SUSTAINABLE PROCUREMENT TRADE-OFFS AND ENVIRONMENTAL SUPPLY CHAIN PERFORMANCE OF EXPORT PROCESSING ZONE FIRMS IN KENYA

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ADM NO.: D67/21764/2019

A RESEARCH PROJECT SUBMITTED IN FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF MANAGEMENT SCIENCE, UNIVERSITY OF NAIROBI

2020

Declaration

This research is my original effort and any information from other researchers included herein has been cited and referenced. No part of this research has been submitted to any other university for evaluation and award of a degree.

Signature 

Jackson Magembe: Admission No.: D67/21764/2019

This research project has been submitted for examination with my approval as the university supervisor.

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List of Abbreviations and Acronyms

CIPS:	Chartered Institute of Procurement & Supply
EPSRC:	Engineering and Physical Sciences Research Council
EPZs:	Export processing zones
ESCP:	Environmental Supply Chain Performance
GDP:	Gross Domestic Product
GDP:	Gross Domestic Product
ISO:	International Organization for Standardization
NRBV:	Natural Resource Based View
PPADA:	Public Procurement and Asset Disposal Act
PSM:	Purchasing and Supply Management
RBV:	Resource Based View
SSCM:	Sustainable Supply Chain Management
UK:	United Kingdom
VAT:	Value Added Tax
VRIN:	Valuable, Rare, In-imitable and Non-substitutable

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Abstract

The study explored sustainable procurement trade-offs and environmental supply chain performance of export processing zone (EPZs) firms in Kenya. The study sought to achieve the following objectives: (i) To identify the sustainable procurement trade-offs adopted by export processing zones (EPZs) firms in Kenya and (ii) To establish the relationship amongst sustainable procurement trade-offs and environmental supply chain performance of export processing zones (EPZs) firms in Kenya. Primary quantitative data was collected in line with the study objectives. The data was collected from the heads of supply chain departments of EPZ firms or their representative in Nairobi and Machakos counties. The findings of the research reveal that export processing zones (EPZs) firms in Kenya have adopted a range of sustainable procurement trade-offs to a greater extent. This includes: procuring products with less environment effects; continuously building new supplier relationships to obtain sustainable products as opposed to retaining existing suppliers and sourcing products from new suppliers who provide sustainable products. The firms opt to spend more on the procurement of products and resources that have environmentally-friendly attributes over those that are not; they have invested in the use of clean materials over toxic and hazardous materials and they use sustainable traceable raw materials rather than unsustainable raw material. Further, the firms label products in compliance to environmental certification criteria established by industry rather than long-established organisational specifications. The relationship between sustainable procurement trade-offs and environmental performance is significant. The environmental performance of EPZs firms in Kenya can be attributed to the sustainable procurement trade-offs the firms have adopted. Thus, sustainable procurement trade-offs can help in improving the firms' overall environmental supply chain performance.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

There have existed significant changes in the way organizations carry out their business activities especially in the last two decades. Many organizations and countries around the globe have moved from focusing on only the economic aspect of their business activities to include two more critical aspects of social and environmental. All these have happened because of the realization that doing business at the expense of the society and environment is not ethical and may not be tolerated by many governments and other stakeholders along a supply chain. This being the case most of the organizations have put more effort in ensuring that all the end to end supply chain activities meet the three pillars of environmental, social, plus economic, with the aim of operating a sustainable supply chain (Walker & Phillips, 2009).

For organizations to achieve sustainability in their supply chains, they must address inclusively both the environmental, the social plus environmental impacts of their activities. Sustainability has therefore become an agenda of most global entities such as governments, United Nations organization as well as many commercial enterprises. The significance of sustainable supply chain management has increased substantially and this is evident from the growing research activity on sustainable supply chain management. One of the areas that have recorded growth in research is sustainable procurement. For instance, between 2009 and 2010 the sum of academic papers on sustainable procurement over and above rose from 40 to 100. This was an indication that sustainable procurement is a practice that many organizations are taking with high degree of seriousness (Haselba, 2012).

According to Boomsma (2008), sustainable procurement is not new to African countries since there is practical evidence of firms in the African continent that have taken implemented sustainable procurement for over a decade. For instance, AgroFair is a Fairtrade fruit company wherein merchants (agriculturalists) are investors. The entity was established in 1996 in order to participate in fair methods of trading. It started importing Fairtrade bananas, targeting stopping instantaneously as widespread businesses too started using fair trade methods. This has transformed, and AgroFair is currently considering inventive techniques adding value. The company has implemented sustainable procurement practices such as 50 percent ownership of the firm being relinquished to farmers and training farmers on organic farming in order to source for organically grown citrus fruits. Boomsma (2008) further argues that sustainable procurement has also been practiced in Sierra Leone by firms such as Unifine which sources Ginger from the country for over a decade now.

Kenya has also experienced adoption of sustainable procurement in the recent past although the rate of adoption seems to be slow in the country. This is happening despite the fact that the Kenyan government has passed laws to enhance adoption of green procurement in many sectors within the country. One such example is the Public Procurement and Asset Disposal Act of 2015 (PPADA) which clearly captures sustainable procurement issues. In as much as sustainable procurement is likely to have greater benefits for organizations, there still many entities in Kenya that are yet to appreciate the concept of sustainable procurement (Muraguri, Waweru & Musyimi, 2015).

1.1.1 Sustainable Procurement Trade-offs

Several definitions of sustainable procurement have been coined by different researchers. For instance according to CIPS (2011), sustainable procurement is a concept that is much wider

than simply being green but encompasses social plus ethical responsibility in buying with objective of reducing environmental influence through the supply chain, conveying cost-effectively comprehensive resolutions then well-meaning trade exercise. According to Haselba (2012) sustainable procurement isn`t evidently about 'burdening' the marketplace with more necessities but quite a well-defined tactic which steadily takes into account sustainable requirements in bids, plus promoting support measures of support, dialog plus communication open amongst the contractors and procurers.

Since the 1980s, sustainable procurement is applicable globally as a means to address plus reduce undesirable environmental influences relating to producing and consuming produces (Chan et al., 2010). For instance, in year 2005, one of the prominent political arguments among the Dutch was sustainability in supply chain which led to motion approval in Representatives House. This motivated the Dutch national administration to seek using yearly expenses approximately 10 billion euros in stimulating marketplace for sustainable merchandises and amenities besides acting as a role model. Exploration on procurement sustainability directs it as a policy scheme helping achieving desirable results in society plus being critical to drive frontward the agenda of sustainability (Carter and Rogers, 2008). Exterior pressures are frequently vital to kick-start organizations` engagement in sustainable procurement; nevertheless, for it to be actually fruitful, some organizational issues are required (Hoejmose & Adrien-Kirby, 2012). Changes need to be made plus removing barriers inside the organization so that desired outcomes in society are achieved.

Kennard M. (2006) shows that there are several returns an organization is likely to enjoy as a result of implementing sustainable procurement. These may include cost controlling via embracing a broader methodology to complete life costing, improvement of external besides

internal criterions thru performance assessments, the firm will be able to comply with social legislation and environmental, organizational management of threat plus repute will be enhanced, the organization will be able to develop a sustainable supply chain for the forthcoming plus the indigenous business public would be actively involved. CIPS (2008) also indicates that implementation of sustainable procurement enables an organization gain a well risk apprehension in the supply chain, to develop sustainable organizational strategy, make improved monetary or commercial choices after apprehending issues impacting the complete life cycle, further effective proposal evaluation plus bids as well as more 'sustainable' source of supply.

For sustainable procurement to be realized by a firm, there are trade-offs firms need to adopt in order for them to succeed. For instance, traditionally most firms have procurement policies centred on the lowest cost. In sustainable procurement firms must make trade-offs between narrow and expanded view of cost in order to include branding and image costs; carbon emissions costs; the monetary effect to deal with social or environmental unreliable suppliers; packaging environmental costs besides many other costs related to sustainable procurement. Firms may also need to make trade-offs concerning integration of external customers. In addition, firms must also make trade-offs between maintaining existing supplier relationships and creating new supplier relationships in order to obtain economically viable products (Bush, 2008).

1.1.2 Supply Chain Environmental Performance

For the previous few decades, a transformation of old-style, individual techniques of performance to more integrated methods of supply chain performance measurement exist. This transformation is compelled via complexity increase besides globalizing supply chain

plus supply chain executives and others attempt increasing visibility above zones not straightforward in their governance. Supply chain performance techniques have conservatively stayed oriented round time, accurateness plus cost. Nevertheless, organizations are currently impending under improved analysis from clienteles and governments as regards their defiance with environmental and communal accountability. Nonetheless these gravities, there exists inadequate exploration into incorporation of a green metric into the popular list of measures of supply chain performance. Hence, a threat green and popularly used measures of supply chain performance disappearing alongside deviating pathways (Shaw and Mangan, 2010).

