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The Impact of Adopting Sustainable Supply Chain Management Practices on the Performance of Public Sector Organizations in Zambia: A Case Study of Zambia Air Force

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Abstract

Purpose: The main objective of this study was to assess the impact of adopting sustainable Supply Chain Management practices on the performance of public sector organizations in Zambia. The study was anchored on three objectives: To identify the main drivers of adopting sustainable supply chain management practices in public sector organizations in Zambia, to establish sustainable supply chain management practices adopted by public sector organizations in Zambia and to determine the challenges of implementing sustainability in public sector supply chains in Zambia.

Methodology: The study adopted a descriptive (qualitative) survey design to assess the impact of adopting sustainable Supply Chain Management practices on the performance of public sector organizations. The population comprised of fifty (50) Zambia Air Force personnel from Procurement, Operations and Finance departments. Survey questionnaire and in-depth interviews were used for data collection. Data was analysed using Excel and thematic analysis was used were data from questionnaires and interviews was summarized, edited, coded, tabulated and analyzed.

Findings: The study concluded that leadership is a significant factor in Sustainable supply chain management practices being implemented by public sector organizations, 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.

Unique Contribution to Theory, Policy and Practice: 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.

Keywords: *ZAF, Sustainable Supply Chain Management, Practices, Performance*

1. INTRODUCTION

Many organizations globally are striving to procure products and services that are less harmful to local and global environments. Both public and private sector organizations 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 and consumption. 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.

Organizations 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 organization's mission.

Eco-efficiency and re-manufacturing 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).

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 organizational 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 organization's social, environmental and economic goals in the systemic coordination of key inter-organizational 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 life-cycle, 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 optimized 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 organizations that are unprepared but also an opportunity for those companies who are prepared to embrace the challenge. But organizations 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 organizations 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 organizations to sustainable growth, both profitably and responsibly.

1.1 Statement of the Problem

Zambia Air Force through the procurement department procures a wide range of equipment which include Aircraft, 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 Aircraft and spares that have reached the end of life are just parked and spares are kept in the stores once the end of life is reached. The problem has to do with space for parking 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 organizations 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 organization performance in Zambia.

1.2 Objectives of the Study

1.2.1 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 organizations in Zambia.

1.2.2 Specific Research Objectives

The specific research objectives of this study were as follows:

a. To identify the main drivers of adopting sustainable supply chain management practices in public sector organizations in Zambia.

b. To establish sustainable supply chain management practices adopted by public sector organizations in Zambia.

c. To determine the challenges of implementing sustainability in public sector supply chains in Zambia.

1.3. Research Questions

The research questions of the study were as follows:

a. What are the main drivers of adopting sustainable supply chain management practices in public sector organizations in Zambia?

b. What are the sustainable supply chain management practices adopted by public sector organizations in Zambia?

c. What are the challenges of implementing sustainability in public sector supply chains in Zambia?

1.4 Significance of the Study

The results from the study can be instrumental to the Zambia Air Force (ZAF) and other public sector organizations 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.

2.0 LITERATURE REVIEW

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 "optimize 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 maximize productivity in the supply chain and deliver the most benefits to all related parties (Finch 2006).

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 globalization and competition the organizations 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 analyzing 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.

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, re-manufacture, repair, refurbishing, or safe disposal of the products and materials (Wamalwa, 2014).

2.1 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)

2.1.1 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-organization, connection-ism 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 organization.

2.2 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 Organizations (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 organizations in Zambia, A case study of Zambia Air Force (ZAF) an be achieved. These constructs and their relationships are illustrated in the following Figure 1:

