SUPPLY CHAIN MANAGEMENT PRACTICES AND PERFORMANCE AMONG PUBLIC RESEARCH INSTITUTIONS IN KENYA

BY

JULIUS MUSAU MWILU

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SUPERVISOR: MICHAEL K. CHIRCHIR

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DECLARATION

This research proposal is my original work and has never been presented in any other University or College for the award of degree or diploma or certificate in any University

Signed..... Date.....

Julius Musau Mwilu

Reg. No. D61/60029/2011

This research proposal has been submitted for examination with my approval as the University supervisor.

Signed..... Date.....

Mr. Michael Chirchir

School of Business,

University of Nairobi

DEDICATION

This thesis is dedicated to my wife Margaret and children Alice, John and Clementine and baby Precious who have always stood by me and dealt with all of my absence from many family occasions with a smile.

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ABSTRACT

Supply chain management (SCM) is identified as a strategic tool to firms to improve organizational performance and secure competitiveness. The study had three objectives to achieve: to establish the extent of supply chain management practices implementation among public research institutions in Kenya, to determine the impact of SCM practices on the performance of research institutions in Kenya and to evaluate the challenges faced by public research institutions in Kenya while adopting SCM . The research design involved a descriptive research of public research institutions in Kenya. Data was collected using questionnaire through drop and pick later method. Tables were used to analyze all the three objectives. The findings were presented on tables. The following were the major findings obtained from the data analysis. Regarding SCM practices, it was found that while a number of SCM best practices had been adopted and implemented to a great extent, majority of the practices have been implemented to a moderate extent. It is worth noting that involvement of major suppliers in planning; an important best practice had been implemented only to a small extent. Thus few best practices had been fully implemented with majority still lagging behind. Regarding the relationship between SCM practices and firm performance, three variables out of the seven, namely logistics, lean suppliers and information technology were found to have strong statistically significant relationships with performance. The other three variables, namely Green supply chain practices, Long term supplier relationships and outsourcing were found to have weak relationships which were not statistically significant. The present study used only publicly funded research institutions, future studies should consider expanding their scope to include other private research institutions. It would be interesting to see whether similar results can be obtained using quantitative measures.

LIST OF ABBREVIATIONS

SCM: Supply Chain Management

PPDA: Public Procurement Disposal Act

PPOA: Public Procurement Oversight Authority

KEFRI: Kenya Forestry Research Institute

GOK: Government of Kenya

SME'S: Small and Medium Enterprise

EDI: Electronic Data Interchange

SCOR: Supply Chain Operations Reference

BSC: Balanced Score Card

STI: Science Technology Innovations

KARI: Kenya Agricultural Research Institute

KEVEVAPI: Kenya Veterinary Vaccine Production Institute

KIRDI: Kenya Industrial Research and Development Institute

KEMRI: Kenya Medical Research Institute

KIPPRA: Kenya Institute of Public Policy & Research Analysis

KESREF: Kenya Sugar Research Foundation

NCRC: National Crime Research Centre

TRF: Tea Research Foundation

CRF: Coffee Research Foundation

KNBS: Kenya National Bureau of Statistics

KEMFRI: Kenya Marine and Fisheries Research Institute

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CHAPTER ONE: INTRODUCTION

1.1 Background of the Study.

This chapter provides the conceptual background of the study by introducing the idea of Supply Chain Management Practices in relationship to performance among public research institutions in Kenya. Organizations can no longer effectively compete in isolation of their suppliers and other entities in the supply chain. Interest in the concept of supply chain management has steadily increased since the 1980s when organizations saw the benefits of collaborative relationships within and beyond their organizations.

A number of definitions have been proposed concerning the concept of the supply chain and its management. Supply chain is defined as the functions within and products that provide services to the customer (Cox *et.al*. 1995). Another source defines supply chain as, the network of entities through which materials flows. Those entities may include suppliers, carriers, manufacturing sites, distribution centers, retailers, and customers (Lummus and Alber, 1997). According to the supply chain council (1997), the supply chain involves all stages of production and delivery of a final product, from the supplier's supplier to customer's customer.

According to Quinn (1997) the supply chain can be seen as all those activities associated with moving goods from the raw-materials stage through to the end user. This includes sourcing and procurement, production scheduling, order processing, inventory management, transportation, warehousing, and customer service. Importantly, it also embodies the information systems so necessary to monitor all those activities. Eilram and Cooper (1993), define supply chain management as an integrating philosophy to manage

the total flow of distribution channel from supplier to ultimate customer. Christopher (1998) stated that an effective SCM is a powerful tool to achieve competitive advantage for all parties in the supply chain. According to Tan (2001), the ultimate goal of SCM is to integrate various members of the supply chain and a seamless manner to achieve high level of customer satisfaction and thus a long term competitive advantage.

1.1.1 Supply Chain Management

The public sector is under pressure from both internal and external sources to demonstrate improvements in their performance (McAdam *et.al*. 2005). Local/municipal entities and other government departments are taking an interest in supply chain performance measures and reporting for improving performance and increasing accountability (Barry 2000; Berman & Wang 2000). Public sectors need to review the way they plan, prepare budgets, implement and manage programs and deliver services to meet the government's and citizens' demands for improved performance and accountability. Countries such as Australia, Britain, South Africa and New Zealand have instituted public sector reform to improve their performance and consequently many organizations are going through the process of change management (Boyne 2003).

As part of overall management strategy, the managers of public organizations need to measure performance to evaluate whether departments are performing as expected, to ensure that the employees are doing the right things, to motivate line staff/middle managers and the stakeholders to do things necessary to improve performance, to determine the budgeting priorities such as on which programs the agency should be spending the public's money, to convince legislators/stakeholders that the agency is doing a good job, to learn whether the activities are working, and determine exactly who

should do what to improve performance (Behn 2003).There is growing recognition that using performance measures to gauge success is vital to any organization, in the private or public or non-profit sectors (Niven 2005).