Management and reportage on environmental pointers could head to saving costs and gaining productivity significantly. For instance, the British Agency for environment approximates the country's manufacturing could save approximately 3 billion pounds every time, corresponding to 7% fraction of profits by embracing finest run-through discard minimization methods, frequently with no or little investment (Defra, 2006). Approximately 75% of the Britons say extra info on ethics of a company plus communal conduct could affect their buying choices. A strong connection amongst management of environmental and hypothesised financial wellbeing exist (McLaughlin and Klassen, 1996). Nevertheless, there is distinctive absence of try-out and theory in green logistics, precisely nurturing an ESCP measurement which could be useful assessing supply chains` impact on the environment. Organizations require additional laws relating to management of environmental issues in supply chains. Inventiveness like the project on Green Logistics (Shaw et al., 2010) that was initiated in 2006 and funded by the UK's EPSRC do help organizations in examining techniques reducing their environment impact plus making their logistics processes greener, mainly from a transportation segment viewpoint.

1.1.3 Export Processing Zone Firms

Export processing zones (EPZs) are labelled portions of Kenya aiming to promote and facilitate export-oriented reserves plus developing an empowering environment for such reserves. Presently in existences are above 40 areas that have been gazetted as zones across the country in Mombasa, Nairobi, Athi River, Kerio Valley, Voi and Kilifi. All these are at various stages of development by public and private operators. EPZ's offers an eye-catching venture prospect for export-oriented trade undertakings. There aren`t constraints on whoever is investing in this business. An EPZ firm might be wholly foreign possessed, wholly Kenyan possessed or whichever arrangement of Kenyan and foreigner. The Enterprise is equally allowable bringing in foreign workforces for managerial, training, also technical classifications (EPZ Kenya, 2020).

The EPZ scheme similarly gives a widespread assortment of eye-catching monetary, corporeal plus dealings enticements for instance 10-year Corporate Tax Holiday and 25% tax afterwards (not relevant to EPZ commercial licenses), 10-year Withholding Tax Holiday on allowances to non-residents (not relevant to EPZ commercial licenses), 100% investment deduction on fresh venture in EPZ constructions and equipment, appropriate over 20 years, Perpetual exception from payment of stamp duty on legal mechanisms, As well as Perpetual exception from input import duty and VAT– machinery, raw inputs, workplace mechanism, specific fossil fuels plus generators, construction supplies, other deliveries. VAT exclusion also is applicable on local procurements of merchandises and amenities delivered by enterprises in the Kenyan customs territory or inland bazaar. Motor vehicles which don`t stay inside the zone aren`t entitled for tax exclusion (KenInvest, 2020).

The EPZs are managed by the Export Processing Zones Authority which was inaugurated in 1990, by the EPZ Act CAP 517, Laws of Kenya. The Authority's mandate is promoting and facilitating export-oriented ventures and developing a supporting environment for the ventures. The authority is a government parastatal, domiciled in the Ministry of Trade and Industry. The Authority has a total of 15 members and the Chairman who is a presidential appointee heads the board. EPZs in Kenya produce a variety of produces shipped to diverse countries. They have a substantial impression to the country's GDP. For example, in the year 2018 Ksh77.2 billion worth of sales and generated more employment opportunities (Kariuki, 2019).

1.2 Research Problem

Modern-day commercial undertakings demonstrate that trade organizations and trade associates focus their plans on procurement to reduce the impact on environment in their supply dealings. The necessity of improving organizational efficiency, reducing superfluous, overcoming supply chain threat, plus achieving viable point has made corporations begin to consider green issues from a viable point of view (Humphreys, 2003). Focal entities and other parties to a supply chain are extra extremely tangled to design plus implement Procurement Sustainability Policies concentrating on how environmental issues and issues concerning other facets of the sustainable development bases (Society and Economy) could be assimilated in the process of procurement. There are some drivers for this growing eminence of sustainability comprising an improved apprehension of the science unfolding to climate change, weight from numerous shareholders against organizations for their activity's inferences, besides superior openness in relation to green and social aspects organizational activities.

Research reveals that many firms across the globe are adopting sustainable procurement. For instance, Kalubanga (2012) conducted a study on the sustainable procurement: concept, also real-world implications for the procurement process in Uganda. The study established that a perfect understanding of sustainability concept and its relation to procurement process is still missing specifically within a developing country context like Uganda. Grandia et al. (2013) conducted a study on the practice of sustainable procurement: clarifying sustainable procurement rating from an organizational viewpoint in Netherlands. It was established that equally both organizational aspects (particularly commitment) and individual actor's engagements are vital in implementation of sustainable procurement.

Esfahbodi, Zhang & Watson (2016) researched on sustainable supply chain management in emerging economies with specific focus on trade-offs between environmental and cost performance in Iran and China. The study revealed that adoption of SSCM practices improved the environmental performance of Iranian and Chinese manufacturing firms. Saunders et al. (2020) conducted a study on addressing economic and environmental sustainability trade-offs in procurement episodes with industrial suppliers in Brazil. The research findings established that the best way to implement SSCM is through competitive bidding. Mann and Kaur (2019) carried out a study on sustainable supply chain activities and financial performance focusing on experience from India. The study results revealed that sustainable sourcing and resource utilization had a positive impact on financial performance of firms.

The available research papers are much inclined towards implementation of sustainable procurement and not the trade-offs and how they will impact on environmental performance. This study aimed at bridging this gap by seeking solutions to the subsequent two queries:

What are the sustainable procurement trade-offs for export processing zones (EPZs) firms in Kenya and what is the association concerning sustainable procurement trade-offs and environmental supply chain performance of export processing zones (EPZs) firms in Kenya?

1.3 Research Objectives

1.3.1 General Objective

To ascertain how sustainable procurement trade-offs affect the environmental supply performance of EPZ firms in Kenya.

1.3.2 Specific Objectives

The study objectives to be achieved were

i. To identify the sustainable procurement trade-offs adopted by export processing zones (EPZs) firms in Kenya
ii. To establish the relationship amongst sustainable procurement trade-offs and environmental supply chain performance of export processing zones (EPZs) firms in Kenya

1.4 Significance of the Study

The findings from this study would profit numerous categories of people. The study will be a significant addition in terms of knowledge to existing research on sustainable procurement. More important, will be the new knowledge on sustainable procurement trade-offs and environmental supply chain performance which is rare at the moment. Therefore, future researchers will get relevant knowledge that will be part of much need literature.

The findings will also assist many firms that are interested in implementation of sustainable procurement but are still undecided. It will serve as an eye opener to such firms and shed more light. Firms that have also implemented sustainable procurement will be able to gain

more understanding on the concept of environmental performance measurement plus how to achieve the same.

Policy makers both in public and private sector organizations will also find the study relevant especially when developing policies relating to environmental performance measurement.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

In this part of the research, literature appropriate to the subject as well as coherent with the research objectives is reviewed. The main themes of focus are the theoretical framework, sustainable procurement trade-offs, environmental supply chain performance and relationship between sustainable procurement trade-offs and the environmental supply chain performance.

2.2 Theoretical Framework

This section focuses on literature concerning theories of sustainable supply chain management. Three theories are reviewed with regard to the topic of this research: resource based view, institutional theory and the stakeholder theory. The anchoring theory for this study is the stakeholder theory. These three theories are explained in detail in sub-sections 2.2.1-2.2.3.

2.2.1 Stakeholder Theory

The stakeholder theory is often considered as the primary theory of sustainable supply chain management (SSCM). This insinuation is based on the understanding that the theory is fundamental in elaborating and substantiating other SSCM theories such as the Resource based view and the institutional theory (Johnsen, Miemczyk & Howard, 2014). Stakeholder theory is credited to the work of Freeman (1984) who brought together different concepts I n order to make a coherent theory as it is known today.

According to the stakeholder theory, the success of an organization depends on the interrelationships that exist between the organization and its various stakeholders. A notable proposition from the theory is that engagement of internal and external stakeholders of an

organization is an important activity to be carried out by the managers. Freeman (1984) argues that the stakeholder theory is central to explaining the turbulence in the business environment of organizations. Freeman further asserts that environmental turbulence occurs due to conflict between the internal stakeholders of an organization and its external stakeholders such as the governments, consumers, environmentalists, media as well as civil society organizations.