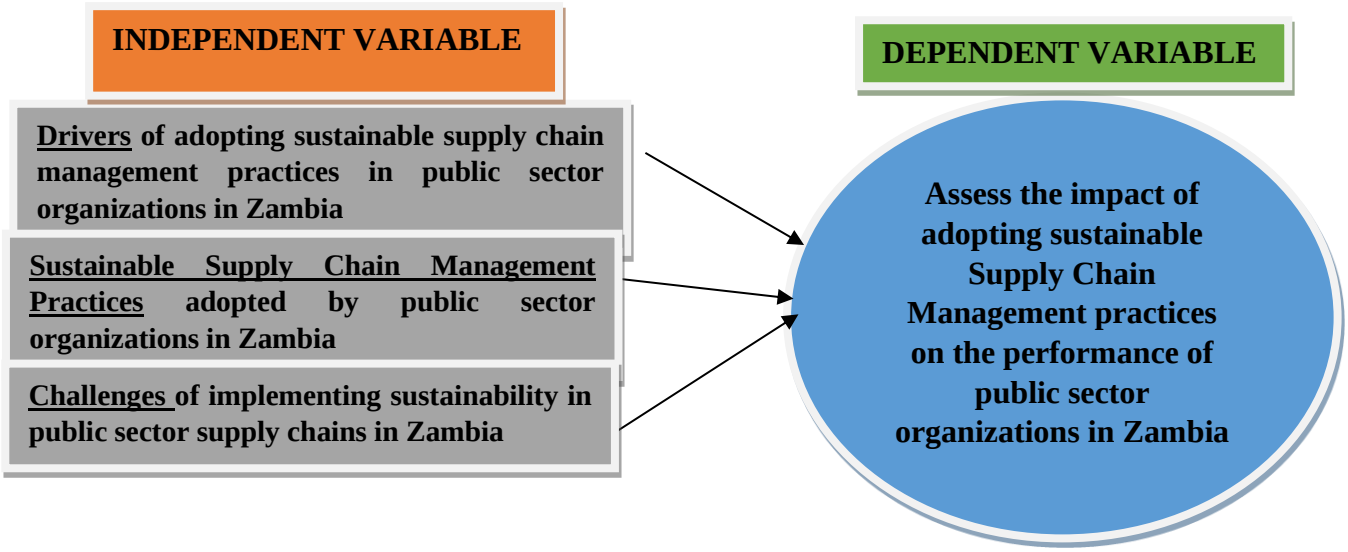

Figure 1: Conceptual Framework Source: (Researcher, 2024)

3.0 RESEARCH METHODOLOGY

3.1 Philosophical assumption

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.

3.2 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 organizations. 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.

3.3 Population, Sample and Sampling techniques

The target population of the empirical study was fifty (50) personnel from Zambia Air Force (ZAF) in Lusaka-based Stations. 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 and had better experiences.

The study used stratified random sampling technique. 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)

3.4 Instrument for data collection

Related to the research study, the survey questionnaire was developed under the inspiration of UNZA 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 & Cannell, 1957, p.149)

3.5 Procedure of Data Collection

Data type both primary and secondary data was collected in order to achieve the research objectives. 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 organization.

3.6 Data Analysis Techniques

Thematic analysis was used were 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 & Clake, 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.

4.0 FINDINGS AND DISCUSSION OF RESULTS

4.1 Key Drivers of Sustainability in Supply Chain

4.1.1 Easier Compliance with Environmental Regulations

Respondents were asked whether easier compliance with environmental regulations was a key driver of sustainability in supply chain. In response, the majority 63 percent (31) answered in the

affirmative while the remainder 37 percent (18) disagreed. This result entails easier compliance with environmental regulations was a key driver of sustainability in supply chain.

4.1.2 Demonstration of Due Diligence

Respondents were asked whether demonstration of due diligence was a key driver of sustainability in supply chain. In response, the majority 53 percent (26) agreed while the remainder 47 percent (23) said no. Therefore, this result shows that demonstration of due diligence was a key driver of sustainability in supply chain.

4.1.3 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. In response, the majority 67 percent (33) said yes while the remainder 33 percent (16) disagreed. This result shows that reduced risk of accidents, reduced liability and lower health and safety costs were key drivers of sustainability in supply chain.

4.1.4 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. In response, the majority 59 percent agreed while the rest 41 percent (20) answered in the negative. This result therefore entails support of environmental/sustainability strategy and vision was a key driver of sustainability in supply chain.

4.1.5 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. In response, the majority 61 percent (30) answered in the affirmative while the rest 31 percent (19) disagreed. This result entails improved corporate image, brand and goodwill was a key driver of sustainability in supply chain.

4.1.6 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 53 percent (26) said yes while the remainder 47 percent (23) disagreed. Therefore, this 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.