Measuring performance, however, has been a challenge for both managers and researchers (Maltz *et.al* 2003) as the process of 'designing and implementing an effective performance management system' involves' addressing a number of methodological issues' and managing the change process Poister (2003). In spite of having workable performance management systems in place in public organizations. 'many of those systems fall apart' before they are complete and also there are other which 'end up installing a system that is not helpful or is simply not used effectively' (Poister 2003).

There are different types of performance measurement systems that can be applicable to public sector supply chains. Some of the common performance measurements methods include the balanced scorecard, SCOR model and benchmarking (Handfield *et.al*., 2009).The Balanced Scorecard (BSC) approach to performance measurement was developed by Kaplan and Norton (1992-1996) as a way to align organizational performance measures with its strategic plans and goals (Fawcett *et.al*., 2007 Wisner *et.al.*, 2008). The SCOR model is used as a SCM diagnostic, benchmarking and process improvement tool by manufacturing and service firms in a variety of industries around the globe (Wisner *et.al*., 2008)

Countries such as the UK, US and Canada have long employed SCM in the management of their procurement and logistics. For instance, Gangster *et.al* (2004) acknowledged that the Department of Defense (DOD) in the US has minimized cost through lead time in the

management of its logistics by employing SCM practices. Also, the office of Government of Commerce (OGC) in the UK releases year to year updates about best practices of SCM in the public sector. In the past decades, the Public Procurement System in Kenya (SCM) has undergone significant development.

From being a system with no regulation in 1960's and system regulated by treasury circulars in 1970's 1980's and 1990's, the reasons for slow growth was occasioned by lack of guidelines for creating alliances with supply chain partners. Failure to develop measures for monitoring alliances, inability to broaden the supply chain vision beyond procurement of production distribution to encompass larger business processes, inability to integrate the organizations internal processes, lack of trust inside and outside the organization, organizational resistance to the concept, lack of integrated information systems and electronic.

In Kenyan context supply chain can be broadly broken down into four main sectors that is, SCM at Public Sector, Private Sector, Non governmental institutions and the donor sector. All the above sectors have resulted to the management of supply chain as a result of the need to be efficient and flexible and to achieve this there must be proper supply chain management. Kenneth and Brian (2006) Public sector is composed of the National government, local government, government owned and controlled agencies and corporations and monetary institutions.

1.1.2 Public Research institutions in Kenya

Most modern economies hinge their growth strategies on their resources, research, innovation and technological abilities. The introduction of Research, Innovation and

Technology (RIT) Sector during 2008/09-2011/12 Medium Term Expenditure Framework (MTEF) period marked an important policy decision geared towards making Kenya knowledge based economy (GoK, 2012). The Sector has a major responsibility of facilitating the process of acquiring new knowledge in a systematic way in order to produce and /or improve products and processes. The Sector therefore explores opportunities associated with the convergence of research, innovation and technology to spur economic growth in the country.

A Knowledge based economy relies heavily on innovations to transform resources into products, processes and services. This requires clearly defined and supportive policies, institutional and legal frameworks that effectively address citizens' needs and aspirations. In order to ensure effective exploitation of knowledge, the Sector plans to; Provide economic and institutional systems with incentives for efficient use of existing knowledge, new knowledge creation, and entrepreneurship; Develop an educated and skilled population that can create, share and use knowledge well; Develop a dynamic information and communication infrastructure (ICT), that facilitates collection, processing, storage, retrieval and dissemination of information; and establish centers of excellence that tap into the growing stock of global knowledge, assimilate and adapt to local needs, while furthering new knowledge and technologies (GoK, 2012).

The increasing complexities in the business environment, resource scarcity and the rising customer expectations are causing economic shifts that destabilize world economies. (OECD, 2007) Only countries with RIT capabilities can ensure sustainability and development of their economies. The Research Sub-Sector is therefore expected to bring about socio-economic transformation of the country, foster national prosperity and global

competitiveness, enhanced efficiency, sustained growth and promotion of value addition in goods and services.

The three pillars of Kenya Vision 2030 namely; Economic, Social and Political rely heavily on this Sector. Kenya has 12 publicly funded research institutions with mandates to conduct research in various key policy areas. The main areas covered include agriculture, policy, information technology, forestry, industry, marine and crime prevention (see appendix II for list of institutions).

1.2 Research Problem

Kenya the strongest economy in Eastern Africa region has taken a strong development path by institutionalizing research institutes in various aspects in a bid to meet its growing population demands (USDS, 2010). However with an increasingly knowledgeable population, such government agencies are facing ever increasing demands for accountability and quality services. The research institutions have to deliver on their core mandates while at the same time facing budgetary limitations. Faced with this challenge, research institutions have to re-evaluate their operations and seek greater efficiencies so as to reduce costs.

One of the major areas that have been identified as having great potential to improve efficiencies and reduce costs is in the supply chain. Burgress *et.al* (2006) noted that SCM has become very important but there appears to be little research that is focused on supply chain practices. Supply chain management coordinates and integrates the activities of supply chain members into a seamless process at a minimum cost (Cox, Blackstore, and Spencer, 1995). Any inefficiency incurred by any of the supply chain

members can impact on the performance of the whole chain. This is because the inefficiencies get translated into increased costs.

The right information exchanged in the SCM at the right time can help improve the performance of all the members in the chain (Chopra & Meindl, 2004) by reducing the bullwhip effect (Hav, Padmanabhan, & Whang, 1997). Information is a key factor in managing and coordinating the supply chain and therefore, has to be carefully managed so that all the supply chain members can achieve their objectives.