The stakeholder theory is very important in this study since it explains the reason why supply chains are keen on adopting sustainable supply chain management practices. Various governments as external stakeholders have adopted legislations requiring firms to carry their activities in a sustainable manner. Environmentalists have also proved to be a major voice in pushing firms to adopt sustainable supply chain management practices.

2.2.2 Institutional Theory

The most important observation made concerning this theory is the fact that it seeks to explain the reasoning behind adoption of same practices by organizations. A huge number of researchers perceive this theory as the most effective way of bringing out the forces behind implementation of sustainable practices in supply chains based on the key assumption that the activities implemented in supply chain are triggered by factors that are external to the supply chain be it by force or through other means (Carbone & Moatti 2011, Shi et al., 2012, Adebanjo et al., 2013, Hsu et al., 2013 and Lee et al., 2013). Gaining a clear understanding of the forces that compel firms to consider adopting various actions is important. However, it is necessary to know that this focus on the major forces or drivers is a critical element of a developing area of research.

Those who support this theory attribute its significance to the ability to describe the sociological and economic foundations of supply chain management and operations (Kauppi 2013). This position is key in providing the required understanding on essence and response concerning existence of uncertainty. In most cases research that focuses on institutions is tilted towards providing an explanation on ways through which firms address and solve issues related to the dynamic and changing nature of the business environment but theory also concerns itself on how these forces can be manipulated to benefit the organization. Meyer and Rowan (1977) talk about transformation of rules and regulations as well as standards an issue which is rarely mentioned as part of the PSM literature despite its paramount significance especially as the purchasing function assumes a strategic role. Among the few examples that can be cited relates to the research of Ritvala and Salmi (2010) which recommends that those who advocate for sustainability can institute change in the organization, society and including to their commercial ventures.

The relevant of the institutional theory to this study based on the argument that environmental networkers can instigate changes in institutions. This is essentially true in adoption of the practice of managing the supply chain that are sustainable by EPZ firms in Kenya. The firms being institutions that are influenced by occurrences in the external environment are forced to bow to pressures from environmental networkers to adopt the SSCM practices.

2.2.3 Resource Based View

This theory puts forth an argument that the main reason why gaining competitive advantage as a firm is the utilization of the resources that are available and accessible to an organization (Wernerfelt, 1984). The RBV recommends four channels that can be applied to determine if the resources utilised by the firm can result to a competitive advantage to an organization:

These channels include and relate to Value, Rare, In-imitability and Non-substitutability or 'VRIN' (Barney 1991, Peteraf 1993). The most primary propositions of the RBV are aimed at explaining firm resource heterogeneousness and immovability. As the originator of RBV, Hart (1995) fronts an argument that firms that firms that are keen on adopting sustainability cannot rely only on the internal approach of achieving competitiveness since there are external networks ties that must be taken into consideration. Hart (1995) argues that competitive advantage is mainly anchored on how the organization relates with the outer environment using three closely linked strategies: reduction or prevention of pollution, better product management and sustainable development. This theoretical orientation brings together the strategies and inhouse and outside factors in order to focus on competitive advantage from a wider perspective. According to Hart the problems facing organizations can be addressed by ensuring that there is access to appropriate knowledge on various important issues.

The above theory is important in explaining why EPZ firms in Kenya may consider adopting sustainable supply chain management practices. Being firms that are export oriented, building a competitive advantage is very important and necessary for survival in the global market. Adoption of the practices of managing supply chain which are sustainable is one of the strategies that can assist EPZ firms to gain competitive advantage among other strategies.

2.3 The Sustainable Procurement Trade-offs

To commence with, trade-offs situations have been delineated as instances of compromise whereby a detriment is done in one area in order to find or gain paybacks in an extra area (Byggeth and Hochschorner, 2006). In stark disparity to win-win scenarios, the notion of sustainable procurement trade-offs aims at addressing those situations in which the

contribution of procurement to the development deemed to be sustainable can only be accomplished through the acceptance of a concession amid at least two facets of sustainability which are in scuffle or clash with one another. The trade-offs require making choices which are difficult (Searcy, 2017). Nonetheless, as argued by Fayezi (2016) this does not necessarily mean that trade-offs scenarios are inferior backings to sustainable procurement development equated with win-win scenarios. Indeed, according to Hahn et al. (2010), accepting a loss that is relatively small for instance in the economic performance of a corporation so as to generate considerable environmental or economic benefits can as well as in the end lead in a positive economic performance that is greater alongside modest enhancements in social or environmental performance.

According to Saunders et al. (2020), the real-world initiatives of sustainable procurement trade-offs ought to start by acknowledging the present-day conditions of an organisation. Usually, the framings of sustainable procurement tend to be based in win-win terms where it is believed by an organisation that it can improve its working environment by lowering costs whilst reducing the environmental impact of its various business activities and operations. Certainly, the aforementioned is the goal of sustainability and it can be possibly achieved. However, in practice as argued by Hahn et al. (2010) more often than not there tends to be conflicts between the objectives of social, environmental and economic endeavours. In order to obtain gains in one area, another area has to be compromised. This is especially the case in the short term. Almost all established organisations have build up outstanding relationships with certain suppliers which cannot be bluntly discarded. In fact, in some scenarios, alternative sustainable options may not even be available.

Arguably, the desire of an organisation in sustainable procurement trade-offs is to reach to the point where trade-offs between the objectives of social, environmental and economic are relatively less pronounced and if possible, eventually eliminated. However, realising the aforesaid is not easy (Searcy, 2017). As suggested by Saunders et al. (2020), developing a hierarchy of sustainable procurement trade-offs is important. Indeed, acceptance of the occurrences of sustainable procurement trade-offs necessitates an organisation to determine the best for identifying and assessing them systematically. This is important in enabling the organisations to articulate appropriately what it values most. An organisation can for instance choose to employ a logic that is dominant ecologically in which the interests of economic are superseded by social and environmental criteria. Even though within an organisation this can be a tough sell, Byggeth and Hochschorner (2006) point out it can help drive an organisation's sustainable procurement endeavours over the long term.

Ultimately, sustainable procurement necessitates that an organisation and its supply chain operates within the thresholds imposed by the society and nature. It is within the constraints that the procurement trade-offs must be developed so as to create win-win alternatives. However, this requires perseverance and finding of sustainable suppliers as the basis upon which to criteria of procurement have to be built (Saunders et al., 2020). Priority setting and focusing on what is truly urgent is crucial since not all things or aspects of sustainable procurement can be addressed at once. As observed by Searcy (2017), an organisation needs to help in strengthening the sustainability performance of its key suppliers. This can include considerations of collaborating with competitors especially sustainability issues that an organisation cannot address single-handedly. Whenever possible, making improvements aimed in balancing the objectives of economic, social and environmental trade-offs based on

perceived buyer preference is deemed vital in the considerations of building sustainable procurement.

2.4 Environmental Supply Chain Performance

The issue of environmental supply chain performance has been growing in significance in the recent times. This has been mainly attributed to the ever increasing environmental problems along the supply chains coupled with growing stakeholder interests on environmental preservation and the shortage of resources n the recent. This has led to the changes in the environment of business as firms are now increasing becoming under pressure to make available evidence of their dedication to corporate social responsibility, especially in regards to the environment (Shaw et al., 2010). Across all sectors and nations, reduction on the emission of harmful gasses, especially carbon dioxide in the supply chains is considered to be one of key aims of environmental management. As a result, measuring of carbon footprint or emissions has now become a fundamental for organisations. Examples on the same are many including the use of Carbon Disclosure Project by organisations like WalMart to manage their suppliers' energy footprint and the utilisation of the House of Carbon to by IBM to communicate initiatives of environmental performance across all areas of their business (Shaw et al., 2010).

A range of categories which are deemed to be important to businesses in terms of environmental performance have been put forward in the literature including resource use, emission to land, emission to water, and emission to air (Defra, 2006). In order to enable handle the aforesaid aspects of environmental performance, systems of environmental management have been adopted by some firms for instance ISO that is the International Organization for Standardization. ISO provides guidance to for use in the mitigation of the

environmental impact. For instance, ISO 14031:1999 provides companies with a tool for evaluating their environmental performance. It details particular guidance not only on the identification and selection of particular indicators of environmental performance but also offers guidance on the design as well as the utilisation of environmental performance evaluation. This enables companies regardless of type, location, complexity and size to on a non-going basis measure their environmental performance (ISO, 2009).

