemical process. The water management practices of Eastman are very good in efficient use and pollution prevention. Eastman takes great care to manage on-site waste reduction and recycling. Eastman focuses on renewable materials and packaging to limit the end-of-use waste of the products.

2.8.3 Westpac Bank

Australia Westpac Bank aims to ensure that suppliers must share their commitment to best practices, continuous improvement and collaborative approaches, deal ethically and responsibly with suppliers and build corporate and long term relationships. Westpac also set a clear and unambiguous minimum standard of supplier behavior for key business practices, via a

sustainable supply chain management (SSCM) code of conduct. SSCM enables Westpac to create other benefits such as reduced costs, improved risk management, enhanced quality and product or service innovation. Westpac also undertakes de-tailed assessment of high spend and higher risk suppliers to ensure a more in-depth understanding of the social, ethical and environmental business practices of these supplier. Sustainability is a core component of Westpac Bank's culture and corporate strategy. Part of this is managing their environmental impact and dealing with the critical issue of climate change. Westpac supports emission trading and other market mechanism in order to affect positive environmental outcomes. Westpac is committed to efficient eater management and water conservation. Westpac's supplier selection process included questions regarding the management of environmental issues.

2.8.4 New Zealand Business Council for Sustainable Development

New Zealand Business Council for Sustainable Development is involved in improving the business's own operations, ensuring that the goods and services provided by suppliers to increase efficiency and competitiveness and working effectively with customers and sales and distribution to design sustainable products and services. A great benefit lies in working with supplier and customers to improve the design of products and processes that connect business with customers. Some success has been achieved in redesigning packaging and in increasing the recyclable content in a variety of products. Process collaboration with suppliers and customers has been shown to deliver improvement in manufacturing and logistics efficiency whilst reducing emissions, road congestion and improving employment stability. One way in which companies can differentiate themselves, reduce cost and improve service is to consider the environmental, social as well as economic factors related to the supply chain. Dow Jones has valued more than 300 companies in relation to their sustainable development in the Dow Jones Sustainability Group Index (DJSI), the index provides evidence that sustainable development pays, with companies in the index underperforming the Dow Jones Group Index. One of the parameters that can have a negative influence on corporate reputation and share price is whether the company's supply chain is socially responsible and accountable. In relation to risk management, any actions which may be seen as inconsistent with Shell Group Business Principles can potentially lead to damage to the group's reputation and its business. San- ford's business in New Zealand is based on the growth and harvesting of wild fish and shell fish with the sustainable fish quota

management system and is entirely dependent upon long-term fish supply. Sanford's prices for 'sustainable Hoki' have increased following accreditations. Consumers are prepared to pay a premium for certified fish. Companies embracing sustainable development can benefit from being a first mover in a market. All else being equal, 82% of UK consumers prefer to purchase goods from socially and environmentally responsibly companies, according to a 2003 study, and 23% would do so even if this option is more expensive. Driving out inefficiency from processes is good business practice and reduces costs. In the service sector, introducing video conferencing reduces energy consumption and emissions associated with travel' increased productivity and reduces costs.

2.8.5 Coca Cola Enterprises

In 2007 Coca Cola Enterprises set five strategic Corporate Responsibility and Sustainability (CRS) focus areas. These areas are energy conservation/climate change, sustainable packaging/recycling, product portfolio/well-being, and diverse and inclusive culture. In 2008, Coca Cola made an investment of US \$34.8 million on capital projects in their three environmental focus areas. They are now establishing a cost-benefit analysis process to prioritize CRS investments. Coca Cola Company has set the following goals in the area of energy conservation, water stewardship, sustainable packaging/recycling, product portfolio/well-being and diverse and inclusive culture: Reduce the overall carbon footprint by 15 percent by 2020, as compared to 2007 baseline. Establish water sustainable operation in which water use will be minimized and have a water-neutral impact on the local communities in which they operate, by safely returning the amount of water equivalent to what they use in their beverages and their production. Reduce the impact of packaging: maximizing the use of renewable, reusable, and recyclable resources; recover the equivalent of 100 percent of packaging, which creates a culture where diversity is valued, every employee is a respected member of a team, and workforce is a reflection of the communities in which they operate. In order to reduce overall carbon footprint, Coca Cola measured their carbon footprint, calculated the first certified product carbon footprint of sparkling beverages, and increase hybrid fleet by 120 trucks. To establish a water- sustainable operation, the company reduced water use ratio to 1.73 liters, saved 301 million liters of water through efficiency initiatives and launched pilot study of embedded water footprint. To reduce the impact of pack- aging, Coca Cola avoided use of approximately 31,000 metric tons of

packaging materials, or 2.7 percent of total used recovered and recycled approximately 125,000 metric tons of packaging and reached 90 percent waste recycling at an additional 14 facilities. In the area of product portfolio well-being, the company introduced first zero-calorie sports drink, POWERADE Zero, reduced average calorie content of the portfolio by three percent since 2006 and introduced first naturally sweetened low-calorie beverage.

2.8.6 Ernst and Young Survey

A survey of executives from \$1bn-plus corporation conducted by Ernst & Young indicates a high level of awareness of sustainability, with an appreciation of the opportunities it offers within supply chain. Reputation, cost reduction and revenue growth were the top three widespread opportunities cited by more than half of respondents. An increase cost base was also highlighted as the greatest risk, suggesting that anticipated operational and energy savings would be offset by increased capital cost and increase price from suppliers. Regulatory compliance was reported as both an opportunity and threat, indicating that there will be individual winners and losers, depending on firms' preparedness to stay ahead of new legislation. There is a strong possibility that carbon will become a parallel currency to money in the future. More business will need to operate within carbon cap, or else pay for the excess carbon produced. Therefore it is important for the international companies to take steps to measure their supply chain emissions in order to predict future cost and liabilities. To combat increasing energy prices and reduce in-house emissions, 40% of the firms have invested in on-site renewable energy generation. This offers great control over energy cost, enhances corporate reputation and may result in profits from the sale of surplus renewable electricity. An increasing number of businesses are competing to launch sustainable products and services to increase their market share. 63% of respondents see sustainability as an opportunity for revenue growth. 71% view reputation and brand as the area where sustainability, green and carbon issues will provide opportunity. The survey also found that 44% of the respondents said they are confident they can deal with sustainability issues. Many large global companies have yet to realize the full potential of the savings and benefits due to sustainable supply chain management.

2.8.7 The companies studied

are involved with suppliers to increase efficiency and working effectively with customers to design sustainable products and services. Most of the companies are involved in measuring

supplier performance, developing alternative methods of supply, develop supplier solution and build long term relationship with suppliers. Most of these companies are involved in developing improved packaging, and increasing the recyclable content of the products. Some of these companies have certification to environmental management standards such as ISO14000. Most of the practices cited are in agreement with the framework of SSCM practices dimensions. In relation to the environmental and operational performance a wide range of opportunities were cited by the companies. Among the key environmental performance measures, greenhouse gas emission reduction, improvement in energy efficiency and conservation of resources logistics efficiency were evident in most of the companies. Other benefits achieved by companies are increased efficiency, reduced cost, improved risk management, improved service, increased sales and market share, revenue growth and reputation. It is important that the company's supply chain is socially responsible and ethical. One of the dimensions in operational performance that needs to be incorporated to the framework is improved risk management and reputation. From the study of these organisations it can be concluded that SSCM practices have considerable effect on the environmental and operation performance of organisations. More in-depth case studies will be conducted in order to further validate/modify the framework. One of the limitations of the study is that the convenience sampling used may not be representative of the population.

2.9 Key Drivers of Sustainability in Supply Chain

Japanese and European leading companies that decide to go along with green procurement activities are experiencing tangible benefits. Strategic sourcing can create value through increased overall cost efficiency, enhanced reputation and market share, and reduced environmental risks and liabilities.

2.9.1 Economic benefits

Are achieved when reducing supplier generated wastes and surpluses, when decreasing handling expenses and risks associated with waste disposal and from supplier's savings from improved efficiencies which may be passed along to buyers in the form of reduced prices.

2.9.2 Competitive advantage

Is achieved through innovation. This occurs when efficient production is enhanced through suppliers' use of cleaner technologies, process innovation, and waste reduction. This is especially true when suppliers and customers work together to find new ideas.

2.9.3 Improved public image

Is achieved when the greening of one's suppliers can contribute to a company's overall reputation among customers, investors, employees, and other stakeholders.

2.9.4 Tangible benefits

That are typically achieved by companies comprise, Cost avoidance due to lower waste management fees, lower hazardous material management fees, less time and costs for reporting; Savings from conserving energy, water, fuel and other resources (Khiewnavawongsa, 2008),(Lacroix, 2005).

- a. Easier compliance with environmental regulations
- b. Demonstration of due diligence
- c. Reduced risk of accidents, reduced liability and lower health and safety costs; (Hill, 1993), (Isaak, 1998)
- d. Support of environmental/sustainability strategy and vision (Lacroix, 2007)
- e. Improved image, brand and goodwill
- f. Improved employee and community health through cleaner air and water, less demand for landfill and less demand for resources (Lacroix, 2008B),(Lacroix, 2006A); and
- g. Increased shareholder value.

While there are a number of other quantifiable measurable benefits which can be achieved from implementing green procurement, cost savings and risk reduction are perhaps the most universal across all types of industries and organisations. Qualitative benefits such as improved image, brand or ability to meet policy commitments is another key benefit and is of note in a business and public sector climate that is increasingly influenced by the public, nongovernmental organisations and employees that are well informed and educated around the environmental and social issues related to products and services. How both public and private sector organisations

measure these benefits varies. They often quantify direct costs savings, environmental benefits, money spent or estimate hidden or indirect savings.

2.10 Sustainable Supply Chain Management Practices Adopted by Public Sector Organisations

In a study by Ioannou (2011) on impact of corporate sustainability on organisational performance, there was evidence that companies that focus on sustainability issues outperform their counterparts in the long term both in the stock market and accounting performance.

Hasan (2013:42-48) provides some of the SSCM practices that companies may implement to improve their performance. These SSCM practice dimensions and items have been based on previous literature that addressed various aspects of SSCM. A description of the GSCM practices and performance constructs is given below: There is agreement within the literature that environmental management practices in the organisation are a key to improve enterprise performance.