A number of studies on SCM practices had been conducted. For instance Mogire (2011) conducted research on Supply Chain Practices in five star hotels in Kenya. Orukoh (2007) examined SCM practices in Numerical Machining Complex Ltd. He established that the company had not institutionalized a collaborative relationship with its suppliers and suggested that effective communication, continuous improvement, competitiveness, culture, quality control and review were required as good supply chain management practices. However, the study did not try to find out the relationship between SCM and performance. Mwirigi (2007) studied green supply chain management practices by manufacturing firms in Kenya. However, the study focused more on the private sector hence there is need to examine SCM in the public sector in Kenya. Gwako (2008) Studied Supply Chain performance measurement in Kenya Airways; This study was however limited in scope as it covered only one company hence there is need to widen the scope and find out SCM practices in public sector in Kenya. Onyango (2011) studied supply chain management practices and performance in cement industry in Kenya. Mogire (2011) conducted research on Supply Chain Practices in five star hotels in Kenya. he established that the major hindrances to be collaboration during planning, lack of understanding of the Supply Chain Management Concept. The study also established that there was strategic relationships with suppliers and customers within the Hotel industry it did not reveal about long term relationships between suppliers and clients. Even though the study shows that five star hotel industry have adopted supply chain

practices in their operations they have also not fully embraced the Practices. Mwirigi (2007) studied green supply chain management practices by manufacturing firms in Kenya. In the study she looked into four areas of GSCM practices namely green purchasing, design for environment, reverse logistics and green marketing. The research established that environmental challenges posed by GSCM practices contributed to environmental challenges a proportion which is contributed by manufacturing firms. This research also had some limitations because the study did not address how green supply chain practices impact on performance towards service delivery.

However, none of these studies has sought to demonstrate the link between supply chain management practices and firm performance in research based institutions.

As evidenced in the above studies there is no known study that has focused on addressing this gap. This study therefore seeks to answer the following question: What are the supplies Chain Management Practices among research institutions? What impact does SCM practices have on performance of service delivery? What challenges do public sector in Kenya face while implementing SCM practices?

1.3 Objectives of the Study

i. To establish the extent of supply chain management practices implementation among research institutions in Kenya.
ii. To determine the impact of SCM practices on the performance of research institutions in Kenya.
iii. To evaluate the challenges faced by public research institutions in Kenya while adopting SCM

1.4 Significance of the Study

The study will be of great use to publicly funded research institutions in Kenya as it will provide insight into SCM practices, challenges faced and how such practices are influencing organizational performance.

The study will also be useful to the government and its policy-making agencies as it serve to guide policy makers on existing SCM practices among research institutions and challenges faced in implementing SCM practices.

The academic community will benefit from the results of the study as it will serve as a reference point on empirical data pertaining to SCM practices and it will also identify areas for further study.

Finally, the study will be useful to other Firms wishing to implement SCM as it will enable them to identify challenges posed while implementing best practices and be able to mitigate such challenges.

CHAPTER 2: LITERATURE REVIEW

Introduction

This chapter discusses the impact of Supply Chain Management in Organizations including the Public Sector. It looks into the challenges in SCM performance and then provides a summary of the main items and identifies the knowledge gap. The chapter also presents the Conceptual Framework that depicts the relationship between SCM practices and organizational performance.

2.1 The Concept of Supply Chain Management

Over the past few years, more emphasis has been placed on gaining competitive advantage by organizations locally and internationally by incorporating Supply chain, management practices in their operations. Many organizations have realized the importance of creating an integrated relationship with the suppliers and customers. This simultaneous integration of customer requirements, internal processes and upstream supplier performance is referred to as supply chain management (Tan et.al; 1999). With dwindling support from central government to its agencies, there is need for better ways for managing operations so as to reduce cost and increase efficiency. Adoption of good SCM practices can thus provide a good avenue to meet these goals.

The term 'Supply Chain Management' (SCM) was introduced by consultants in the early 1980s (Lambert-Cooper 2000). It has its origins in the logistics literature (Bowersox et al. 1999) and logistics has continued to have a significant impact on the concept. The scope

of SCM has widened over time from intra-organizational focus to moreinter-organisational issues (Dubois et al. 2004). According to Tan (2001) there does not seem to be much consistency in the use of it or its exact meaning. Tan also argues that although there are some shared ideas about what SCM is about, there is no universally accepted definition. Absence of universally acceptable meaning of SCM may negatively influence comparability of SCM studies. However, this study adopts the wider meaning of SCM which includes all aspects encompassed in most studies.

Supply chain can be defined generally as where three or more organizations are directly linked by one or more of the flows of products, services, finances and information from a source to a customer (Mentzer et.al; 2005). In this context of study, SCM involves managing complex flow of information, materials and money across multiple areas both within and among organizations. The aim is to achieve goals related to total system performance. With the current business environment, organizations cannot battle entirely as individuals. They must rely on the other organizations in their supply chains to successfully compete in the global market.

The concept of SCM builds on the theories of the firm, especially transaction cost economics, Porter's value chain and the network approach which has become established as a useful business paradigm. The other theory is Best practices theory - a method that has consistently shown results superior to those achieved with other means, and that is used as a benchmark. In addition, a "best" practice can evolve to become better as improvements are discovered. Best practice is considered by some as a business buzzword, used to describe the process of developing and following a standard way of doing things that multiple organizations can use.

It has been argued that the SCM area lacks sufficient theoretical underpinnings resulting in simplified conceptualizations of supply chains and their contexts, and furthermore, that theory may be helpful to uncover some of the complexity characterizing supply chains. A literature review made in 2000 (Croom et al.) shows a relative lack of theoretical work compared to empirical based studies.