As argued by Shaw et al. (2010), more guidance is still needed by companies on the management of environmental supply chain performance either through government legislation or the existing systems of environmental management. Further, according to Hervani et al. (2005), the process of selecting environmental supply chain performance is made difficult by the nature and complexity of environmental management. Varying levels of significance is often attached by companies to the indicators of environmental performance depending on their region and sector of operation they are in. The evolutionary stage in which the company is at in the process of environmental management also adds more complexity. Some companies tend to be reactive and focus on adhering to the prevailing legislation whereas others are proactive, demonstrating the way in which they have actually greened their entire supply chain. However, as suggested by Shaw et al. (2010), in developing environmental supply chain performance measurement, there seems to be distinct lack of theory and practice in identifying dimensions that can be utilised in assessing the supply chains' impact on the environment

2.5 Sustainable Procurement Trade-offs and Environmental Performance

Primary, an environmental supply chain performance as asserted by Simpson and Power (2005) consist of the various activities which in one way or the other impact the environment.

According to Kumar and Rahman (2015), dimensions of various activities related to the supply chain's environmental performance are discussed in the literature encompassing enhancing packaging, cost effective energy utilization, minimizing negative environmental effect, reduction of waste, return logistics enhancement, affirmative purchasing, minimal input material, designing for sustainability, material substitution, eco-labelling and cleaner technology. It is argued that organisations which adopt most of these events usually intensify the sustainability of the supply chain. As it relates to the environmental supply chain performance, the metrics utilised to measure performance as pointed out by Fayezi (2016) fall into three categories namely improved stock prices, lower costs and increased revenues. Research focusing on improved stock prices explored the effects of the activities of sustainable supply chain management on the value of shareholder in short and medium term. Under lower costs, management of risks, higher quality and operational efficiencies have been examined by studies whereas under increased revenues, new market entry, price premiums, greater productivity and higher volumes have been examined by studies.

Literature on the exploration of the various issues and processes specific to the interventions of sustainable procurement shows a connection exists concerning sustainable procurement and environmental supply chain performance (Kahanaali et al., 2015 & Sybertz, 2017). Indeed, as mentioned by Walker and Phillips (2009) studies show positive economic performance as a result of sustainable supply chain interventions that are issue-specific and process-specific. Sustainability procurement has been perceived by academics, policy-makers and practitioners as being capable of delivering noteworthy environmental benefits. In agreement, Achari (2015) notes that the practices of sustainability procurement are manifestly considered to be powerful change agents to reduce the impacts caused by the business actions on the environment than any other corporate functions.

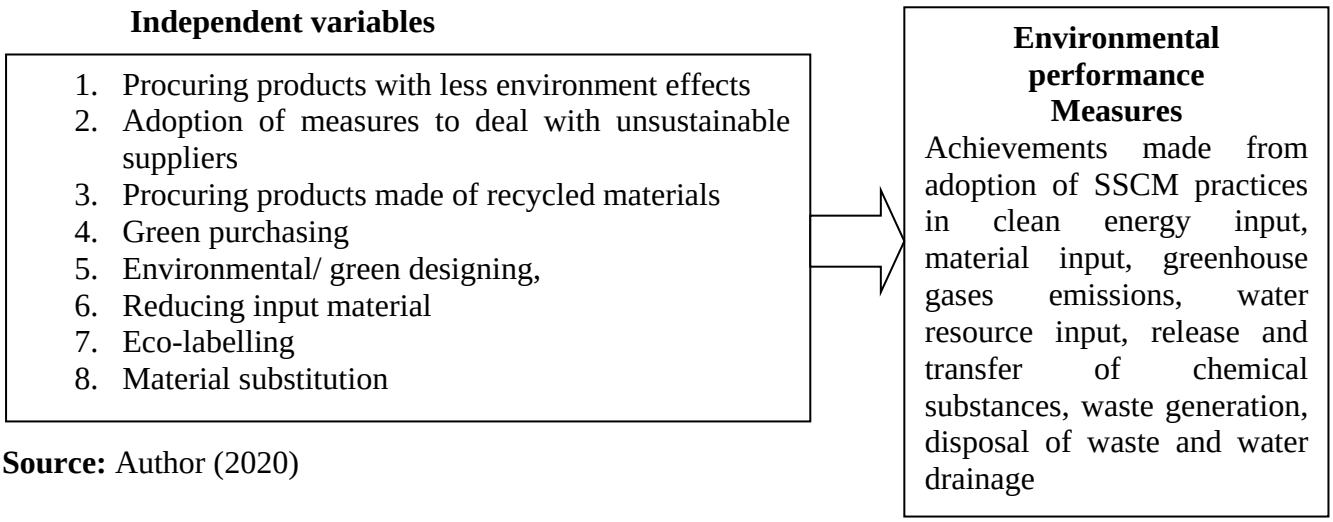
In line with Zsidisin et al. (2001), the overall environmental supply chain performance is propped up by the collaborative establishment between an organisation and its suppliers by the maintenance of health relationships, regular communication and provision of feedback as well as the integration of the information and communication platform to support environmental goals. Achari (2015) asserts that organisations might for instance find it necessary to make more payments to suppliers who guarantee to meet the environmental requirements. Indeed, making trade-offs between maintaining the existing supplier relationships and creating new relationships with suppliers that are deemed to me more responsible environmentally can result in enhanced environmental performance. As observed by United Nations Development Programme (2008), through sustainable procurement trade-offs, an organisation can seek to integrate a range of checks plus safeguards in the practice of procurement which would help in safeguarding against unintentional transgression of opposing environmental powers. Trade-offs can be made in procurement endeavours for instance by focusing on obtaining produces and amenities having fewer impacts on environment besides wellbeing of the society with the competing commodities and/or services which serve a similar purpose. This can ultimately lead to improved environmental supply chain performance.

2.6 Conceptual Framework

From the diagrammatic presentation of the conceptual framework shown in figure 2.1 below, supply chain performance is the dependent variable whereas sustainable procurement trade-offs in terms of procuring products with less environment effects, adoption of measures to deal with unsustainable suppliers, procuring products made of recycled materials, green purchasing, reducing input material, environmental/green designing, material substitution and

eco-labelling are independent variables. Implementation of the sustainable procurement trade-offs that is the independent variables can lead to enhanced environmental supply performance.

Figure 2.1: Conceptual Framework



Source: Author (2020)

CHAPTER THREE: RESEARCH METHODOOGY

3.1 Introduction

Presented in this part is methodology which provided the roadmap during the research. Among the important items discussed herein comprises the design used in the research, the population targeted, the sample size selected and techniques applicable, the instruments for data collection including their reliability and validity and the data analysis procedures embraced.

3.2 Research Design

Based on the nature of the investigation, design which fitted well was descriptive. Akhtar (2016) defines this design as one that involves the observation of a group or situation in order to describe with accuracy the characteristics of that group or situation. Akhtar (2016) further asserts that descriptive research seeks to answer questions related to what, who, where, how and when. It examines components in their customary environment without automatically interfering with them. The design was chosen based on the researcher's interest in collecting current data from export processing zone firms in Kenya concerning sustainable procurement trade-offs without manipulating any of the variables in any way. The use of descriptive research design therefore permitted the researcher to collect data concerning actual situations on procurement trade-offs and environmental supply chain performance.

3.3 Target Population

For this study, the population of focus constituted entirely the export processing zone firms in Kenya. According to the Export Processing Zone Kenya (2020), there existents over forty (40) gazetted zones in Athi River, Mombasa, Nairobi, Kerio Valley, Voi, Kilifi in several

development phases by jointly private and public zone developer/operators. These gazetted export processing zone firms therefore constituted the study target population.

3.4 Sample Size and Sampling Techniques

A sample mentions the elements selected to denote the objective population in a study. It is from the sample the researcher collects the required data to analyse and make conclusions concerning the features of the objective populace. The researcher included all the gazetted zones in Nairobi and Machakos counties in the study. The total number of gazetted zones in Nairobi and Machakos is 25. Therefore, the sample for this study included the 25 gazetted zones in Nairobi and Machakos.

3.5 Data Collection Instruments

The type of data gathered by the researcher was from the respondents otherwise referred to as Primary. The data was collected from the heads of Supply Chain Departments of EPZ firms or their representative in Nairobi and Machakos counties. The research adopted the ordinal scale in measuring the variables. The survey questions were of two main categories. Some provided specific responses for the participants to select while others provided them with a chance to give more explanations. The open-ended questions permitted the respondents voicing their views or propositions (Cooper & Schindler, 2003). The closed ended questions were in a 5 point Likert scale. A 5 point Likert scale was considered appropriate because it decreases variability of responses while pre-stipulating a set of feedback options to improve response rate (Jarvenpaa et al., 2000).