According to Hasan (2013:42-48), SSCM practices relating to suppliers and customers include but not limited to:

- a. Cooperation with suppliers for environmental objectives
- b. Supplier 's ISO14000 certification
- c. Company-wide environmental audits
- d. Environmental management for supplier's internal management
- e. Provide training to build supplier environmental management capacity
- f. Cooperation with customers for eco-design and cleaner production
- g. Cooperation with customers for green packaging

2.11 The Challenges of incorporating Sustainability in Supply Chains

Green-procurement initiatives typically don't come easily.

2.11.1 Getting buy-in from suppliers often takes a concerted and persistent effort.

Environmental managers may also encounter initial resistance to change from within their own company's procurement department.

2.11.2 Some environmentally preferable products aren't as readily available,

And may not meet performance specifications, or may not be cost-competitive. However, these products often outperform their less-green counterparts through improved efficiencies or favorable life-cycle costs. The better known challenges which exist for private sector organisations in implementing and stimulating green procurement programs include:

- a. **Estimating hidden costs and potential savings.** Total cost of ownership and life-cycle costing tools provide a means towards estimating potential benefits (e.g., reporting, material handling, and disposal), however, purchasing departments are often ill equipped to conduct such calculations. These calculations often require an in-depth knowledge of the products being procured and how they are used and disposed of.
- b. They often also include **Mis-informed advocacy groups.** One important challenge to green procurement as a whole is that well-intentioned environmental groups may not understand the full picture and will send conflicting messages. This can lead to frustration on the part of procurers and undermine the effort. There appears to be a need to facilitate communication among environmental groups to ensure that their advocacy efforts send a consistent message to procurement officers (i.e., education on what is an environmentally preferable car, paper, etc.) (Case, 2002).

2.11.3 Lack of clear definitions

In some cases the culprit is the. Many procurement professionals and their organisations are still unaware, uncertain or struggling to define the term “environmentally preferable.” This becomes particularly difficult when organisations need to balance multiple environmental attributes in their decision-making.

2.11.4 Integration into management Systems

In practice larger organisations are challenged with the **systems.** Decentralized organisations require consistent management systems to ensure consistent application of environmental initiatives. Many green procurement activities in the public sector have been bottom-up, initiated by small groups or individuals. Integrating green procurement activities within a quality or environmental management system can help ensure objectives, targets and measurement procedures are established throughout an organisation.

2.11.5 Educating marketing and sales professionals.

Many mid-sized companies face a challenge in for companies who are selling and marketing green products, educating sales people about the environmental attributes of a product or services is a challenge. This is especially important in industries with high employee turnover. Stimulating customer demand for environmentally preferable products is key, but if employees are not actively communicating this information, much opportunity to raise consumer awareness is lost.

The Lifecycle mindset is new to some procurement professionals and requires **changing the first cost mindset**. A key challenge identified by many public and private sector organisations is changing behavior with the purchasing departments. In many instances, procurement is based on established supplier relationships, personal or brand preferences. First cost as the prime decision factor in purchasing. Many public sector organisations do not have purchasing practices that factor in total cost of ownership, or full life-cycle costs of the organisation. Providing information and tools that will change these behaviors to favor environmentally preferable products will be key to overcoming the status quo.

Last but not least, **Insufficient and incomparable environmental information** makes sourcing difficult for procurement professionals. There is often not enough environmental information available on certain products (e.g., Interface requires information on embodied energy of supplied materials, which most suppliers do not have).

Making this information available in a manner that is relevant to procurement officers, procurement specifications and their decision-making processes is a further challenge. For instance, the Bank of America had to work hard to convince a standards-setting committee for the financial industry to accept recycled paper for checks and other encoded banking documents (PPRC, 1999).

2.12 Conclusion

This chapter extensively reviewed literature and other studies which have been done from the global perspective narrowed down to the Zambian context of the impact of adopting sustainable supply chain management practices on the performance of public sector organisations. It was important to review the literature in order to give an in-depth understanding

of supply chain management, sustainability, performance measures and how they can be all linked to meet the objectives of the study. It was also important to review the literature in order to appreciate what other researchers found and also helped the researcher to see the knowledge gaps and also identify possible areas for future research.

CHAPTER THREE

THEORETICAL AND CONCEPTUAL FRAMEWORKS

3.1 Introduction

This chapter brings out the theoretical framework and conceptual framework underpinning the research.

3.2 Theoretical Framework

Theories are formulated to explain, predict and understand phenomena and, in many cases, to challenge and extend existing knowledge within the limits of critical bounding assumptions. The theoretical framework is the structure that can hold or support a theory of a research study. The theoretical framework introduces and describes the theory that explains why the research problem under study exists. (Abend and Gabriel, 2008:173-179)

3.2.1 Systems Theory

This theory suggests that the ecological, social and economic systems are a group of interrelated, interacting or interdependent systems forming a complex whole. Environmentalists, social scientists and economists have laid a basis of an integrative theory of systems change which is based on the idea that human systems and nature systems, as well as social ecological systems are interlinked in endless adaptive cycles of growth, accumulation, restructuring, and renewal within hierarchical structures (Ashby and Hudson, 2012).

Subjects like complexity, self-organisation, connectionism and adaptive systems had already been studied in the 1940s and 1950s. Gold, Seuring and Beske (2010) observed that the systems view is based on the idea that all phenomena can be viewed as a web of relationships among elements, or a system. Second, all systems have common patterns, behaviors and properties that can be understood and used to develop greater insight into the behavior of complex phenomena.

The concepts of sustainability and sustainable development are analyzed from a systems perspective. Sustainability has three components with are greatly interdependent and whose relationship can be easily explained using the systems theory. The economic component, social

component and environmental component are interrelated just like a system in order to achieve sustainability in an organisation.

3.3 Conceptual Framework

The conceptual frame work links the independent variables to the dependent variable (Kombo *et al*, 2006). A variable is a concept which can take different qualitative values (Kothari, 2008). According to Kothari, (2008) a dependent variable is a consequence of the other variable whereas an independent variable is the variable that is antecedent to the dependent variable. An independent variable is the presumed cause, whereas the dependent variable is the presumed effect. Therefore, by identifying the main drivers of adopting Sustainable Supply Chain Management (SSCM) practices, establishing (SSCM) practices adopted by Public Sector Organisations (PSOs) and determining the challenges of implementing sustainability in PSO supply chains in Zambia, an assessment of the impact of adopting sustainable Supply Chain Management practices on the performance of public sector organisations in Zambia, case study of Zambia Air Force (ZAF) an be achieved. These constructs and their relationships are illustrated in the following Figure 3.1:

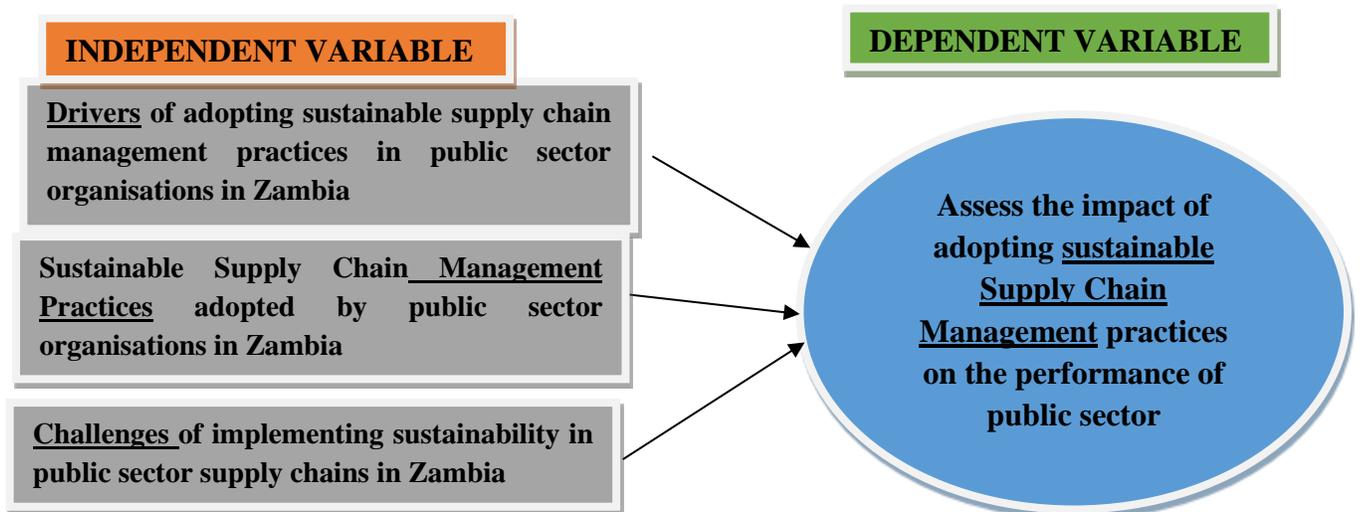


Figure 3.1: Conceptual Framework

Source: (Researcher, 2019)

3.4 Operationalisation

This term describes when a variable is defined by the researcher and a way of measuring that variable is developed for the research.

The term operationalization can be applied to independent variables (IV), dependent variables (DV) or co variables (in a correlational design)

Table 3: Operationalization table

The Variable	The operationalised Variable
Environmental management practices within the organisation	<ol style="list-style-type: none"> 1. Commitment of GSCM from senior and middle level managers 2. Total quality environmental management 3. Environmental compliance and auditing program 4. ISO 14000 certification
SSCM practices relating to suppliers and customers	<ol style="list-style-type: none"> 1. Cooperation with suppliers for environmental objectives 2. Supplier's ISO14000 certification 3. Company-wide environmental audits 4. Environmental management for suppliers internal management 5. Provide training to build supplier environmental management capacity 6. Cooperation with customers for eco-design and cleaner production 7. Cooperation with customers for green packaging
Environmentally conscious product and process design	<ol style="list-style-type: none"> 1. Environmentally friendly raw material 2. Design of products for reduced consumption of material and energy 3. Design of products for reuse, recycle, recovery of material 4. Design of products to avoid or reduce use of hazardous products and/or their manufacturing process 5. Optimisation of process to reduce solid/liquid waste and emission Use reverse logistics <p>Note.</p>

Adapted from Sustainable SCM Practices and Operational Performance, in The American Journal of Industrial and Business Management by M. Hasan (2013). Vol 3 No 1, 2013, pp.42

3.5 Conclusion

This chapter discussed the theoretical and conceptual framework where the systems theory was discussed in-depth in relation to the study. In the conceptual framework independent variables were identified as drivers, management practices and challenges while the dependent variable was sustainable supply chain management.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Introduction

This chapter discusses the methodology that was used in achieving the objectives of the study. It includes the research design, target population, sample size and sampling techniques, data collection as well as data analysis.