2.2 Supply Chain Management Practices

Owing to SCM's interdisciplinary origin, there have been various definitions of SCM (Li *et.al;* 2006). The SCM concept was derived from the areas of purchasing and Supply Management, and transportation and Logistics Management (Li *et.al* 2006, Tan *et.al*; (2006) stated that SCM is synonymous with the integration of the supply base that evolved from the traditional purchasing and materials functions. Others who defiend SCM from the Purchasing perspective include Wisner and Tan (2000) and Reck and Long (1998) and they stated that SCM is a basic strategic business process rather than a specialized supporting function. From the perspective of transportation and logistics management however, SCM is synonymous with integrated logistics systems' and focuses on inventory reduction both within and across organizations in supply chain (Fisher, 1997; Lamb, 1995).

Various studies have been conducted to identify these different SCM practices. (Koplin *et.al.* 2007) determined the underlying dimensions of SCM practices and tested empirically and framework identifying the relationship among SCM practices, operational performance and SCM-related organizational performance for SMEs in

Turkey. The set of twelve SCM practices identified were: close partnership with suppliers; close partnerships with customers. Supply Chain benchmarking; JIT Supply E-procurement, few suppliers; many suppliers; strategic planning; outsourcing; sub contracting; holding safety stock and 3PL (Chen and Pawlraj,2004) study on development of SCM practices identified a set of four reliable and valid practices significant to SCM.

Ulusoy (2003) identified four SCM practices while assessing the supply chain and innovation management in manufacturing industries of Turkey, They are; logistics, supplier relations, customer relations and production. Similarly a study conducted by Lee and Kuncade (2003) proposed six major dimensions of SCM: partnership; information technology; operational flexibility; performance measurement; management commitment and demand characterization.

Kuei et.al (2001) on the other hand used eleven supply quality-management practices to study and test manager's perception on the association between Supply chain quality-management practices and organizational performance. The eleven factors were; Top management leadership, training; product design, supplier quality management; process management; quality data reporting, employees' relationships; customers' relations, benchmarking; supplier selection; and supplier participation. They found that perceived improvements in organisational performance are associated with improvements in supply chain quality management.

Li *et.al*. (2005) defined SCM practices as the set of activities that organizations undertake to promote effective Management of the Supply chain, SCM practices are

described include supplier partnership, outsourcing, cycle-time compression, continuous process flow and information technology (IT) sharing, supply chain practices is a way of reducing duplication effects by focusing on core competencies, and use inter-organizational standard such as activity based costing or EDI and eliminating un necessary waste along the supply chain.

2.2.1 Green Supply Chain Management Practices

Green Supply Chain Practices are divided into four dimensions, internal environment management, external environment management, investment recovery and eco-design (Zhu and Sarkis, 2004) as quoted by Rha, (2010). For an Organization to improve its environmental performance, its internal environment performance is critical (Zhu *et.al*, 2008) and this can only be achieved through quality management which ensure adherence to vigorous quality control by learning from experiences of their quality management programs (Zhu and Surkis, 2004). By receiving the certificate for the ISO 14001 Environmental Management System (EMS) Standard, Organizations are able to create structured mechanisms for continuous improvement to environmental performance (Kitazawa and Srakis, 2000).

Betty Feng, (2009) in the article Reduce Supply Chain Carbon Footprint, highlights the many trade off decisions to be made in green supply chain management optimization with the goal of maximizing Carbon emission reduction. She suggested environmental initiatives from supply chain, functions point of view and divided the functions into five groups' product development, procurement, production, distribution and transportation.

Green Supply chain improves operations by employing an environmental solution through triple A concept. That is it improves Agitility by helping management mitigate risks and speed innovations, increases Adaptability since it leads to innovative processes and continuous improvements and also it Promotes Alignment of business and principles. Abrahams (2011) tested the impact of green supply chain capabilities on performance of oil marketing firms in Kenya.

2.2.2 Long term Relationships/ Partnerships

Collaboration between supply chain partners will reduce risk and great improve the efficiency of the overall pipeline. Supply chain efficiency therefore relies heavily on successful long-term relationships (partnerships) where information sharing, joint problem solving, and trust are key success factors (Hugo, *et.al* 2004:11). Supplier development and the evaluation of suppliers performance is an issue of managing the supplier relationship. If the supplier's performance is perceived as inadequate, it should be assisted to enhance its performance by means of trainings and continuous improvement teams (Gadde & Hakansson, 2001: pp 145-152).

2.2.3 Information Technology

Supply Chain Management has emerged quickly throughout the early part of 21st Century due to improvement in technology. Technology is increasingly affordable and available to help organizations to take advantage of supply chain strategies. Because of the competitive pressures facing business it is critical for them to use supply chain strategies

to create synergies with supply chain partners in order to succeed in the global competitive environment (Chairman *et.al,* 2002:34). High level best practice for SCM, technology can apply to any business, even though the operation may be specific to an organization implementing a specific SCM System, for example, could be a waste of money if the overall operation is a problem. Automating a broken process does not fix the process.

2.2.4 Lean Suppliers/ Supplier Base Reduction.

Supply base management as a best practice plays a crucial role for organizations since it enhances global supply chain liquidity and helps maintain record. It also allows identification of new suppliers, evaluation of existing suppliers, improve supplier performance and supplier portfolio. It is possible to measure and develop supplier performance in a proactive way by mixing and collaborating tools. Consequently there is reduction in risk and also ensuring that the suppliers are the best in class.

Lean supply base enables organizations to audit their suppliers and reviews them prior to entering into partnerships. This will enhance level of trust and mutual understanding.

Lean supply base through partnerships improves business processes and leads to improved products and reduction in costs and inventories.

Best practices in supply base management arms organizations with means and ways to use procurement as a competitive edge to their supply chain services. Forging closer relationships with the remaining suppliers leads to lower total costs and inventories, improved working capital and better products. Narrowing the supplier base also benefits

remaining vendors who usually increase business volumes in exchange of lower unit pricing.