The questionnaire was partitioned to give three distinct parts. There was a part on demographic details of respondents to assist ascertain their suitability to provide reliable data.

Secondly there was a section which had questions on the sustainable procurement trade-offs adopted by the EPZ firms whereas the last section (section III) contained questions on environmental supply chain performance.

3.5.1 Reliability

Reliability is steadiness and trustworthiness of data collected through repetitive usage of scientific instruments or data collection technique in similar situations (Mugenda & Mugenda 2012). It is the scope to which a particular measuring instrument gives matching results every time in use (Abbott and McKinney 2013). As stated by Drost (2011), approaches used estimating test reliability in behavioural research include; split-halves, test-retest reliability, alternative forms, internal consistency and inter-rater reliability. This study adopted internal consistency method for the reason being more stability comparing other approaches (Cooper & Schindler, 2003). Internal consistency is tested using the Cronbach's alpha statistic. For a test to be internally consistent, estimations of reliability ought to be centred on the average intercorrelations amid all the distinct items in a test (Drost, 2011). Whereby Cronbach's Alpha coefficient is used for reliability test, the value must be above 0.7 (Drost, 2011).

3.5.2 Validity

This is the accurateness and relevance of interpretations grounded on research aftermaths, (Mugenda & Mugenda, 2003). Validity is the mark whereby results attained from analysing data truly signifies the issue under investigation. The content of the questions must be aligned to the two objectives and research questions with focus on review of literature. It must relate precisely to the research questions. This study utilised construct validity and content validity (Sekaran & Bougie, 2010). Construct validity is applicable once a test is aimed to measure a

construct which is a variable not unswervingly observable that has been settled explaining the behaviour on the base of some theory (Abott and Bordens, 2008).

For achievement of content validity, the study determined the level to which the questionnaire measured the content. This was done by engaging professionals who had enough knowledge in order to critique the tool. The suggestions made by the professionals were carefully considered and factored into the final tool. This helped in filtering out any superfluous content from the tool (Cooper and Schindler, 2003).

3.6 Data Analysis Techniques

Analysis of the raw pieces of information was based on three different approaches. The data concerning the demographic information of the respondents was analysed using frequencies and percentages. The findings on demographic information were presented using charts and tables. The data on the sustainable procurement trade-offs was analysed using descriptive statistics specifically, mean as commonly used average and standard deviation. The objective on the association amongst sustainable procurement trades-offs and environmental supply chain performance was evaluated using regression of linear nature. R Squared was useful in determining the strength of the connection concerning the two variables.

The following regression model was applied in conducting regression analysis:

$$\mathbf{Y= \mathit{a}+ \mathit{B_1X_1} + \mathit{B_2X_2}+\mathit{B_3X_3}+\ldots\ldots+\mathit{B_8X_8}+\mathit{e}}$$

Where: X_1 to X_8 are the 8 sustainable procurement trade-offs as listed in section II of the questionnaire, $B_1$to B_8 are the regression weights associated with each of the independent variables, ***a*** is the value of environmental performance when X is equal to zero, ***e*** is the error term representing other variables outside this research and Y is environmental performance

CHAPTER FOUR: DATA ANALYSIS AND DISCUSSIONS

4.1 Introduction

This research was initiated with the aim of investigating sustainable procurement trade-offs and environmental performance of EPZ firms in Kenya. The two objectives which directed the research were: to identify the sustainable procurement trade-offs adopted by the EPZ firms and to establish the relationship amongst sustainable procurement trade-offs and environmental performance of export processing zones (EPZs) firms in Kenya. A sample of 25 EPZ firms was selected and the results from the study findings are presented in the sections that follow.

4.2 Response Rate

The sample for this study was 25 EPZ firms from Nairobi and Machakos Counties. A total of 25 questionnaires were administered to the heads of supply chain departments or their representatives of the said firms. The study managed to achieve a response rate of 80 percent since a total of 20 out of the total 25 administered questionnaires were successfully completed and collected. This response rate was considered adequate for the purpose of generalizing the research findings on all the EPZ firms in Kenya concerning sustainable procurement trade-offs and environmental performance.

4.3 Demographic Information Results

The respondents were required to respond to four questions aimed at establishing their suitability to provide relevant and informative data that could be beneficial for this research. The findings on the demographic information provided by the respondents are presented in sub-sections 4.3.1 to 4.3.4 below.

4.3.1 Sector of Specialization

The respondents were asked to indicate the sector the EPZ firm they represented specialized in. The EPZ firms were categorized into four broad sectors of specialization. The results are presented in Table 4.1 below.

Table 4.1: Respondents' sector of specialization

Response	Frequency	Percent
Agro processing/food processing	12	60.0
Textile and clothing/garments	6	30.0
Pharmaceuticals and chemicals	1	5.0
Services	1	5.0
Total	**20**	**100.0**

The study revealed that 60% of the EPZ firms were engaged in Agro processing, 30% in textile and clothing sector, 5% in pharmaceuticals and chemicals sector whereas another 5% were involved in services sector. This implies that majority of the EPZs are in the food processing business, followed by textile and clothing sector. Few are in pharmaceuticals and chemicals as well as services.

4.4 Procurement Trade-offs adopted by EPZ Firms

The first specific objective of this study was to identify the sustainable procurement trade-offs adopted by the EPZ firms in Kenya. The sustainable procurement trade-offs were categorized into eight broad categories and the respondents were required to rate the extent to which various aspects of the trade-offs had been adopted by the firms. The scale used to rate was: 1=to a very small extent, 2=to a small extent, 3= to a moderate extent, 4= to a great

extent and 5=to a very great extent. The data collected was analysed using the mean and standard deviation and the results and presented in subsections 4.4.1 to 4.4.8 below.

4.4.1 Procuring Products with Less Environment Effects

The study sought to identify the extent sustainable procurement trade-offs relating to procuring products with less environment effects had been adopted by export processing zones (EPZs) firms in Kenya. A total of three trade-offs were provided and the respondents rated the adoption in their respective EPZs. The results relating to this are presented in table 4.2.

Table 4.2: Products with less environmental effects

Description	Mean	Std. Deviation
Selection of product which minimize negative environmental effect	4.40	.681
Procurement of less harmful products	3.90	.641
Periodic review of products to verify if they guarantee environmental protection	3.25	.786

It was established from the research findings that selection of products which minimize negative environmental effect had a mean of 4.4 and standard deviation of 0.681 whereas Procurement of less harmful products had a mean of 3.90 and standard deviation of 0.641. This was an indication that the two trade-offs were adopted to a great extent by the EPZ firms. On the other hand Periodic review of products to verify if they guarantee environmental protection had a mean of 3.25 and standard deviation of 0.786 and this implied that this trade-offs had been adopted to a moderate extent.

4.4.2 Dealing with Unsustainable Suppliers

The researcher wanted to establish the extent to which sustainable procurement trade-offs relating to how the EPZ firms dealt with unsustainable suppliers had been adopted. The findings are presented in table 4.3 below.

Table 4.3: Dealing with unsustainable suppliers

Description	Mean	Std. Deviation
Discontinue collaboration with suppliers who fail to comply	4.45	.510
Organization spends more resources to monitor the compliance	4.15	.671
Organisation builds new supplier relationships to obtain sustainable products	3.70	.657
Organisation sources products from new suppliers who provide sustainable products	3.35	.745

The research findings established that the organisation chooses to discontinue collaboration with suppliers who fail to comply with obligatory laws and regulations concerning environmental preservation requirements had a mean 4.45 and standard deviation of 0.510, The organization spends more resources to monitor the compliance of suppliers with corporate environmental policies had a mean of 4.15 and standard deviation of 0.671 and he organisation continuously builds new supplier relationships to obtain sustainable products as opposed to retaining existing suppliers had a mean of 3.70 and a standard deviation of 0.657. This implied that the three trade-offs above had been adopted to a great extent by the EPZ firms. The organisation sources products from new suppliers who provide sustainable products and shuns unsustainable suppliers had a mean of 3.35 and standard deviation of 0.745, an indication that it had been adopted to a moderate extent.

4.4.3 Products Made of Recycled Materials

The research further sought to establish the extent to which trade-offs relating to products made of recycled materials had been adopted by the EPZs. The results are presented in table 4.4 below.