4.2 Philosophical Assumptions

4.2.1 Ontological Position

According to Bryman and Bell (2007), social ontology is concerned with the nature of social entities and the meanings of social phenomena where the central point of orientation is objectivism (realism) or constructionism (constructivism or nominalism). Therefore, my ontological standpoint in this research is mainly towards constructionism. In my opinion, supply chains are constructed by social actors. In fact, it is the supply chain agents and stakeholders that give meaning to its existence. Management, governance, and development of supply chains require an understanding of subjectivity and revisions in supply chains strategies and operations.

4.2.2 Epistemological position

Epistemology is the philosophy of knowledge and involves long-standing debates about what knowledge is and how it is obtained (Kvale and Brinkmann, 2009). The central point of orientation in epistemology is positivism or interpretivism (anti-positivism or relativism) (Bryman and Bell, 2007). Therefore, my epistemological stance in this research was mainly anti-positivistic with some elements of positivistic epistemology. Studying supply chains from this standpoint is better matched with the subjectivity that is intrinsic in management, governance, and the development of supply chains.

4.2.3 Phenomenological position

Phenomenology refers to the way in which we as humans make sense of the world around us. It was apparent that the study relates a phenomenon that interpreted usage of perceptions, opinions and experiences of human beings (Saunders, 2009) as a branch of science and philosophy,

phenomenology aims to develop a rigorous and unbiased study of subjective experience by exposing how our prejudgments impose themselves upon our reality.

In this study, it was very important to interview people that had experience and knowledge in order to understand the area of study.

4.2.4 Axiology

Axiology is a branch of philosophy dealing with quality or value. (Rosenthal, 1967) Axiology is the branch of philosophy that studies judgements about values including both ethics and aesthetics. A good study is based on values and credibility. The values are critical components to research. (Saunders, *et al*,2009). This study therefore gathered credible data and values to explain impact of adopting sustainable supply chain practices in the Zambia Air Force and further obtained meaningful results to give a position at the end of the study.

4.3 Research Design

This study adopted a descriptive (qualitative) survey design to assess the impact of adopting sustainable Supply Chain Management practices on the performance of public sector organisations. According to Mugenda and Mugenda, (2003) descriptive survey design is appropriate because it involves collecting data in order to answer questions concerning the current status of subjects of the study. A descriptive research design helps to ascertain and be able to describe the characteristics of the variables of interest in a situation (Sekaran, 2006). According to Kothari (2008), a survey is a research method for collecting information from a selected group of people using standardized questionnaires or interviews.

The scientific process in this research was started by clarifying the ontological and epistemological standpoints. These are important as they later influence the data that was collected; how they were to be collected; how they were analysed; theories and assumptions that were to be considered; and types of perspectives, views and paradigms that were required.

4.4 Target Population

The target population of the empirical study was fifty (30) personnel from Zambia Air Force (ZAF) in Lusaka-based Stations with experiences related to the study. The study also targeted the

staff in Procurement and Supply, Operations and Finance departments because they were in a better position to respond appropriately on the matters being researched.

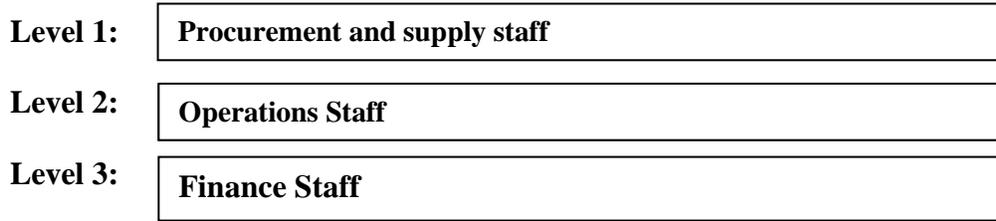


Figure 4.2: Sampling Model

Level 1 represents survey respondents forming part of the Procurement and Supply department largely tasked for defining specifications and sourcing of requirements (input materials), among other responsibilities.

Level 2 focus on survey respondents from Operations department responsible for actual utilizations of in-puts.

Level 3 represents survey respondents from Finance department who make payments for various material requirements.

4.5 Sample Size

Qualitative analyses typically require a smaller sample size than quantitative analyses. Qualitative sample sizes should be large enough to obtain enough data to sufficiently describe the phenomenon of interest and address research questions. The goal of qualitative researcher should be the attainment of saturation. Saturation occurs when adding more participants to the study does not result in additional perspectives or information. Glaser and Strauss (1967) recommend the concept of saturation for achieving an appropriate sample size in qualitative studies. Other guidelines have also been recommended. For an ethnography, Morse (1994) suggested approximately 30-50 participants. For grounded theory, Morse (1994) suggested 30-50 interviews, while Creswell (1998) suggested only 20-30. For phenomenological studies, Creswell (1998) recommends 5-25 and Morse (1994) suggests at least 6. These recommendations can help a researcher estimate how many participants they will need, but ultimately, the required number of participants should depend on when saturation is reached.

In order to make the survey among these personnel more practical, a sample of the below-mentioned target population was taken. Numerically or quantitatively speaking, the sample table is represented in Table 4 as follows:

Table 4: Sampling Table

Station/Department	ZAF Central Equipment Depot
1. Procurement & Supply	10
2. Operations	10
3. Finance	10
TOTAL	30

4.6 Sampling Technique

The study used stratified random sampling techniques. The Stratified technique was used to group the samples in strata having similar characteristics. The technique was used to achieve representation of the main respondents as the population studied was heterogeneous. The main respondents were stratified on the basis of their departments.

For respondents purposive sampling was used in order to access information from people with experiences for the required data. Purposive sampling is a technique widely used in qualitative research for identification and selection of information-rich cases for the most effective use of limited resources (Patton, 2002)

4.7 Instrument for Data Collection

Related to the research study, the survey questionnaire was developed under the inspiration of University of Zambia guidelines for creating questionnaires and discussions was held with senior staff for the purpose of testing its practicability. The questionnaire developed had several questions that had structured responses and also included some that were open-ended the content of the questionnaire was evaluated for non-ambiguity, relevance, validity and interpretation.

In-depth interviews were used to collect data and are described as “a conversation with a purpose” (Kahn and Cannell, 1957, p.149), in-depth interviews may be the overall strategy or one of several methods employed in a study. Interviews vary in terms of a priori structure and in latitude the interviewee has in responding to questions. Patton (1990, pp.280-290) categorizes interviews into three general types: the informal conversational interview, the general interview guide approach, and the standardized open-ended interview. Typically, qualitative in-depth interviews are much more like conversations than formal events with predetermined response categories. The researcher explores a few general topics to help uncover the participants meaning perspective, but otherwise respects how the participant frames and structures the responses. This, in fact, is an assumption fundamental to qualitative research-the participant’s perspective on the phenomenon of interest should unfold as the participant views it, not as the researcher views it.

4.8 Procedure of Data Collection

Data type both primary and secondary data was collected in order to achieve the research objectives. Primary data was collected from the respondents while secondary data was from reviewed literature. The theoretical part or the literature of the study was represented by the debate of various parameters relative to the impact of adopting sustainable supply chain management practices on the performance public sector organisation.

4.9 Data Analysis Techniques

Data analysis is the process of bringing order, structure, and meaning to the mass of collected data. It is messy, ambiguous, time consuming, creative, and fascinating process. It does not proceed in a linear fashion; it is not neat. Qualitative data analysis is a search for general

statements about relationships among categories of data; it builds grounded theory. Useful discussions and procedures are provided in Miles and Huberman (1993) and Patton (1990)

Thematic analysis was used where data from questionnaires and interviews was summarized, edited, coded, tabulated and analyzed. Thematic analysis provides a purely qualitative, detailed, and nuanced account of data (Braun & Clarke, 2006). Data was analyzed using Excel. This provided charts, graphs and tables to give the reader, a condensed picture of the data. Information about the scores in a sample was presented in tables and charts to make it easier for readers to see and understand the evidence collected.

4.1.0 Ethical Consideration

Ethical Considerations is the responsibility of the researcher to recognize and protect the rights of participants in the study. Both phases of the study endeavored to abide by good ethical standards through the administration of the informed consent and ensuring that confidentiality and privacy were observed and the acknowledgement of all sources of information. Ethical approval was sought from the ethical committee at the University of Zambia.

Consent: participants were asked if they were willing to participate in the study and were also asked to sign the consent form.

Anonymity: In order to maintain anonymity for the participants, the study used pseudonyms. Potential participants were assured of confidentiality in the consent forms and all published findings were included as pseudonym. There was no distinguishing information linking participants to the pseudonym or study.

Data Security: All the interview transcripts, and signed informed consent papers were stored in a protected computer. All written data was scanned into my computer and stored in a password protected computer. Physical copies were shredded.

Participants of this survey were duly informed and assured that all the information they provided was strictly confidential and participation was voluntary.

4.1.1 Pilot Study

The form and the contents of the questionnaire were finalized only after the questionnaire was pre-tested. The researcher carried out a pre-test to ensure that the questions to be asked were having the same meaning for all the respondents of the study. The sampled participants during pretesting were not being part of the participants who were interviewed in the actual study. Pretesting has the capacity to reduce sampling error and increase response rates (Drennan, 2003; de Leeuw, 2001) and may be a valuable method to evaluate whether a new measure performs in the field as planned (Greco and Walop, 1987). A well-constructed data collection instrument according to Gupta (2011) eliminates the worries of validity and reliability. Pre-testing ensured that all the questions which were required were clarified and corrected.

Apart from the questionnaire, a certain number of personal interviews were also conducted with project managers in view of getting sufficient information for the materialization of this research study.

4.1.2 Conclusion

The scientific process in this research was started by clarifying the philosophical assumptions. These are important as they later influenced the data that was collected, how it was collected, how they were analysed; theories and assumptions that were considered; and types of perspectives, views and paradigms that were required.