2.2.5 Outsourcing

Outsourcing has been defined as the process of engaging a third party provider to perform services for the host organization that were previously performed in-house (Domberger, 1998). In this definition, third party provider (3PL) refers to any entity outside the traditional supplier-carrier-consumer relationship. Within any organization, public or private, there may be valid business and strategic reasons to outsource parts of the operation so the business can focus on its core capabilities. This process requires both an objective evaluation of internal performance and capacity, followed by a search for reliable partners that can deliver responsive services.

The numerously presented definitions of outsourcing have been varied from what is concerned with the transfer of goods and services that have been carried out internally to an external provider (Domberger, 1998) to the procurement of products or services from external sources of organisation (Lankford and Parsa, 1999). To describe the main features of outsourcing, the transaction involved normally consists of two parts; the transfer to a third party of the responsibility for the operation and management of part of an organisation, and the provision of services to the organisation by the supplier, usually for a period of several years.

The practice of outsourcing is believed by many to be sustainable. Lankford and Parsa (1999) for instance revealed that a study has indicated that outsourcing operations is the

trend of the future, and those organisations which already involved with outsourcing are satisfied with the result. At present, the outsourcing of selected organisational activities is an integral part of corporate strategy.

Several outsourcing frameworks and models presented have signified the importance of identifying the organizations' core business (McIvor, 2002; Franceschini et al, 2003) and core competence (McIvor, 2003). The core competence paradigm is based on companies understanding what internal skills and resources they should own and control through internal contracts in order to sustain their business success. Other than core competence, the organisation must also first understand the business perfectly in every possible aspect, namely the operations, tactical and strategic (Gavin and Matherly, 1997).

Various forms of organisational benefits and advantages have been related to the idea of outsourcing. Since outsourcing has attracted many parties to explore the possible benefits and profits it may bring, outsourcing benefits, drivers and advantages have been carefully scrutinized and clearly explained by many researchers (Jennings, 2002; Lankford and Parsa, 1999; McIvor 2003; Linder et al, 2002).

Outsourcing is claimed to reduce costs, expand services and expertise, improve employee productivity and morale, and create a more positive corporate image by allowing the organisation to refocus their resources on their core business, buy technologies from vendors that would be too expensive for them to reproduce internally, re-examine the organisations' plans, make them more efficient and save time and money while improving efficiencies, and improve the plans' service level to their employees by making the information more consistent and more available. Nevertheless, the cost

efficiency advantage could be gained only if the right tasks are contracted out (Behara et al, 1995).

2.2.6 Logistics

At the heart of an organisation are the operations that create and deliver the products. These operations take a variety of inputs and convert them into desired outputs. The inputs include raw materials, components, people, equipment, information, money and other resources. Operations include manufacturing, serving, transporting, selling, training among others with the outputs being goods and/or services. Logistics manages the flow of inputs from suppliers, the movement of materials through different operations within the organisation, and the flow of materials out to customers (Wisner, 2003).

A supply chain management strategy requires an end-to-end supply chain focus that supports integration of business processes such as purchasing, manufacturing, selling, and logistics throughout the chain for the purpose of providing optimum value to the ultimate customer/consumer (Cohen and Roussel, 2005; Wisner, 2003). Implementation of such a strategy requires that actions be taken to strengthen relationships and develop trust among supply chain partners to facilitate the integration of processes throughout the supply chain from suppliers' supplier to ultimate consumer/consumer (Cohen and Roussel, 2005; Wisner, 2003).

Morash and Clinton (1997) proposed a schema for future supply chain research that included transportation and logistics capabilities as the link between supply chain structure and performance. Wisner (2003) hypothesized a positive link between logistics

strategy and organizational performance, he did not report data collection related to logistics strategy measurement and did not report results related to his hypotheses. Schramm-Klein and Morschett (2006) assessed the relationship between logistics quality and the organizational performance of firms in the retail sector.

The logistics construct reflects the organization's performance as it relates to its ability to deliver goods and services in the precise quantities and at the precise times required by customers. Bowersox et al. (2000) incorporate performance metrics such as customer satisfaction, delivery speed, delivery dependability, and delivery flexibility (Green and Inman, 2005; Green et al., 2006). Financial performance reflects an organization's profitability and return on investment as compared to its competition (Green and Inman, 2005).

2.3 Supply Chain Management Practices and Performance

Chong *et.al* (2011) empirically tested a framework which identified the relationships between supply chain management practices, operational performance and innovation. Performance of Malaysian manufacturing and service firms. Data for the study were collected from a sample of 163 Malaysian manufacturing and service firms. The research model was tested using structural equation modeling. The results showed that SCM practices in both the upstream and downstream supply chain have a direct and significant impact on organizational performance among Malaysian firms. The findings also revealed that manufacturing and service firms in Malaysia did not have a significant difference in their SCM practices.