Table 4.4: Products made of recycled materials trade-offs

Description	Mean	Std. Deviation
Reuse of products rather than purchasing new ones	4.40	.681
Utilisation of products made with recycled materials	3.80	.523
Preference to products conforming to the minimum recycled content	3.75	.550
Organisation procures products made from recycled materials	3.40	.503
Organisation procures products made from recycled materials	3.40	.503

The findings relating to trade-offs on products made of recycled materials as tabulated above reveal that the organisations have put more effort in the reuse of products rather than purchasing new ones had a mean of 4.4 and standard deviation of 0.681, the organisation encourages the utilisation of products made with recycled materials rather than those from previously unused raw material had a mean of 3.80 and standard deviation of 0.523 and products conforming to the minimum recycled content standards are usually given preference in the organisation' procurement practices over those that are not had a mean of 3.75 and standard deviation of 0.550. This meant that the above three trade-offs had been adopted to a great extent by the EPZs. The organisation procures products made from recycled materials as opposed to products made from virgin materials had a mean of 3.40 and standard deviation

of 0.503 an indication that the trade-offs had been adopted by the EPZ firms to a moderate extent.

4.4.4 Green Purchasing

The respondents were also asked questions concerning the extent of adoption of trade-offs relating to green purchasing by the EPZ firms. The results are presented in table 4.5 below.

Table 4.5: Green purchasing Trade-offs

Description	Mean	Std. Deviation
Organizations opts to spend more on environmentally friendly products	4.60	.503
organisation invests in working with suppliers to help them reduce environmental impacts	4.50	.513
Purchasing of long-lasting, high quality and reusable products	4.10	.641
Organisation has adopted procurement processes that encourage re-use and recycling	3.45	.759

It was established from the research findings presented in table 4.5 above that the organisation opts to spend more on the procurement of purchase products and resources that have environmentally-friendly attributes over those that are not had a mean of 4.60 and standard deviation of 0.503, the organisation has invested more in working with suppliers to help them reduce environmental impacts rather leaving environmental preservation efforts to suppliers alone had a mean of 4.50 and standard deviation of 0.513 and the organisation promotes purchasing of long-lasting, high quality and reusable products as opposed to short-lived non- recyclable products had a mean of 4.10 and standard deviation of 0.641. This implies that the first trade-offs had been adopted to a very great extent and the other two to a great extent. The organisation has adopted procurement processes that encourage re-use and

recycling as opposed to single use of materials had a mean of 3.45 and standard deviation of 0.759 thus confirming that it had been adopted to a moderate extent by the EPZ firms.

4.4.5 Reducing Input Material

The study further sought to unveil the extent to which trade-offs on reducing input material had been adopted by the EPZ firms in Kenya. The results are illustrated in table 4.6 below.

Table 4.6: Reducing input material trade-offs

Description	Mean	Std. Deviation
Organisation embraces energy and water conservation	4.55	.510
Organisation has invested in the use of clean materials	4.35	.671
Organisation uses sustainable and traceable raw materials	3.55	.510
Organisation has shifted from overreliance on non-renewable sources of energy	2.65	.813

It was evident from the research findings that the organisation embraces energy and water conservation rather than wastage had a mean of 4.55 and standard deviation of 0.510, the organisation has invested in the use of clean materials over toxic and hazardous materials had a mean of 4.35 and standard deviation of 0.671 whereas the organisation uses sustainable and traceable raw materials rather than unsustainable raw materials had a mean of 3.5 and standard deviation of 0.510. This was an implication the three trade-offs had been adopted by the EPZ firms to a great extent. On the other hand, the organisation has shifted from overreliance on non-renewable sources of energy to renewable energy sources had a mean of 2.65 and standard deviation of 0.813 implying that it had been adopted to a moderate extent.

4.4.6 Environmental/ Green Designing

The researcher wanted to find out the extent to which EPZ firms in Kenya had adopted trade-offs concerning environmental or green designing. The participants were provided with four possible trade-offs in this section and were expected to rate the extent to which they had been adopted. The results are presented below in table 4.7.

Table 4.7: Environmental/ green designing trade-offs

Description	Mean	Std. Deviation
Organisation has invested in the minimization of carbon emissions	4.60	.503
Minimizing discharge of poisonous effluent	4.40	.681
Minimization in the generation of waste and release of pollutants	4.35	.587
Production of goods and services that are ecological sustainable	4.15	.587

The results from the study as presented above established that the organisation has invested in the minimization of carbon emissions as opposed to focusing on cost minimization had a mean of 4.0 and standard deviation of 0.503 an indication that it had been adopted to a very great extent. The organisation focuses on the costs of minimizing discharge of poisonous effluent as opposed to a narrow cost view had a mean of 4.40 and standard deviation of 0.681,there is minimization in the generation of waste and release of pollutants in the organisation had a mean of 4.35 and standard deviation of 0.587 and the organisation has invested in the production of goods and services that are ecological sustainable as opposed to unsustainable products had a mean of 4.15 and standard deviation of 0.587. This was an indication that all these three trade-offs had been adopted to a great extent by the EPZs.

4.4.7 Material Substitution

The study sought to determine the extent to which the EPZs had adopted trade-offs relating to material substitution. The results are presented in table 4.8 below.

Table 4.8: Material substitution trade-offs

Description	Mean	Std. Deviation
Use of biodegradable packaging materials	4.45	.605
The organisation shifted from the of fossil fuels to bio-fuels	3.70	.470
Material substitution through environmental sourcing of sustainable raw materials	3.40	.503
Use of renewable and clean energy	2.50	.688

It was established as tabulated above that there is extensive use of biodegradable packaging materials in the organisation rather than compostable materials had a mean of 4.45 and standard deviation of 0.605 and the organisation shifted from the of fossil fuels to bio-fuels had a mean of 3.70 and standard deviation of 0.470. Therefore, these two trade-offs had been adopted to a great extent. On the other hand, the organisation engages in material substitution through environmental sourcing of sustainable raw materials as opposed to unsustainable ones had a mean of 3.40 and standard deviation of 0.503 whereas the organisation has shifted to the use of renewable and clean energy from the use of non-renewable energy had a mean of 2.50 and standard deviation of 0.688. This implies these trade-offs had been adopted to a moderate extent.

4.4.8 Eco-labelling

The results on the extent to which the EPZ firms had adopted trade-offs relating to eco-labelling are presented in table 4.9 below.

Table 4.9: Eco-labelling trade-offs

Description	Mean	Std. Deviation
Organisation labels products in compliance to environmental certification criteria	4.60	.503
Product labelling standards based on environmental criteria	4.40	.503
Accreditation and certification of its products for environmental labels	4.10	.718

The study findings established that the organisation labels products in compliance to environmental certification criteria established by industry associations as opposed to own criteria had a mean of 4.60 and standard deviation of 0.503. This confirmed that the trade-off had been adopted to a very great extent. The organisation has shifted to product labelling standards based on environmental criteria rather than long-established organisational specifications had a mean of 4.40 and standard deviation of 0.503 and the organisation has invested in the accreditation and certification of its products for environmental labels from external parties as opposed to reliance of internal seals of approval had a mean of 4.10 and standard deviation of 0.718. This implies that these trade-offs have been adopted by the EPZs to great extent.

4.5 Sustainable Procurement Trade-offs and Environmental Performance

The second objective of the study was to establish the relationship between sustainable procurement trade-offs and environmental performance among the EPZs in Kenya. The trade-

offs were the independent variables of the study and the average means were used for each one of the eight categories. The quantitative measures of environmental performance namely: total amount of clean energy input; total amount of material input; volume of water resource input; amounts of greenhouse gases emissions; amounts of release and transfer of chemical substances; total amount of waste generation; total amount of final disposal of waste and total amount of water drainage were used as the dependent variable and their natural logs were used. The results are presented in the following section.

Table 4.10: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.850[a]	.723	.561	.378368	.723	4.469	7	12	.012

a. Predictors: (Constant), Eco-labelling , Dealing with unsustainable supplies , Green purchasing, Reducing input material, Material substitution , Environmental/ green designing, Products with less environment effects

The above results reveal that the adjusted coefficient of determination is 0.561. This is inferred to mean that 56.1% of the variance in environmental supply chain performance can be explained by sustainable procurement trade-offs adopted by the EPZ firms. It therefore implies that 56.1% of the environmental supply chain performance of EPZ firms in Kenya can be attributed to the sustainable procurement trade-offs the firm have adopted.

Table 4.11: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.478	7	.640	4.469	.012[b]
	Residual	1.718	12	.143		
	Total	6.196	19			

a. Dependent Variable: Environmental performance

b. Predictors: (Constant), Eco-labelling , Dealing with unsustainable supplies , Green purchasing, Reducing input material, Material substitution , Environmental/ green designing, Products with less environment effects

The results in table 4.11 confirm that the relationship between sustainable procurement trade-offs and environmental performance is significant (0.012 < 0.05). Therefore, based on the level of significance of 0.012 from the table and testing at the 0.05 level of significance, it suffices to conclude that there is a significant relationship between the tested variables.