**CHAPTER FIVE:
PRESENTATION OF FINDINGS/RESULTS**

5.1 Introduction

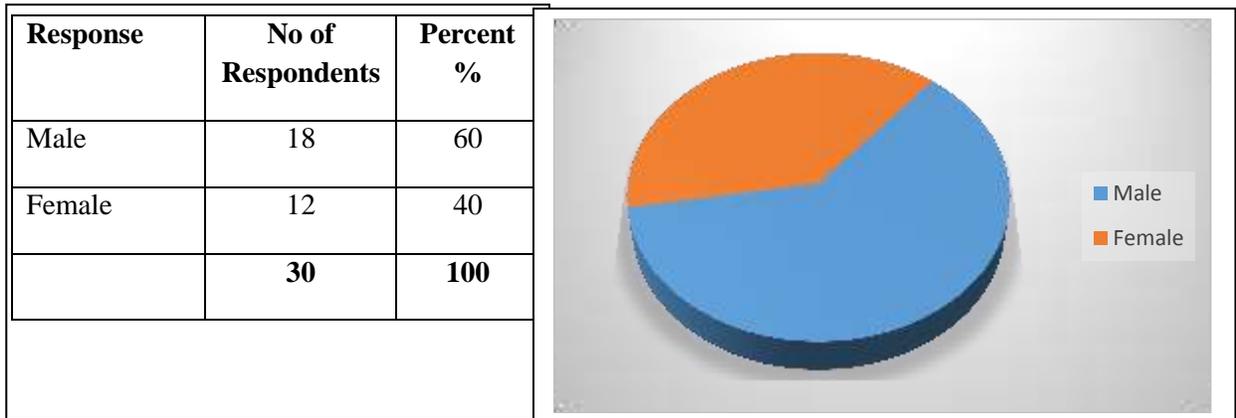
In this chapter, the results of this research paper are presented. Of the 30 questionnaires administered, 30 were returned completed and responsive. This entails a response rate of 100 percent.

5.2 Background Characteristics of Respondents

5.2.1 Gender of Respondents

Results indicated that the majority 60 percent (18) of the respondents were male and the rest 40 percent (12) were female. The results are presented in the Table 5 below.

Table 5: Gender

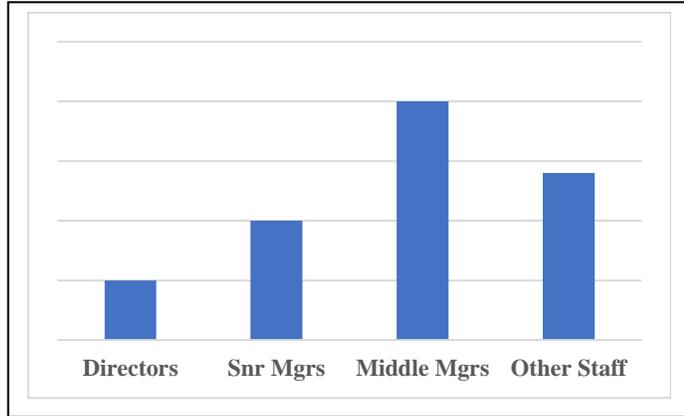


5.2.2 Rank/Position in Organisation

Results showed that the majorities 40 percent (12) of the respondents were middle managers, 20 percent (06) of them were senior managers, 10 percent (03) were directors and the rest 30 percent (09) were other staff. The results are presented in the Table 6 below.

Table 6: Rank/Position in Organisation

Response	No of Respondents	Percent %
Directors	03	10
Snr Mgrs	06	20
Middle Mgrs	12	40
Other Staff	09	30
	30	100

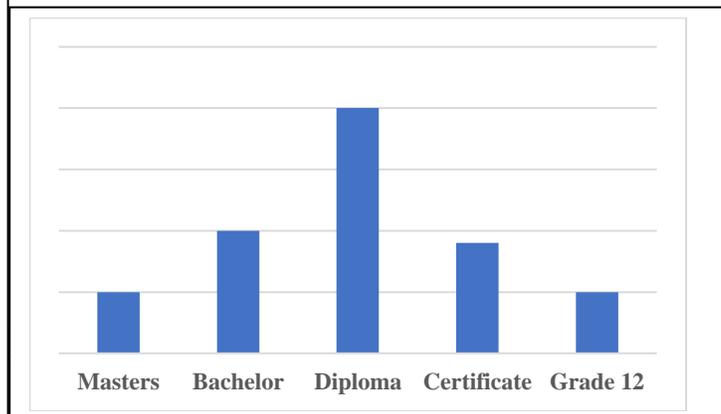


5.2.3 Level of Academic Achievement

It was ascertained that out of the 30 respondents, the majority 40 percent (12) were Diploma holders, 20 percent (06) were Bachelor degree holders, 20 percent (06) were certificate holders and percent 10 (03) had Master's Degree while 10 percent (03) were Grade 12. The results are presented in the Table 7 below.

Table 7: Level of Academic Achievement

Response	No of Respondents	Percent %
Masters	03	10
Bachelor	06	20
Diploma	12	40
Certificate	06	20
Grade 12	03	10
	30	100

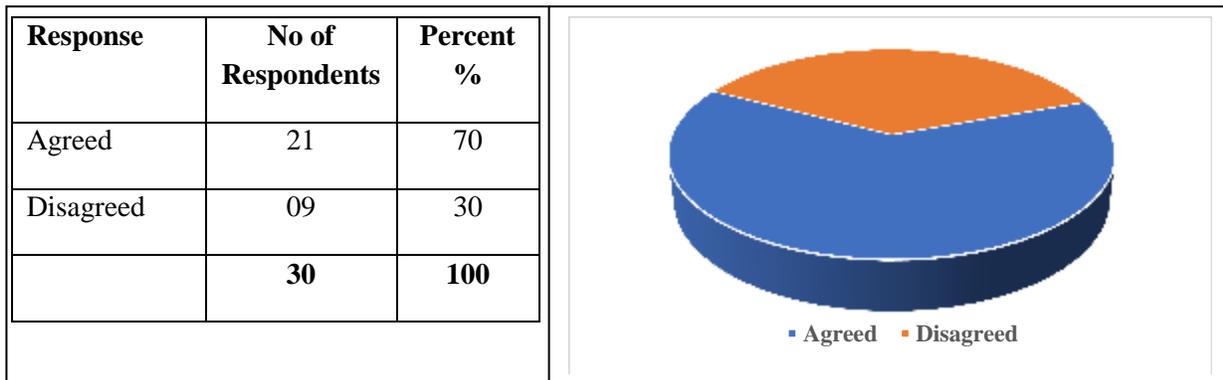


5.3.1 Easier Compliance with Environmental Regulations

In this regard, respondents were asked whether

Respondents were asked whether easier compliance with environmental regulations was a key driver of sustainability in supply chain. In response, the majority 70 percent (21) answered in the affirmative while the remainder 30 percent (09) disagreed. The results are depicted in the Table 8 below.

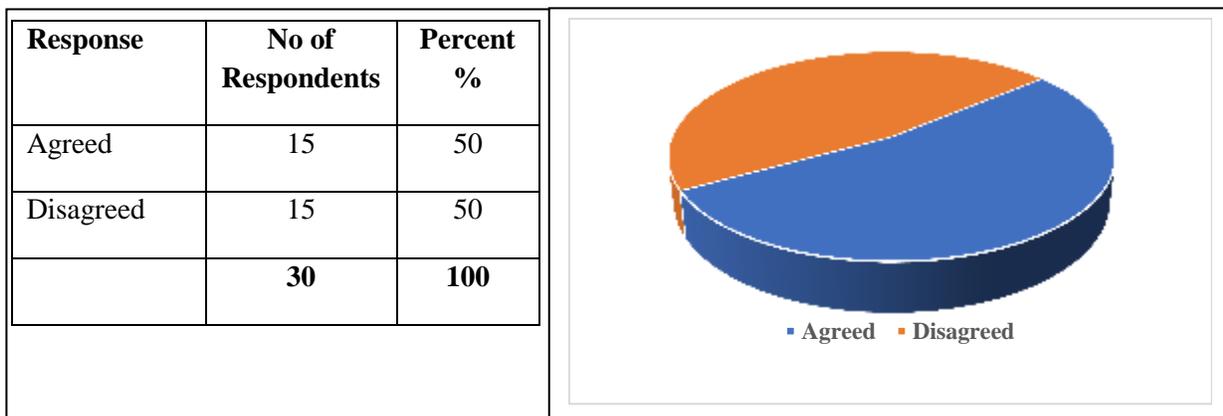
Table 8: Compliance with Environmental Regulations



5.2.4 Demonstration of Due Diligence

In this regard, respondents were asked whether demonstration of due diligence. In response, the majority 50 percent (15) agreed while the remainder 50 percent (15) said no. The results are depicted in the Table 9 below.

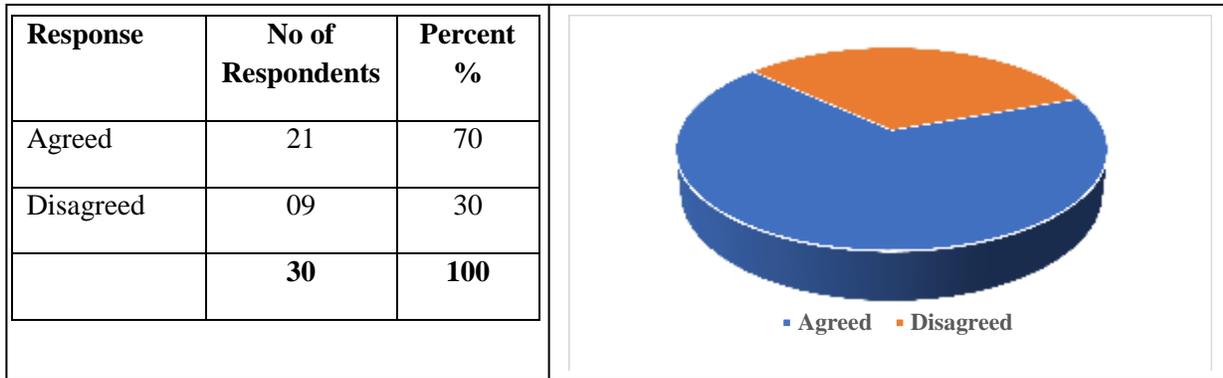
Table 9: Due Diligence



5.2.5 Reduced Risk of Accidents, Reduced Liability and Lower Health and Safety Costs

In this regard, respondents were asked whether reduced risk of accidents, reduced liability and lower health and safety costs were key drivers of sustainability in supply chain. In response, the majority 70 percent (21) said yes while the remainder 30 percent (09) disagreed. The results are depicted in the Table 10 below.