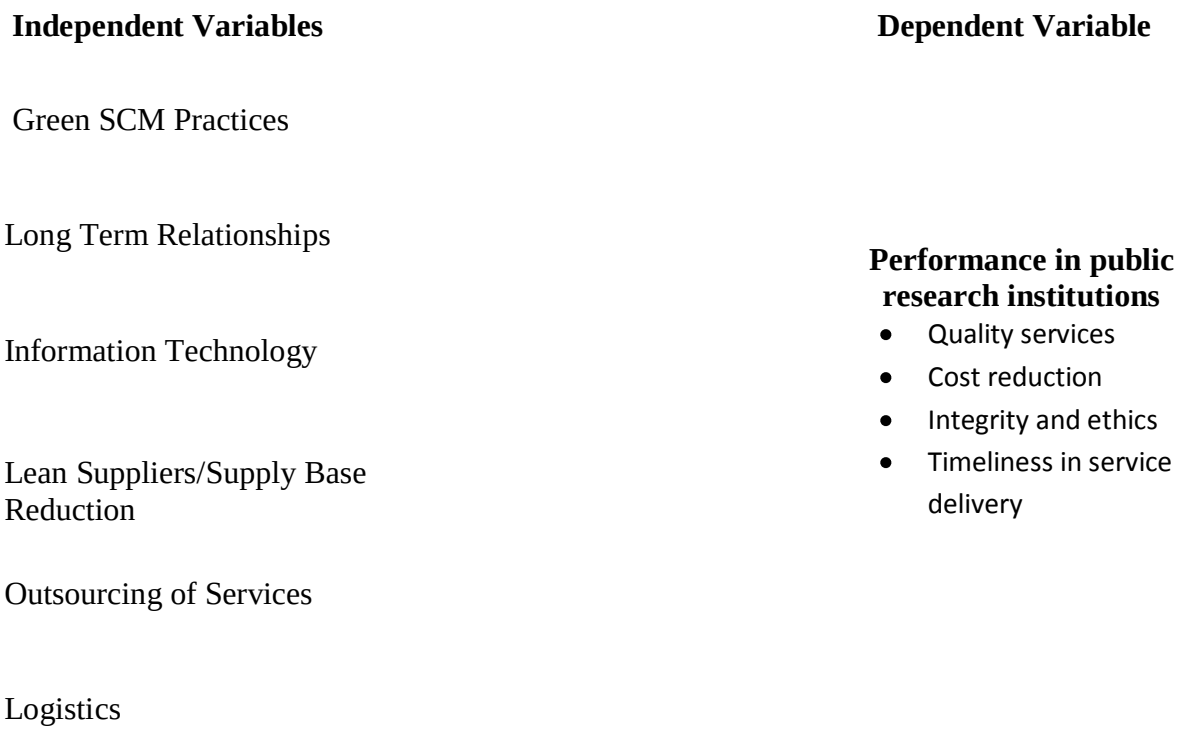
Tracey *et.al* (2005) empirically tested the impact of Supply-Chain Management (SCM) capabilities on business performance so as to determine the degree customer-oriented SCM issues influence competitive position and organizational performance. Methodology was employed to generate reliable and valid measurement instrument. Responses from 474 manufacturing managers were then utilized to test casual model using the results indicated significant positive relationships exit among three types of SCM capabilities.

Awino and Gituro (2009) focused on SCM practices in large private manufacturing firms in Kenya. The preliminary tests employed the use of Kaiser Mayer-Olkin (KMO) and Bartlett's Test. A sample of 52 large private manufacturing companies, which are members of Kenya Association of Manufacturers (KAM) was used. To establish SCM practices, 39 variables were used to measure the level of application among those firms. The variables were analyzed using factor analysis procedure to achieve a simple and meaningful structure that is, have a nonzero locking of the explained variance for each individual factor. As a result 11 critical factors were established as the best practices: Operating policies, linkages within supply chain firms, improved performance, information technology systems strategic alliances, performance measures, goal orientation, customer and relationships, guidelines and procedures supplier selection and supplier evaluation. When benchmarked, these practices were found to be universal and compared with the best practices globally.

2.4 Conceptual Framework

The existence of a procurement system in a public procuring entity is interplay of a variety of variables: legislative and regulatory framework, integrity and transparency, institutional framework, management capacity, procurement operations and market practices. It is often concluded that a well-coordinated procurement system offers value for money and consequently monetary savings.

Figure 1.1: Conceptual Framework of the study.



Source: ***Author***

The research conceptualized that the presence of green supply chain practices, long term relationships, information technology, lean suppliers/supply base reduction, logistics and

outsourcing of non-core services were the main factors that impact on performance among public research institutions in Kenya.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter presents the research methodology that was applied in conducting the study. This involved the research design, target population, sampling design and sample size, data collection procedures and instrument, determination of reliability and validity as well as data analysis techniques.

3.2 Research Design

A descriptive research was used in this study. According to Donald and Pamela (2006), descriptive research a descriptive study deals with the what, how and who of a phenomenon which is the concern for this study. The study specifically tries to ascertain the SCM practices among research institutions in Kenya and seeks to show their relationship with firm performance. The study also sought to find out the challenges faced in the adoption of SCM practices. Thus descriptive research design is appropriate.

Mogire (2011) conducted research on Supply Chain Practices in five star hotels in Kenya and Komen (2005) did a survey of the extent of outsourcing of Human Resource management functions Services by the Public Service in Kenya. Both researchers used descriptive analysis to analyze their research data and it was successful.

3.3 Population

Pout and Hungler (1999) defined a study population as an aggregate or totality of all the objects, subjects or members that conform to a set of specifications. In the present study, the population was made up of all publicly funded Kenyan research institutions whose core mandate is to conduct policy research. The study targeted 36 respondents from the

public research institutions in Kenya (See Appendix II for complete list). Since the population of the study is small, a census was carried out.

3.4 Data Collection

The study utilized quantitative data. Quantitative data involves collecting data from a population or from one or more large samples that represent the population, in a form that is easily converted to numerical indices (Leedy Ormrod, 2001).The research instrument was a semi structured questionnaire (appendix II). The questionnaires were administered through two methods namely; self-administered questionnaires and researcher administered questionnaires. The questionnaire was divided into various sections following the research objectives. Section I of the instrument had general information, Section II sought to answer the research objective I, Section III sought to address research objective II while section IV sought to address research objective III. Most of the questions were close-ended to allow easy coding, faster responses and direct research to relevant and desirable variables hypothesized as possible challenges. Three questionnaires were distributed to each research institution. These were sent to the supply chain manager, finance manager and the CEO/deputy CEO.