4.2 Extent of Adoption of Sustainable SCM Practices

4.2.1 Climate Change Commitment Safety

Respondents were asked whether climate change commitment safety has improved sustainability in supply chains. In response, the majority 67 percent (33) disagreed while the rest 33 percent agreed. This result entails climate change commitment safety has NOT improved sustainability in supply chains.

4.2.2 Ensuring Suppliers Have a Sustainability Policy

Respondents were asked whether ensuring suppliers have a sustainability policy has improved sustainability in supply chains. In response, the majority 61 percent (30) did not agree while the rest 39 percent (19) agreed. Therefore, this result shows that ensuring suppliers have a sustainability policy has NOT improved sustainability in supply chains.

4.2.3 Managing Products Returns

Respondents were asked whether managing products returns had improved. In response, the majority 65 percent (32) answered in the negative while the rest 39 percent (19) agreed. This result entails managing products returns had NOT improved.

4.2.4 Green Purchasing Strategies

Respondents were asked whether green purchasing strategies has improved sustainability in supply chains. In response, the majority 71 percent (35) disagreed while the rest 29 percent (14) agreed. Therefore, this result shows that green purchasing strategies has NOT improved sustainability in supply chains.

4.2.5 Suppliers' ISO-14000 Certification

Respondents were asked whether Suppliers' ISO-14000 certification has improved sustainability in supply chains. In response, the majority 59 percent (29) disagreed while the rest 41 percent (20) agreed. Therefore, this result shows that Suppliers' ISO-14000 certification has NOT improved sustainability in supply chains.

4.2.6 Managing Waste Disposal

Respondents were asked whether managing waste disposal has improved sustainability in supply chains. In response, the majority 59 percent (29) disagreed while the rest 41 percent (20) agreed. This result entails managing waste disposal has NOT improved sustainability in supply chains.

4.2.7 Recycling/Reuse of Material

In this regard, respondents were asked whether Recycling/Reuse of material has improved sustainability in supply chains. In response, the majority 57 percent (29) disagreed while the rest

43 percent (20) agreed. Therefore, this result shows that Recycling/Reuse of material has NOT improved sustainability in supply chains.

4.3 The Challenges of Incorporating Sustainability in Supply Chains

4.3.1 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 53 percent (26) disagreed while the rest 47 percent (20) agreed. Therefore, this result shows that high overall cost increase was NOT a challenge in incorporating sustainability in supply chains.

4.3.2 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 59 percent (29) disagreed while the rest 41 percent (20) agreed. This result entails difficulty in operationalizing sustainable development was NOT a challenge in incorporating sustainability in supply chains.

4.3.3 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 63 percent (31) disagreed while the rest 37 percent (18) agreed. Therefore, this result shows that Management of demand and supply uncertainties was NOT a challenge in incorporating sustainability in supply chains.

4.3.4 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 67 percent (33) disagreed while the rest 33 percent (16) agreed. This result entails Staff resistance to adopting the change was NOT a challenge in incorporating sustainability in supply chains.

5.0 Conclusions and Recommendations

5.1 Conclusions

In conclusion, Governments around the world have sought to address the challenges of sustainable development by leveraging their influence as major procurers of good and services. The study provided the first comprehensive overview of how public bodies internationally are implementing Sustainable Supply chain practices and of the factors that shape the engagement of organizations with Sustainable Supply Chain management practices. Analysis shows that while most public sector organizations 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 Sustainable supply chain management practices being implemented by public sector organizations, 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.

Financial concerns still remain the biggest barrier to sustainable supply chain management practices, with public sector procurers resistant to paying more to buy sustainably. Across regions, environmental aspects of Sustainable supply chain management practices are relatively established but there is variation in other aspects of Sustainable supply chain management practices 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 Sustainable supply chain management practices, public sector organizations are more likely to implement Sustainable supply chain management practices. Policy makers need to be mindful of the emphasis they place on the various aspects of Sustainable supply chain management practices, as different interpretations are apparent in different countries, and there is no right way to approach Sustainable supply chain management practices. Internationally, sustainability practices are changing apace, and sharing learning across regions will benefit all.

5.2 Recommendations

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 public sector supply chains in Zambia.

5.3 Areas for further studies

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

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