Table 4.12: Regression coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	-172.961	129.137		-1.339	.205
	Products with less environment effects	9.475	25.026	.449	.379	.712

	Dealing with unsustainable supplies	-7.970	5.493	-.385	-1.451	.172
	Green purchasing	1.761	11.229	.136	.157	.878
	Reducing input material	58.653	23.095	1.432	2.540	.026
	Environmental/ green designing	12.561	19.028	.473	.660	.522
	Material substitution	13.695	14.008	.485	.978	.348
	Eco-labelling	-36.832	30.301	-.821	-1.216	.248
a. Dependent Variable: Environmental performance						

Table 4.12 presents the regression weights as well as the Beta values associated with each of the independent variables. The model constant is -172.961 and standard error is 129.137. The model that represents the relationship can therefore be obtained from the above coefficients and this will assist in determining the relationship between sustainable procurement trade-offs and environmental supply chain performance of EPZ firms in Kenya.

Regression model

The following regression model was applied in conducting regression analysis: $Y= a+ B_1X_1 + B_2X_2+B_3X_3+……...+B_8X_8+e$, where: X_1 to X_8 are the eight sustainable procurement trade-offs as listed in section II of the questionnaire, $B_1$to B_8 are the regression weights associated with each of the independent variables, a is the value of environmental performance when X is equal to zero, e is the error term representing other variables outside this research and Y is environmental supply chain performance. From the data presented in the regression coefficients table 4.12 above, the regression equation established is as follows: $Y= -172.961 + 9.475X_1 - 7.970X_2 + 1.761X_3 + 58.653X_4 + 12.561X_5 + 13.695X_6 - 36.832X_8$.

The regression model indicates that environmental supply chain performance among the export processing zones (EPZs) firms in Kenya would be at -172.961 when holding procuring of products with less environment effects, dealing with unsustainable supplies, green purchasing, reducing input material, environmental/ green designing, material substitution and eco-labelling to a constant zero and by holding all the other relevant factors constant. A unit increase in procuring products with less environment effects, green purchasing, reducing input material, environmental/ green designing and material substitution will lead to increase in environmental supply chain performance among the export processing zones (EPZs) firms in Kenya by factors of 9.475, 1.761, 58.653, 12.561 and 13.695 respectively. On the other hand, a unit increase in dealing with unsustainable supplies and eco-labelling would lead to a decrease in environmental supply chain performance among the export processing zones (EPZs) firms in Kenya by a factor of -7.970 and -36.832 respectively.

4.6 Discussion of Findings

The findings of the study indicate that to a great extent, the export processing zones (EPZs) firms in Kenya have adopted trade-offs in terms of choosing to discontinue collaboration with suppliers who fail to comply with obligatory laws and regulations concerning environmental preservation requirements. This corresponds to the observation by Achari (2015) that making trade-offs between maintaining the existing supplier relationships and creating new relationships with suppliers that are deemed to me more responsible environmentally can result in enhanced environmental supply chain performance. The findings also indicate that to a great extent, the export processing zones (EPZs) firms in Kenya have adopted trade-offs in terms of choosing to spend more resources to monitor the compliance of suppliers with corporate environmental policies and they continuously build new supplier relationships to obtain sustainable products as opposed to retaining existing suppliers. This is in line with the

assertion by Bush (2008) that in sustainable procurement, firms must also make trade-offs between maintaining existing supplier relationships and creating new supplier relationships in order to obtain economically viable products. What is more, an organisation according to Searcy (2017) needs to help in strengthening the sustainability performance of its key suppliers.

The findings also show that to a greater extent, the EPZ firms in Kenya opts to spend more on the procurement of purchase products and resources that have environmentally-friendly attributes over those that are not. This corresponds with Ho, Dickinson & Chan (2010)'s assertion that sustainable procurement is applicable globally as a means to address plus reduce undesirable environmental influences relating to producing and consuming produces. The study also established that to a great extent, the firms use sustainable and traceable raw materials rather than unsustainable raw materials. As observed by United Nations Development Programme (2008), trade-offs can be made in procurement endeavours for instance by focusing on obtaining produces and amenities having fewer impacts on environment besides wellbeing of the society with the competing commodities and/or services which serve a similar purpose. The findings also show that investing in the minimization of carbon emissions as opposed to focusing on cost minimization had been adopted to a very great extent by EPZ firms in Kenya. The firms also to a great extent focuses on the costs of minimizing discharge of poisonous effluent as opposed to a narrow cost view, minimization in the generation of waste and release of pollutants and have invested in the production of goods and services that are ecological sustainable as opposed to unsustainable products. As pointed out by Bush (2008), in sustainable procurement firms must make trade-offs between narrow and expanded view of cost in order to include carbon emissions costs

and the monetary effect to deal with social or environmentally unreliable suppliers besides many other costs related to sustainable procurement.

Further, the study established that to a great extent EPZs firms in Kenya embrace energy and water conservation rather than wastage; they have invested in the use of clean materials over toxic and hazardous materials. They use sustainable and traceable raw materials, engage in extensive use of biodegradable packaging materials, have shifted from the use of fossil fuels to bio-fuels, and have shifted to the use of renewable and clean energy from the use of non-renewable energy and label products in compliance to environmental certification criteria. As observed in the literature by Kumar and Rahman (2015), dimensions of various activities related to the supply chain's environmental performance encompass packaging improvements, energy efficiency, pollution & emission minimization, waste minimization, green purchasing, reducing input material, environmental/ green designing, material substitution and eco-labelling among others. It is argued that organisations which adopt most of these events usually intensify the sustainability of the supply chain as is the case with EPZs firms in Kenya.

CHAPTER FIVE: SUMMARY OF THE FINDINGS, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

This chapter presents the summary of the findings, recommendations and conclusion of the current study which explored sustainable procurement trade-offs and environmental supply chain performance of export processing zone firms in Kenya. The study sought to achieve the following objectives: to identify the sustainable procurement trade-offs adopted by export processing zones (EPZs) firms in Kenya and to establish the relationship amongst sustainable procurement trade-offs and environmental supply chain performance of export processing zones (EPZs) firms in Kenya.

5.2 Summary of the Findings

To a greater extent, the EPZ firms have adopted trade-offs in terms of choosing to discontinue collaboration with suppliers who fail to comply with obligatory laws and regulations concerning environmental preservation requirements, they spend more resources to monitor the compliance of suppliers with corporate environmental policies and they continuously build new supplier relationships to obtain sustainable products as opposed to retaining existing suppliers. What is more, the study findings show that to a greater extent, the EPZs firms in Kenya have put more effort in the reuse of products rather than purchasing new ones, they encourage the utilisation of products made with recycled materials rather than those from previously unused raw materials and usually products conforming to the minimum recycled content standards are given preference in the firms' procurement practices over those that are not.

The results also reveal that to a very great extent, the EPZ firms in Kenya opts to spend more on the procurement of purchase products and resources that have environmentally-friendly attributes over those that are not; they have invested more in working with suppliers to help them reduce environmental impacts rather leaving environmental preservation efforts to suppliers alone. To a great extent, the firms embrace energy and water conservation rather than wastage, they have invested in the use of clean materials over toxic and hazardous materials, and they use sustainable and traceable raw materials rather than unsustainable raw materials. Further, the EPZ firms in Kenya to a greater extent focus on the costs of minimizing discharge of poisonous effluent as opposed to a narrow cost view, they engage in extensive use of biodegradable packaging materials rather than compostable materials and have shifted from the of fossil fuels to bio-fuels. What is more, the EPZ firms in Kenya label products in compliance to environmental certification criteria rather than long-established organisational specifications. Concerning the association between sustainable procurement trade-offs and environmental performance, the study determined that 56.1% of the environmental supply chain performance of EPZ firms in Kenya can be attributed to the sustainable procurement trade-offs the firms have adopted.