3.6 Data Analysis

The questionnaires were administered, and the mass of raw data collected was systematically organized in a manner that facilitated analysis. All data collected was checked for consistency of responses and cleaned before entry into computer file. The data was analyzed using statistical methods and the results, displayed using tables, charts

and graphs. Descriptive statistics mainly frequencies, percentages, and mean were used to summarize the responses. This was used to analyze objective (I) determination of supply chain management practices among public research institutions and objective (III) the challenges that public research institutions in Kenya face while adopting SCM Practices. The researcher also used multivariate linear regression analysis to address objective (II) the impact of SCM Practices on performance. Data was analyzed using Statistical Package for Social Sciences (SPSS) V19.

The regression equation shall be of the form:

$$P = \beta_0 + \beta_1 GSCP + \beta_2 LTR + \beta_3 IT + \beta_4 LS + \beta_5 OS\ \beta_6 L$$

Where: P = Performance; GSCP = Green Supply Chain Practices; LTR = Long Term Relationships; IT = Information Technology; LS = Lean Suppliers; OS = Outsourcing; and L = Logistics

CHAPTER FOUR: DATA ANALYSIS, INTERPRETATION AND DISCUSSIONS

4.1 Introduction

This chapter presents the data analysis results, interpretations and discussion of findings. The chapter is organized as follows: First it presents the response rate then the background information of the respondents. This is followed by analysis of supply chain practices that have been adopted by the research institutions. The chapter concludes with an analysis of the relationship between various supply chain management practices and firm performance using regression analysis.

4.2 Response rate

The study targeted 36 heads of departments/directorates from the publicly funded research institutions In Kenya. The response rate was as displayed in the table below.

Table 4.1: Response rate

	Targeted	Achieved	Percentage
Respondents	36	30	83%

Source: Research data (2013)

From the table above, 30 out of the expected 36 respondents returned the questionnaires representing an 83% response rate. This is a very high response rate and is representative of the targeted sample. This response rate was favorable according to Mugenda and Mugenda (2003) in which they assert that a 50% response rate is adequate, 60% good and above 70% rated very well.

4.3 General information

4.3.1 Nature of institution

The study sought to establish the nature of institution according to funding status. The responses were as shown in the table below.

Table 4.2: Nature of institution

	Frequency	Percent
Fully publicly funded	20	66.7
Partially publicly funded	10	33.3
Total	**30**	**100.0**

Source: Research data (2013)

From the table above, majority (66.7%) of the institutions were fully publicly funded while 33.3% were partially funded publicly. The implication of these proportions is that the data collected had private funding element making the findings even more useful since the profit motive for the partially publicly funded institutions could drive them to adopt more robust strategies to ensure their sustainability as witnessed among educational institutions.

4.3.2 Gender

The respondents were asked to indicate their gender. The table below shows the responses.

Table 4.3: Distribution of Respondents by gender

	Frequency	Percent
Male	23	76.7
Female	7	23.3
Total	**30**	**100.0**

Source: Research data (2013)

From the table above, majority (76.7%) of the respondents were male while only 23.3% were female. This suggests that most of the procurement managers among public research institutions are male. This does not however affect the research data since the focus was on the institutions rather than personal opinions.

4.3.3 Length of service in current position

The study sought to find how long the respondents had served their organizations in their current positions. The responses were as shown in the table below.

Table 4.4: Distribution of Respondents by length of service

	Frequency	Percent
1 - 5 years	7	23.3
6 - 10 years	9	30.0
11 - 15 years	7	23.3
Over 16 years	6	20.0
Total	**29**	**96.7**

Source: Research data (2013)

From the table above, most respondents (30%) had worked for between 6 and 10 years in their current positions while 23.3% had served for between 11 and 15 years and 20% had served for over 16 years. Thus 76.7% of the respondents had well over six years experience in their present positions meaning they are competent to answer the questions.

4.3.4 Extent of Supply Chain Management Practices Implementation

The study sought to establish the various supply chain management practices that had been adopted by the various organizations. The respondents were asked to rate their levels of agreement with various statements on a scale of 1 – 5 where 1 was strongly disagree and 5 was strongly agree. The summary statistics of the responses are provided in table 4.5.

Table 4.5: Means of the level of Implementation of Supply chain management practices

	N	Minimum	Maximum	Mean	Std. Deviation
Supplier Selection	30	2.00	5.00	3.8667	.93710
Existence SC of LAN and WAN	29	1.00	5.00	3.7586	1.12298
Supplier Evaluation	30	2.00	5.00	3.7333	.98027
Existence of environmental Policy	30	1.00	5.00	3.6333	1.29943
Collaboration with Suppliers on long term relationships	30	2.00	5.00	3.6000	.96847
Real time delivery	30	1.00	5.00	3.6000	1.06997
Outsourcing of services	30	1.00	5.00	3.6000	.93218
Free Flow of information among members of staff and suppliers	30	2.00	5.00	3.5333	1.04166
Provision of dependable Services	30	2.00	5.00	3.5000	.82001
Quality outsourced services	30	1.00	5.00	3.5000	.97379
Reduction of fuel consumption	30	1.00	5.00	3.4333	1.27802
Sharing of Information through Information Technology	30	1.00	5.00	3.4000	1.22051
Reduction of pollutant emissions	30	1.00	5.00	3.4000	1.32873
Prequalification of Suppliers that are aware of Environmental Issues	30	2.00	5.00	3.4000	1.03724
Formal partnerships with Suppliers	30	1.00	5.00	3.3667	1.29943