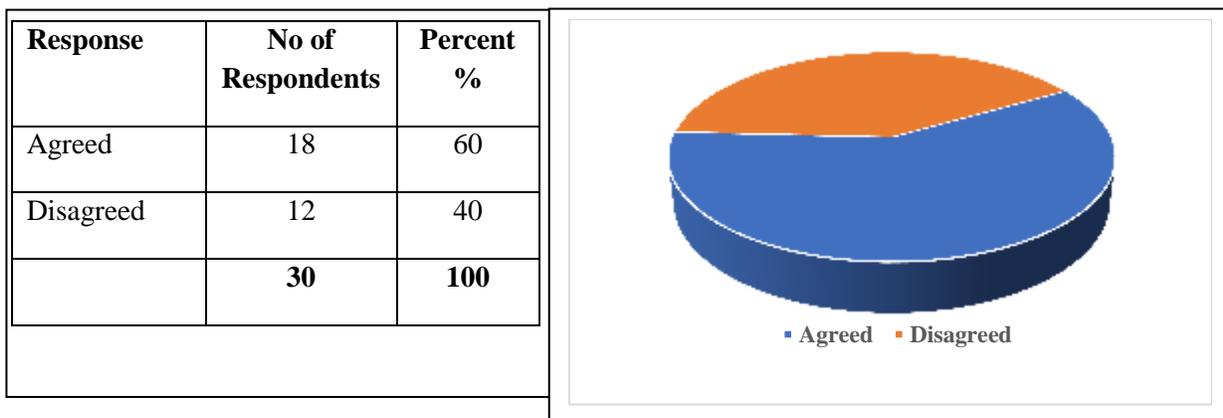
Table 10: Reduced Risk



5.2.6 Support of Environmental/Sustainability Strategy and Vision

In this regard, respondents were asked whether support of environmental/sustainability strategy and vision was a key driver of sustainability in supply chain. In response, the majority 60 percent agreed while the rest 40 percent (12) answered in the negative. The results are depicted in the Table 11 below.

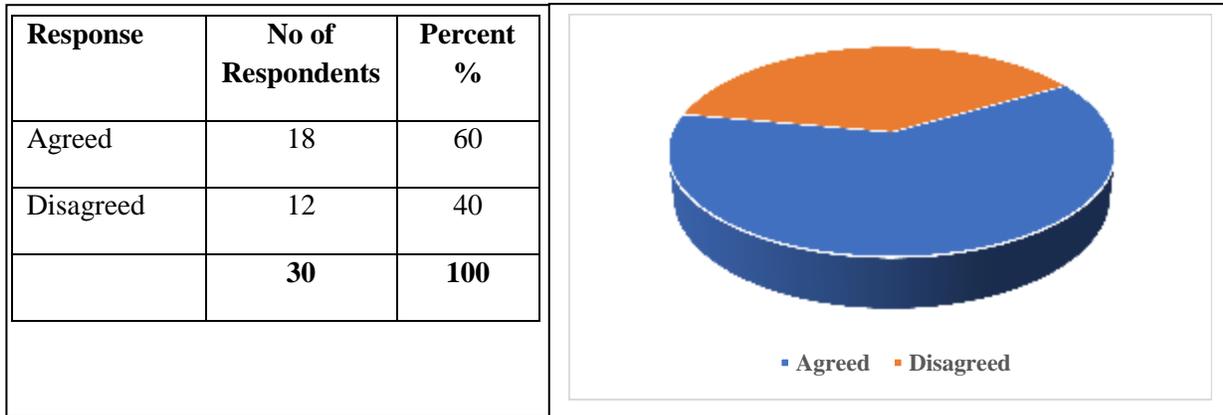
Table 11: Support of Sustainability Strategy and Vision



5.2.7 Improved Corporate Image, Brand and Goodwill

In this regard, respondents were asked whether improved corporate image, brand and goodwill was a key driver of sustainability in supply chain. In response, the majority 60 percent (18) answered in the affirmative while the rest 40 percent (12) disagreed. The results are depicted in the Table 12 below.

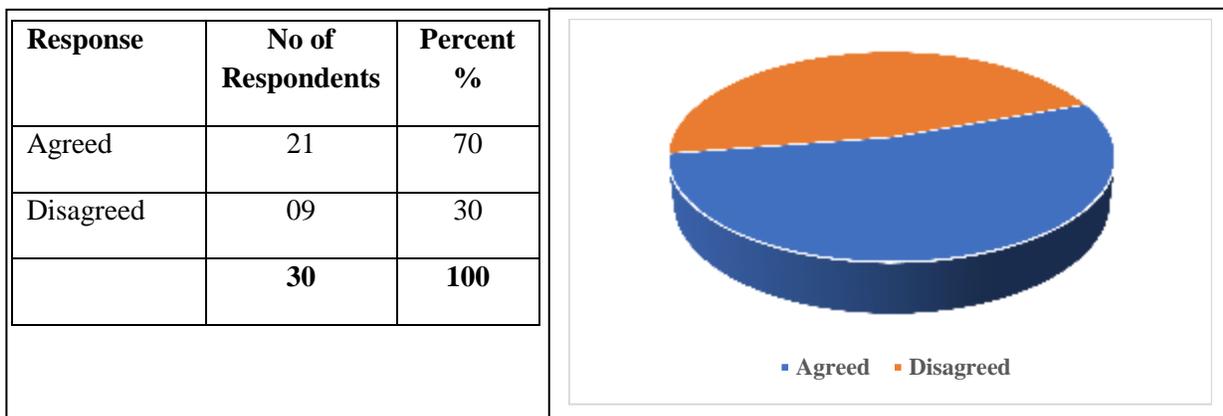
Table 12: Improved corporate image, brand and goodwill



5.2.8 Improved Employee and Community Health

In this regard, respondents were asked whether improved employee and community health through cleaner air and water, less demand for landfill and less demand for resources was a key driver of sustainability in supply chain. In response, the majority 70 percent (21) said yes while the remainder 30 percent (09) disagreed. The results are depicted in the Table 13 below.

Table 13: Improved Employee and Community Health

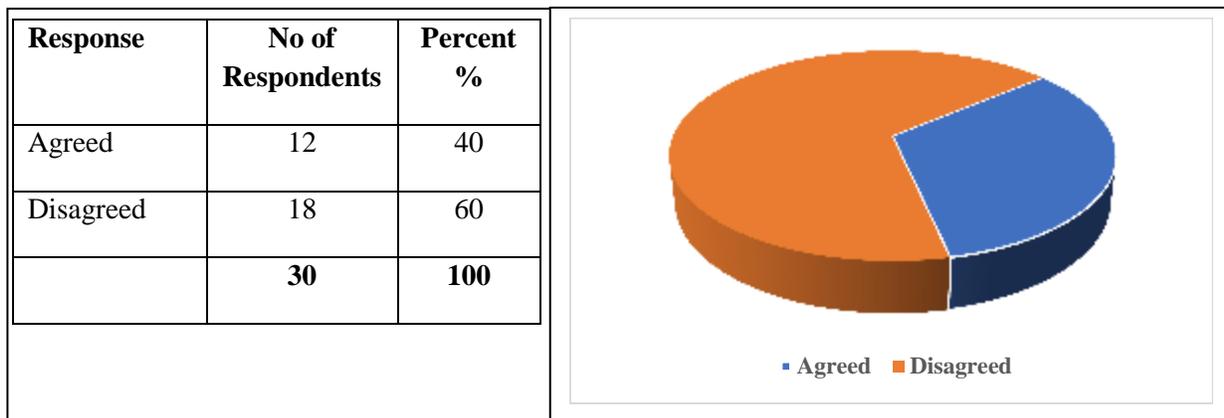


5.3 Extent of Adoption of Sustainable SCM Practices

5.3.1 Climate Change Commitment Safety

In this regard, respondents were asked whether climate change commitment safety has improved sustainability in supply chains. In response, the majority 60 percent (18) disagreed while the rest 40 percent agreed. The results are depicted in the Table 14 below.

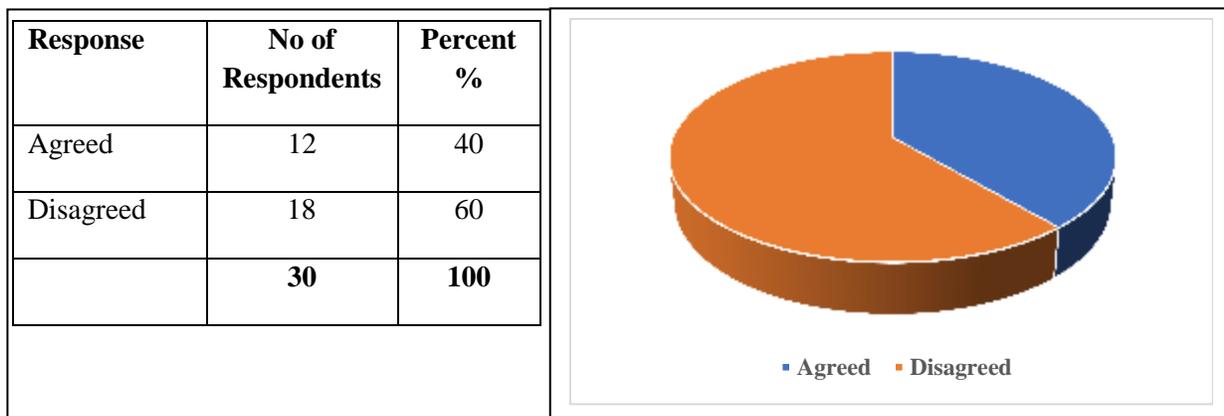
Table 14: Climate Change Commitment Safety



5.3.2 Ensuring Suppliers Have a Sustainability Policy

In this regard, respondents were asked whether ensuring suppliers have sustainability policy has improved sustainability in supply chains. In response, the majority 60 percent (18) did not agree while the rest 40 percent (12) agreed. The results are depicted in the Table 15 below.