5.3 Recommendations

Taking into consideration the fact that suppliers play a crucial role in the environmental supply chain performance, it is recommended that the firms should but in place measures which will enable them to monitor and evaluate the environmental performance of all their suppliers. They should spend more resources to monitor the compliance of suppliers with corporate environmental policies. It is also recommended that firms can adopt trade-offs in terms of choosing to discontinue collaboration with suppliers who fail to comply with obligatory laws and regulations concerning environmental preservation requirements and

instead build new supplier relationships to obtain sustainable products as opposed to retaining existing suppliers. This can enable firms to deal with unsustainable suppliers and hence aid in improving the firms' environmental supply chain performance. Further, it is recommended that firms should put more effort in the reuse of products rather than purchasing new ones and in their procurement policies, firms should give preference to products conforming to the minimum recycled content standards over those that are not. This can go a long way in helping the firms to procure products and resources with environmentally-friendly attributes over those that are not. It is also recommended that firms should invest in the use of clean materials over toxic and hazardous materials. These sustainable procurement trade-offs can help in improving the firms' overall environmental supply chain performance.

5.4 Conclusion

Based on the study results, it can be concluded that export processing zones (EPZs) firms in Kenya have to a greater extent adopted a range of sustainable procurement trade-offs encompassing procuring products with less environment effects; carrying out periodic review of products to verify if they guarantee environmental protection; discontinuing collaboration with suppliers who fail to comply with obligatory laws and regulations concerning environmental preservation requirements. The firms continuously build new supplier relationships to obtain sustainable products as opposed to retaining existing suppliers; they source products from new suppliers who provide sustainable products and shun unsustainable suppliers and they encourage utilisation of products made with recycled materials rather than those from previously unused raw materials. To a very great extent, the EPZ firms in Kenya opts to spend more on the procurement of purchase products and resources that have environmentally-friendly attributes over those that are not; they have invested more in working with suppliers to help them reduce environmental impacts rather leaving

environmental preservation efforts to suppliers alone. Further, the firms embrace energy and water conservation, they have invested in the use of clean materials over toxic and hazardous materials and they use sustainable and traceable raw materials rather than unsustainable raw material. The firms have shifted from overreliance on non-renewable sources of energy to renewable energy sources; they engage in extensive use of biodegradable packaging materials rather than compostable materials; they have shifted from the use of fossil fuels to bio-fuels. What is more, the firms label products in compliance to environmental certification criteria established by industry associations as opposed to own criteria and they have shifted to product labelling standards based on environmental criteria rather than long-established organisational specifications among others. Observably, the environmental performance of EPZ firms in Kenya can be attributed to the sustainable procurement trade-offs the firms have adopted.

5.5 Study Limitations

The study encountered limitations emanating from inadequate amount of resources in terms of finance and time. The financial resources needed to conduct the research were limited to personal funding. Due to limited amount of financial resources available to the researcher, it was not possible to conduct a comprehensive investigation. Only twenty export processing zones (EPZs) firms located in Nairobi and Machakos counties were surveyed in the study. Therefore, this may limit the generalisation of the research findings. Besides, due to the time need to complete this research project, the researcher was not able to carry out a prolonged extensive investigation on the environmental supply performance of EPZ firms in Kenya.

5.6 Suggestions for Further Research

Considering that the research only examined export processing zones (EPZs) firms located in Nairobi and Machakos counties, it is suggested that the study can be replicated in the future involving export processing zones (EPZs) firms located in other counties like Mombasa and compare the findings. Since the current research was based on the use of quantitative approach, a similar research can be carried out in the future using qualitative method. This can enable gain more insight on sustainable procurement trade-offs and environmental supply chain performance of export processing zone firms in Kenya.

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Appendix I: Research Questionnaire

Introduction

This questionnaire is schemed to support the collection of data linked to sustainable procurement trade-offs and environmental performance in EPZ firms in Kenya. The data collected shall be useful for educational commitments only and shall be held private. Kindly feel free to respond to the questions in all the three sections.

Section I: Demographic information

1. **What EPZ sector do you specialize in?**
   - ☐ Agro-processing/food processing
   - ☐ Textile and clothing/garments
   - ☐ Pharmaceuticals and chemicals
   - ☐ Services
   - ☐ Other (specify)…….
2. **Kindly tick the option that best describes your level of education**
   - ☐ College Certificate
   - ☐ College Diploma
   - ☐ Undergraduate Degree
   - ☐ Masters Degree
   - ☐ Ph. D
   - ☐ Other (specify)…….
3. **In what capacity do you serve this organisation?**
   - ☐ Supply Chain Director
   - ☐ Supply Chain Manager
   - ☐ Procurement Manager
   - ☐ Supply Chain/Procurement officer
   - ☐ Other (Specify)……..
4. **Tick the option that best describes the period you have worked in this organization**
   - ☐ Less than a year
   - ☐ 1 to 5 years
   - ☐ 6 to 10 years
   - ☐ 11 to 15 years
   - ☐ More than 15 years

Section II: Sustainable Procurement Trade-offs

Rate the extent to which each of the following sustainable supply chain management trade-offs have been adopted within the EPZ firm you work for. Use the following key: 1=to a very small extent, 2=to a small extent, 3= to a moderate extent, 4= to a great extent and 5=to a very great extent.

No.	Description	1	2	3	4	5
1.	**Products with less environment effects**					
i.	The organisation prefers to procure goods and services that are less harmful to the environment over those that are not					
ii.	The organisation selects and acquires products that most effectively minimise negative environmental impacts in their life cycle as opposed to those that are not					
iii.	The organisation invests in periodic review of products to verify if they guarantee environmental protection in spite of the resources spent					
2.	**Dealing with unsustainable supplies**					
i.	The organisation chooses to discontinue collaboration with suppliers who fail to comply with obligatory laws and regulations concerning environmental preservation requirements					
ii.	The organization spends more resources to monitor the compliance of suppliers with corporate environmental policies					
iii.	The organisation sources products from new suppliers who provide sustainable products and shuns unsustainable suppliers					
iv.	The organisation continuously builds new supplier relationships to obtain sustainable products as opposed to retaining existing suppliers					
3.	**Products made of recycled materials**					
i.	The organisation procures products made from recycled materials as opposed to products made from virgin materials					
ii.	The organisation has put more effort in the reuse of products					

	rather than purchasing new ones					
iii.	Products conforming to the minimum recycled content standards are usually given preference in the organisation' procurement practices over those that are not					
iv.	The organisation encourages the utilisation of products made with recycled materials rather than those from previously unused raw material					
4.	**Green purchasing**					
i.	The organisation promotes purchasing of long-lasting, high quality and reusable products as opposed to short-lived non-recyclable products					
ii.	The organisation opts to spend more on the procurement of purchase products and resources that have environmentally-friendly attributes over those that are not					
iii.	The organisation has adopted procurement processes that encourage re-use and recycling as opposed to single use of materials					
iv.	The organisation has invested more in working with suppliers to help them reduce environmental impacts rather leaving environmental preservation efforts to suppliers alone					
5.	**Reducing input material**					
i.	The organisation has invested in the use of clean materials over toxic and hazardous materials					
ii.	The organisation embraces energy and water conservation rather than wastage					
iii.	The organisation uses sustainable and traceable raw materials rather than unsustainable raw materials					
iv.	The organisation has shifted from overreliance on non-renewable sources of energy to renewable energy sources					
6.	**Environmental/ green designing**					
i.	The organisation has invested in the minimisation of carbon emissions as opposed to focusing on cost minimisation					
ii.	The organisation has invested in the production of goods and					

	services that are ecological sustainable as opposed to unsustainable products					
iii.	The organisation focuses on the costs of minimising discharge of poisonous effluent as opposed to a narrow cost view					
iv.	There is minimisation in the generation of waste and release of pollutants in the organisation					
7.	**Material substitution**					
i.	The organisation engages in material substitution through environmental sourcing of sustainable raw materials as opposed to unsustainable ones					
ii.	There is extensive use of biodegradable packaging materials in the organisation rather than compostable materials					
iii.	The organisation has shifted to the use of renewable and clean energy from the use of non-renewable energy					
iv.	The organisation shifted from the of fossil fuels to bio-fuels					
8.	**Eco-labelling**					
i.	The organisation has shifted to product labelling standards based on environmental criteria rather than long-established organisational specifications					
ii.	The organisation has invested in the accreditation and certification of its products for environmental labels from external parties as opposed to reliance of internal seals of approval					
iii.	The organisation labels products in compliance to environmental certification criteria established by industry associations as opposed to own criteria					

Section III: Environmental performance

Kindly indicate the actual figures recorded by your organization with regard to the following aspects of environmental performance over the five years

No.	Description	2015	2016	2017	2018	2019
1	Total amount of clean energy input					
2	Total amount of material input					
3	Volume of water resource input					
4	Amounts of greenhouse gases emissions					
5	Amounts of release and transfer of chemical substances					
6	Total amount of waste generation					
7	Total amount of final disposal of waste					
8	Total amount of water drainage					