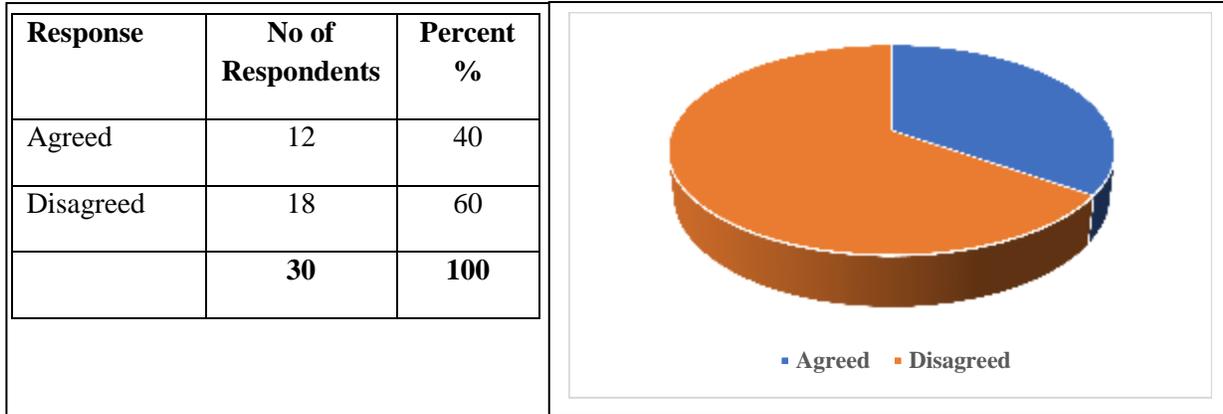
Table 15: Sustainability Policy



5.3.3 Managing Products Returns

In this regard, respondents were asked whether managing products returns had improved. In response, the majority 60 percent (18) answered in the negative while the rest 40 percent (12) agreed. The results are depicted in the Table 16 below.

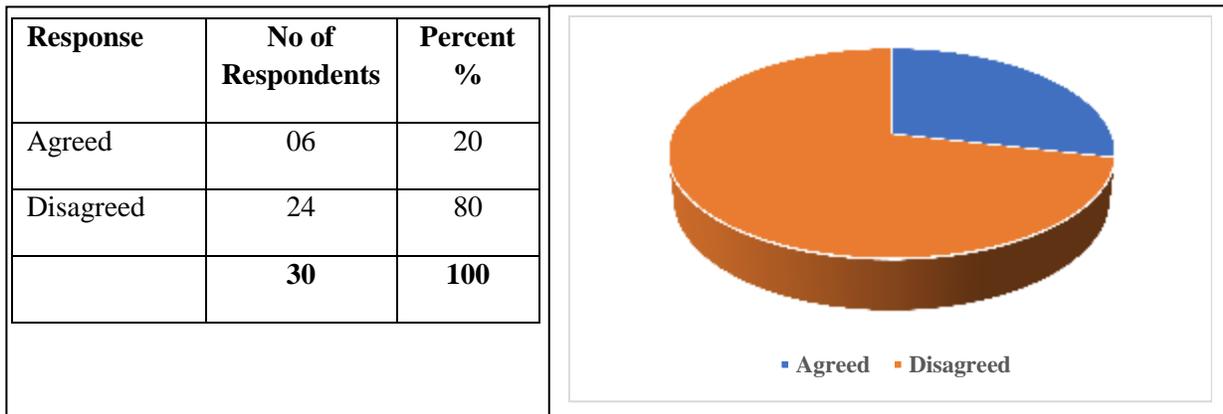
Table 16: Products Returns



5.3.4 Green Purchasing Strategies

In this regard, respondents were asked whether green purchasing strategies has improved sustainability in supply chains. In response, the majority 80 percent (24) disagreed while the rest 20 percent (06) agreed. The results are depicted in the Table 17 below.

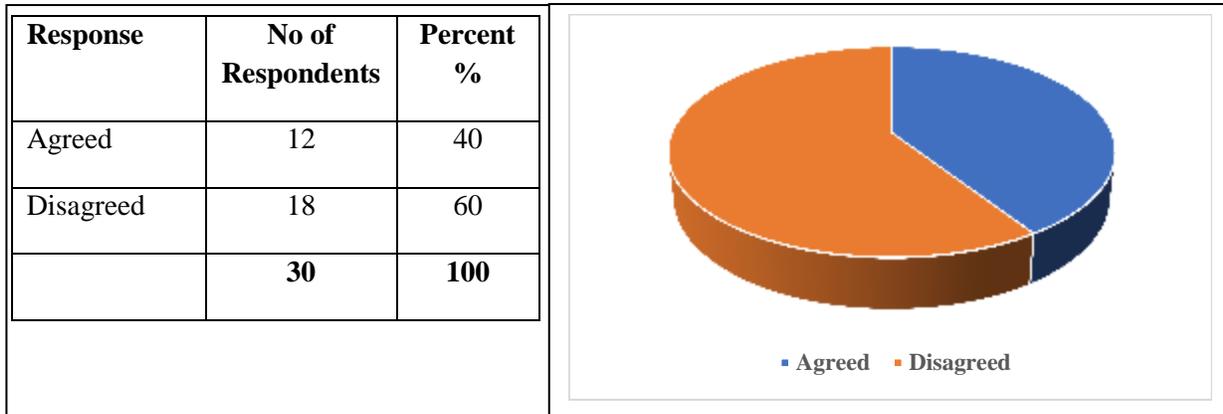
Table 17: Green Purchasing Strategies



5.3.5 Suppliers' ISO-14000 Certification

In this regard, respondents were asked whether Suppliers' ISO-14000 certification has improved sustainability in supply chains. In response, the majority 60 percent (18) disagreed while the rest 40 percent (12) agreed. The results are depicted in the Table 18 below.

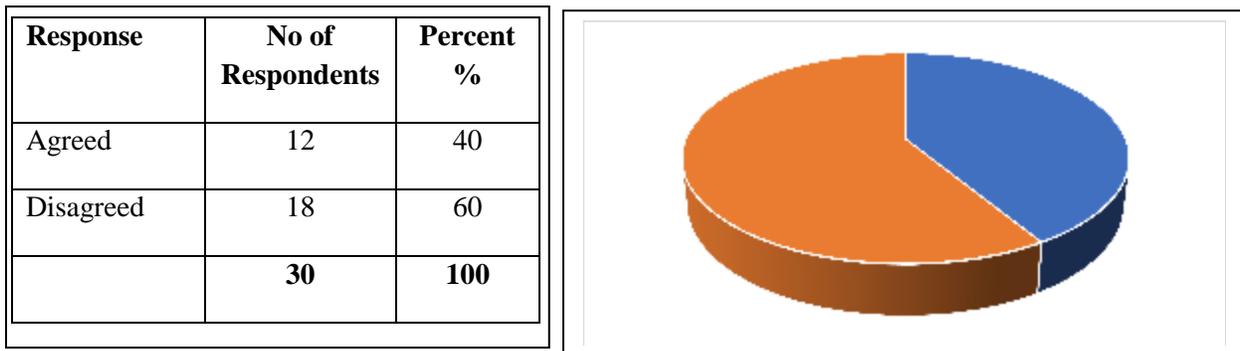
Table 18: ISO-14000 Certification



5.3.6 Managing Waste Disposal

In this regard, respondents were asked whether managing waste disposal has improved sustainability in supply chains. In response, the majority 60 percent (18) disagreed while the rest 40 percent (12) agreed. The results are depicted in the Table 19 below.

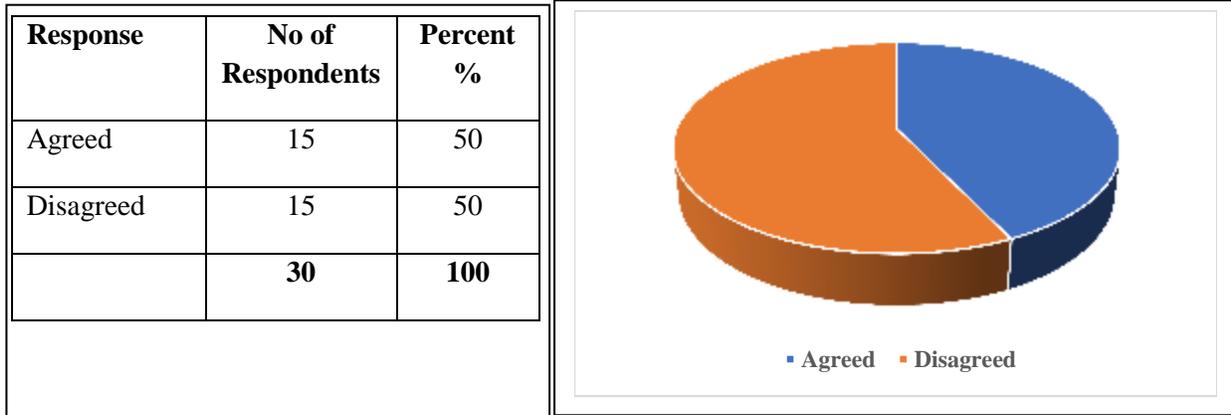
Table 19: Waste Disposal



5.3.7 Reuse of Material

In this regard, respondents were asked whether Reuse of material has improved sustainability in supply chains. In response, the majority 50 percent (15) disagreed while the rest 50 percent (15) agreed. The results are depicted in the Table 20 below.

Table 20: Reuse of material

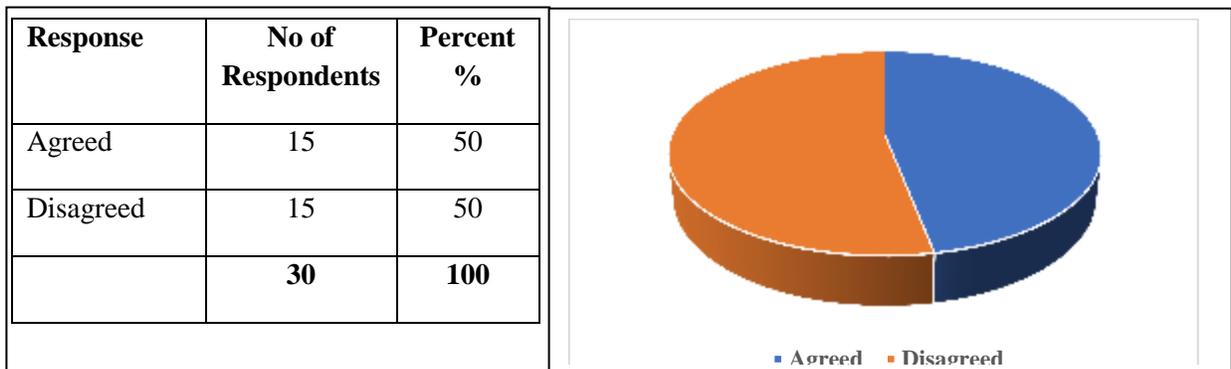


5.4 The Challenges of Incorporating Sustainability in Supply Chains

5.4.1 High Overall Cost Increase

In this regard, respondents were asked whether High overall cost increase was a challenge in incorporating sustainability in supply chains. In response, the majority 50 percent (15) disagreed while the rest 50 percent (15) agreed. The results are depicted in the Table 21 below.

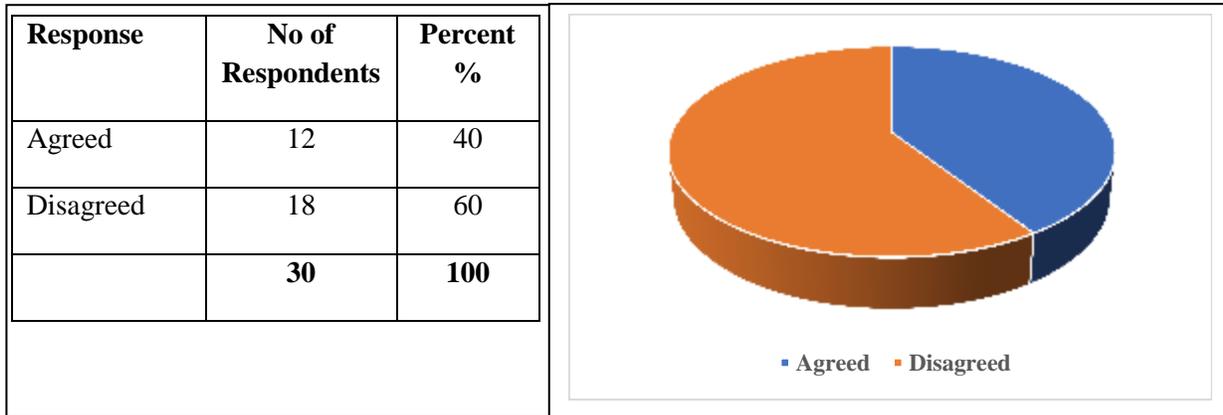
Table 21: Cost Increase



5.4.2 Difficulty in Operationalizing Sustainable Development

In this regard, respondents were asked whether difficulty in operationalizing sustainable development was a challenge in incorporating sustainability in supply chains. In response, the majority 60 percent (18) disagreed while the rest 40 percent (12) agreed. The results are depicted in the Table 22 below.

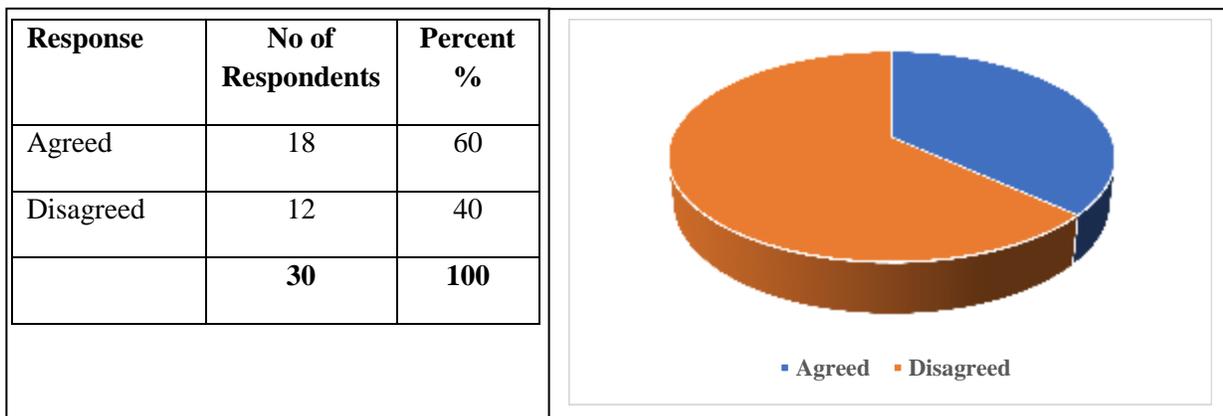
Table 22: Difficulty in Operationalizing Sustainable Development



5.4.3 Management of Demand and Supply Uncertainties

In this regard, respondents were asked whether Management of demand and supply uncertainties was a challenge in incorporating sustainability in supply chains. In response, the majority 60 percent (18) disagreed while the rest 40 percent (12) agreed. The results are depicted in the Table 23 below.

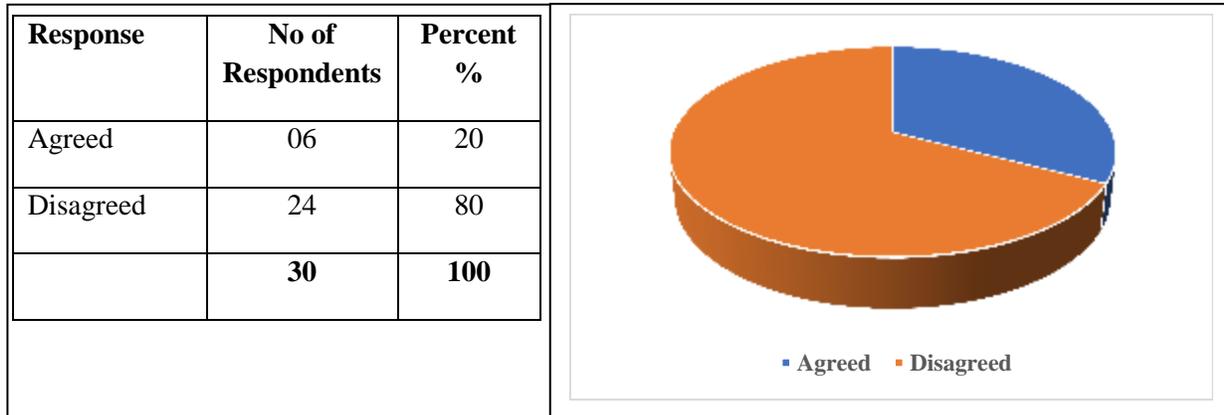
Table 23: Demand and Supply Uncertainties



5.4.4 Staff Resistance to Adopting the Change

In this regard, respondents were asked whether Staff resistance to adopting the change was a challenge in incorporating sustainability in supply chains. In response, the majority 80 percent (24) disagreed while the rest 20 percent (06) agreed. The results are depicted in the Table 24 below.

Table 24: Staff Resistance



DISCUSSION OF RESULTS

5.5 Overview

In this chapter, the results of this research paper are discussed and analyzed.

5.6 Key Drivers of Sustainability in Supply Chain

5.6.1 Easier Compliance with Environmental Regulations

Respondents were asked whether easier compliance with environmental regulations was a key driver of sustainability in supply chain. The result entails easier compliance with environmental regulations was a key driver of sustainability in supply chain.

5.6.2 Demonstration of Due Diligence

Respondents were asked whether demonstration of due diligence was a key driver of sustainability in supply chain. The result showed that demonstration of due diligence was a key driver of sustainability in supply chain.

5.6.3 Reduced Risk of Accidents, Reduced Liability and Lower Health and Safety Costs

Respondents were asked whether reduced risk of accidents, reduced liability and lower health and safety costs were key drivers of sustainability in supply chain. The result shows that reduced risk of accidents, reduced liability and lower health and safety costs were key drivers of sustainability in supply chain.

5.6.4 Support of Environmental/Sustainability Strategy and Vision

Respondents were asked whether support of environmental/sustainability strategy and vision was a key driver of sustainability in supply chain. The result therefore entails support of environmental/sustainability strategy and vision was a key driver of sustainability in supply chain.

5.6.5 Improved Corporate Image, Brand and Goodwill

Respondents were asked whether improved corporate image, brand and goodwill was a key driver of sustainability in supply chain. The result entails improved corporate image, brand and goodwill was a key driver of sustainability in supply chain.

5.6.6 Improved Employee and Community Health

Respondents were asked whether improved employee and community health through cleaner air and water, less demand for landfill and less demand for resources was a key driver of sustainability in supply chain. The result shows that improved employee and community health through cleaner air and water, less demand for landfill and less demand for resources was a key driver of sustainability in supply chain.

5.7 Extent of Adoption of Sustainable SCM Practices

5.7.1 Climate Change Commitment Safety

Respondents were asked whether climate change commitment safety has improved sustainability in supply chains. The result entails climate change commitment safety has NOT improved sustainability in supply chains.

5.7.2 Ensuring Suppliers Have a Sustainability Policy

Respondents were asked whether ensuring suppliers have a sustainability policy has improved sustainability in supply chains. Therefore, the results showed that ensuring suppliers have a sustainability policy has NOT improved sustainability in supply chains.

5.7.3 Managing Products Returns

Respondents were asked whether managing products returns had improved. The result showed that managing products returns had NOT improved.

5.7.4 Green Purchasing Strategies

Respondents were asked whether green purchasing strategies has improved sustainability in supply chains. Therefore, this result shows that green purchasing strategies has NOT improved sustainability in supply chains.

5.7.5 Suppliers' ISO-14000 Certification

Respondents were asked whether Suppliers' ISO-14000 certification has improved sustainability in supply chains. Therefore, this result shows that Suppliers' ISO-14000 certification has NOT improved sustainability in supply chains.

5.7.6 Managing Waste Disposal

Respondents were asked whether managing waste disposal has improved sustainability in supply chains. This result entails managing waste disposal has NOT improved sustainability in supply chains.

5.7.7 Recycling/Reuse of Material

Respondents were asked whether Recycling/Reuse of material has improved sustainability in supply chains. Therefore, this result shows that Recycling/Reuse of material has NOT improved sustainability in supply chains.

5.8 The Challenges of Incorporating Sustainability in Supply Chains

5.8.1 High Overall Cost Increase

Respondents were asked whether high overall cost increase was a challenge in incorporating sustainability in supply chains. Therefore, this result shows that high overall cost increase was NOT a challenge in incorporating sustainability in supply chains.

5.8.2 Difficulty in Operationalizing Sustainable Development

Respondents were asked whether difficulty in operationalizing sustainable development was a challenge in incorporating sustainability in supply chains. This result entails difficulty in operationalizing sustainable development was NOT a challenge in incorporating sustainability in supply chains.

5.8.3 Management of Demand and Supply Uncertainties

Respondents were asked whether Management of demand and supply uncertainties was a challenge in incorporating sustainability in supply chains. Therefore, this result shows that Management of demand and supply uncertainties was NOT a challenge in incorporating sustainability in supply chains.

5.8.4 Staff Resistance to Adopting the Change

Respondents were asked whether Staff resistance to adopting the change was a challenge in incorporating sustainability in supply chains. This result entails Staff resistance to adopting the change was NOT a challenge in incorporating sustainability in supply chains.

Conclusion

By identifying the main drivers of adopting Sustainable Supply Chain Management (SSCM) practices, establishing (SSCM) practices adopted by Public Sector Organisations (PSOs) and determining the challenges of implementing sustainability in PSO supply chains in Zambia, an assessment of the impact of adopting sustainable Supply Chain Management practices on the performance of public sector organisations in Zambia, case study of Zambia Air Force (ZAF) can be achieved

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Governments around the world have sought to address the challenges of sustainable development by leveraging their influence as major procurers of goods and services. In this study, we have provided the first comprehensive overview of how public bodies internationally are implementing Sustainable supply chain management practices and of the factors that shape the engagement of organisations with Sustainable supply chain management practices (SSCMP). Analysis shows that while most public sector organisations are embedding some sustainability criteria in their procurement, some areas of sustainability are relatively neglected and there is wide variation across regions in the overall extent and nature of involvement with Sustainable supply chain management practices. Research showed that there are several managerial and policy implications.

First, leadership is a significant factor in SSCMP being implemented by public sector organisations, and if senior managers are supportive of sustainability and incorporate SSCMP into planning, strategies and goal setting, then the purchasing team will implement SSCMP.

Financial concerns still remain the biggest barrier to SSCMP, with public sector procurers resistant to paying more to buy sustainably. Across regions, environmental aspects of SSCMP are relatively established but there is variation in other aspects of SSCMP such as buying from diverse suppliers, supporting human rights and ensuring safe practices in the supply chain. If governmental policy and legislation is supportive of SSCMP, public sector organisations are more likely to implement SSCMP. Policy makers need to be mindful of the emphasis they place on the various aspects of SSCMP, as different interpretations are apparent in different countries, and there is no right way to approach SSCMP. Internationally, sustainability practices are changing apace, and sharing learning across regions will benefit all.

In this section, the research findings were briefly shown in order to support the aim of this research paper in accordance with the research objectives in section 1.5 of this research report. The research objectives of this study provided clear mention of:

- a. The identification of the main drivers of adopting sustainable supply chain management practices in public sector organisations in Zambia. Thus, the main drivers of adopting sustainable supply chain management practices in public sector organisations in Zambia include the following:
- 1) Easier compliance with environmental regulations was a key driver of sustainability in supply chain.
 - 2) Demonstration of due diligence was a key driver of sustainability in supply chain.
 - 3) Reduced risk of accidents, reduced liability and lower health and safety costs were key drivers of sustainability in supply chain.
 - 4) Support of environmental/sustainability strategy and vision was a key driver of sustainability in supply chain.
 - 5) Improved corporate image, brand and goodwill were a key driver of sustainability in supply chain.
 - 6) Improved employee and community health through cleaner air and water, less demand for landfill and less demand for resources was a key driver of sustainability in supply chain.
- b. The establishment of sustainable supply chain management practices adopted by public sector organisations in Zambia. Thus, sustainable supply chain management practices adopted by public sector organisations in Zambia include the following:
- 1) Climate change commitment safety has NOT improved sustainability in supply chains.
 - 2) Ensuring suppliers have a sustainability policy has NOT improved sustainability in supply chains.
 - 3) Managing products returns had NOT improved.
 - 4) Green purchasing strategies has NOT improved sustainability in supply chains.
 - 5) Suppliers' ISO-14000 certification has NOT improved sustainability in supply chains.
 - 6) Managing waste disposal has NOT improved sustainability in supply chains.
 - 7) Recycling/Reuse of material has NOT improved sustainability in supply chains.

- c. The determination of the challenges of implementing sustainability in public sector supply chains in Zambia. Thus, challenges of implementing sustainability in public sector supply chains in Zambia include the following:
- 1) High overall cost increase was NOT a challenge in incorporating sustainability in supply chains.
 - 2) Difficulty in operationalizing sustainable development was NOT a challenge in incorporating sustainability in supply chains.
 - 3) Management of demand and supply uncertainties was NOT a challenge in incorporating sustainability in supply chains.

By identifying the main drivers of adopting Sustainable Supply Chain Management (SSCM) practices, establishing (SSCM) practices adopted by Public Sector Organisations (PSOs) and determining the challenges of implementing sustainability in PSO supply chains in Zambia, an assessment of the impact of adopting sustainable Supply Chain Management practices on the performance of public sector organisations in Zambia, case study of Zambia Air Force (ZAF) can be achieved.

6.2 Recommendations

The following are the recommendations of this research report:

Zambia Air Force should make use of identified main drivers of adopting sustainable supply chain management practices, should continuously improve sustainable supply chain management practices and should endeavor to overcome the challenges of implementing sustainability in public sector supply chains in Zambia.

6.3 Areas for further studies

There's need for further studies on Sustainable Supply Chain management regulations and policies on public sector organisations in Zambia. A Case study of Zambia Air Force.

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APPENDIX A

**ASSESSING THE IMPACT OF ADOPTING SUSTAINABLE SUPPLY CHAIN
MANAGEMENT PRACTICES ON THE PERFORMANCE OF PUBLIC SECTOR
ORGANIZATIONS IN ZAMBIA. A CASE OF ZAMBIA AIR FORCE (ZAF).**

QUESTIONNAIRE

<p>SECTION A</p> <p>BACKGROUND CHARACTERISTICS OF RESPONDENTS</p>

Q. ID	QUESTION	RESPONSE	FOR OFFICIAL USE ONLY
A1.	Gender of respondent? 1. Female 2. Male	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
A2.	<u>Position</u> in organization? 1. Director 2. Senior Manager 3. Middle Manager 4. Other Staff	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
A3.	What is your <u>highest qualification</u> ? 1. Grade 12 2. Certificate 3. Diploma 4. Degree 5. Masters and Above	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>

SECTION B

KEY DRIVERS OF SUSTAINABILITY IN SUPPLY CHAIN

B1.	<p>Easier compliance with environmental regulations?</p> <p>1. Very high 2. High 3. Not high 4. Do not know</p>	<input type="checkbox"/>	<input type="checkbox"/>
B2.	<p>Demonstration of due diligence?</p> <p>1. Disagree 2. Neutral 3. Agree</p>	<input type="checkbox"/>	<input type="checkbox"/>
B3.	<p>Reduced risk of accidents, reduced liability and lower health and safety costs?</p> <p>1. Disagree 2. Neutral 3. Agree</p>	<input type="checkbox"/>	<input type="checkbox"/>
B4.	<p>Support of environmental/sustainability strategy and vision?</p> <p>1. Disagree 2. Neutral 3. Agree</p>	<input type="checkbox"/>	<input type="checkbox"/>
B5.	<p>Improved corporate image, brand and goodwill?</p> <p>1. Disagree 2. Neutral 3. Agree</p>	<input type="checkbox"/>	<input type="checkbox"/>
B6.	<p>Improved employee and community health through cleaner air and water, less demand for landfill and less demand for resources?</p> <p>1. Disagree 2. Neutral 3. Agree</p>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION C

EXTENT OF ADOPTION OF SUSTAINABLE SCM PRACTICES

C1.	Climate change commitment safety? 1. Disagree 2. Neutral 3. Agree	<input type="checkbox"/>	<input type="checkbox"/>
C2.	Ethical sourcing, production and distribution? 1. Disagree 2. Neutral 3. Agree	<input type="checkbox"/>	<input type="checkbox"/>
C3.	Ensuring suppliers have a sustainability policy? 1. Disagree 2. Neutral 3. Agree	<input type="checkbox"/>	<input type="checkbox"/>
C4.	Sustainable supply network management? 1. Disagree 2. Neutral 3. Agree	<input type="checkbox"/>	<input type="checkbox"/>
C5.	Managing products returns? 1. Disagree 2. Neutral 3. Agree	<input type="checkbox"/>	<input type="checkbox"/>
C6.	Green purchasing strategies? 1. Disagree 2. Neutral 3. Agree	<input type="checkbox"/>	<input type="checkbox"/>

C7.	Suppliers' ISO-14000 certification? 1. Disagree 2. Neutral 3. Agree	<input data-bbox="1089 260 1149 333" type="checkbox"/>	<input data-bbox="1284 260 1344 333" type="checkbox"/>
C8.	Managing waste disposal? 1. Very much 2. Much 3. Not much	<input data-bbox="1089 485 1149 558" type="checkbox"/>	<input data-bbox="1284 485 1344 558" type="checkbox"/>
C9.	Recycling of material? 1. Very Adequate 2. Much 3. Not much	<input data-bbox="1089 768 1149 842" type="checkbox"/>	<input data-bbox="1284 768 1344 842" type="checkbox"/>
C10.	Reuse of material? 1. Disagree 2. Neutral 3. Agree	<input data-bbox="1089 1052 1149 1125" type="checkbox"/>	<input data-bbox="1284 1052 1344 1125" type="checkbox"/>

SECTION D
THE CHALLENGES OF INCORPORATING SUSTAINABILITY IN SUPPLY CHAINS

D1.	High overall cost increase? 1. Disagree 2. Neutral 3. Agree	<input type="checkbox"/>	<input type="checkbox"/>
D2.	Difficulty in operationalizing sustainable development? 1. Disagree 2. Neutral 3. Agree	<input type="checkbox"/>	<input type="checkbox"/>
D3.	Changing culture and mindset? 1. Disagree 2. Neutral 3. Agree	<input type="checkbox"/>	<input type="checkbox"/>
D4.	Management of demand and supply uncertainties? 1. Disagree 2. Neutral 3. Agree	<input type="checkbox"/>	<input type="checkbox"/>

D5.	Complexity of supply chain problems? 1. Disagree 2. Neutral 3. Agree	<input data-bbox="1078 260 1128 331" type="checkbox"/>	<input data-bbox="1265 260 1315 331" type="checkbox"/>
D6.	Staff resistance to adopting the change? 1. Disagree 2. Neutral 3. Agree	<input data-bbox="1078 548 1128 619" type="checkbox"/>	<input data-bbox="1265 548 1315 619" type="checkbox"/>
D7.	Procurement delays? 1. Disagree 2. Neutral 3. Agree	<input data-bbox="1078 800 1128 871" type="checkbox"/>	<input data-bbox="1265 800 1315 871" type="checkbox"/>
D8	Inability to anticipate disaster? 1. Disagree 2. Neutral 3. Agree	<input data-bbox="1078 1052 1128 1123" type="checkbox"/>	<input data-bbox="1265 1052 1315 1123" type="checkbox"/>

THANK YOU FOR YOUR COOPERATION.