	N	Minimum	Maximum	Mean	Std. Deviation
Existence of a SC data base	28	1.00	5.00	3.3214	1.38921
Sharing of Information with Suppliers	30	1.00	5.00	3.2000	1.09545
Operating with Lean supply base	30	1.00	5.00	3.2000	1.12648
Green Supply Chain Management Practices	28	1.00	5.00	3.0714	1.24510
Supplier Development	30	1.00	5.00	3.0000	1.25945
Preparation of specifications with Suppliers	30	1.00	5.00	2.9667	1.35146
Existence of Outsourcing policy	29	1.00	5.00	2.9310	1.41247
Procurement of recyclable Material	30	1.00	5.00	2.7000	1.55696
Reverse logistics	29	1.00	5.00	2.6897	1.19832
Involvement of key suppliers in planning	30	1.00	4.00	2.2667	1.17248
Valid N (listwise)	24				

Source: Research data (2013)

From the above, the following SCM practices have been adopted to a great extent (mean lies between 3.51 and 5) : Supplier Selection (mean, 3.87), Supply Chain LAN and WAN (mean, 3.76), Supplier Evaluation (mean, 3.73), Environmental Policy (mean, 3.63), Collaboration with Suppliers on long term relationships (mean, 3.60), Real time delivery (mean, 3.60), Outsourcing of services (mean, 3.60) and Free Flow of information among members of staff and suppliers (mean, 3.53).

The following SCM practices have been implemented to a moderate extent (mean lies between 2.51 and 3.5): Provision of dependable Services (mean, 3.5), Quality outsourced services (mean, 3.5), Reduction of fuel consumption (mean, 3.4333), Sharing of Information through Information Technology (mean, 3.4), Reduction of pollutant emissions (mean, 3.4), Prequalification of Suppliers that are aware of Environmental Issues (mean, 3.4), Formal partnerships with Suppliers (mean, 3.37), Existence of a SC data base (mean, 3.32), Sharing of Information with Suppliers (mean, 3.2), Operating with Lean supply base (mean, 3.2), Green Supply Chain Management Practices (mean, 3.07), Supplier Development (mean, 3.0), Preparation of specifications with Suppliers

(mean, 2.97), Existence of Outsourcing policy (mean, 2.93), Procurement of recyclable Material (mean, 2.7) and Reverse logistics (mean, 2.7).

Only Involvement of key suppliers in planning (mean, 2.26) had been implemented to a small extent.

These findings indicate that while a number of SCM best practices have been adopted and implemented to a great extent, majority of the practices have been implemented to a moderate extent. Further, a key practice like involvement of major suppliers in planning still lacks behind. These findings imply that research institutions still have lots of ground to cover in terms of fully implementing supply chain best practices.

4.4 Impact of Supply Chain Management Practices on Performance

The study sought to examine the relationship between various SCM practices and performance. The variables which were all measured using a 5-point likert scale included the following: green supply chain practices, long term supplier relationships, information technology, lean suppliers, outsourcing and logistics. A multivariate linear regression was fitted to the data and the results were as shown in the table below.

Table 4.6: Coefficients estimates

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.175	.271		.647	.524
	Green Supply Chain Practices	.014	.049	.019	.279	.783
	Long Term Relationships	-.024	.077	-.025	-.309	.760
	Information Technology	.380	.083	.474	4.586	.000
	Lean Suppliers	.273	.063	.323	4.319	.000
	Outsourcing Services	-.069	.063	-.069	-1.090	.287
	Logistics	.379	.081	.370	4.694	.000

Source: Research data (2013)

The resulting equation was as follows:

P = .175 + .014GSCP - .024LTR + .380IT + .273LS -. 069OS +. 379L

Where: P = Performance; GSCP = Green Supply Chain Practices; LTR = Long Term Relationships; IT = Information Technology; LS = Lean Suppliers; OS = Outsourcing; and L = Logistics

From the table above, Green supply chain practices has a weak positive relationship with performance but the relationship is not statistically significant at the 5% significance level (β = .014; p = .783 > .05). Long term supplier relationships has a negative relationship with performance but the relationship is not statistically significant at the 5% significance level (β = -.024; p = .760 > .05). Information technology however has a positive relationship with performance which is statistically significant at the 5% significance level (β = .380; p = .000 <.05). Lean suppliers also has a positive correlation which is statistically significant at the 5% significance level (β = .273; p = .000 <.05). Outsourcing was found to have a negative relationship with performance but the

relationship was not statistically significant (p = -.069; p = .287 > .05). Finally, Logistics was found to have a positive and statistically significant relationship at 5% level of significance with performance (β = .379; p = .000 < .05).

From the above findings, logistics, lean suppliers and information technology were found to have positive statistically significant relationships with performance. The other three variables, namely Green supply chain practices, long term relationships and outsourcing were found to have weak correlations which were not statistically significant. However the study findings are consistent with those of Orukoh (2007) where in his study he established that Numerical Machining Complex had not institutionalized collaborative long term relationships with suppliers. The study also contradics the findings with those of Mwirigi (2007) on Green Supply Chain Practices which she established that GSC practices contributed to environmental challenges to firms.

The table below shows the model summary

Table 4.7: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.798	.637	.598	.42620

Source: Research data (2013)

From the table above, the coefficient of determination was found to be .637 indicating that SCM practices account for 63.7% of the variability in performance. This represents a good fit since the rule of thumb has it that an R-square between 60% and 69% represents a good model.

The table below shows the ANOVA table from the regression analysis.

Table 4.8: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.986	6	2.998	16.503	.000
	Residual	4.178	23	.182		
	Total	22.164	29			

Source: Research data (2013)

From the table above, the F-statistic was 16.503 with a P-value of 0.000 which is less than .05. This indicates that the model was statistically significant at the 5% level of significance implying that SCM practices have a statistically significant relationship with performance.

4.5 Challenges impeding adoption of SCM practices

The study further sought to establish the challenges impeding the adoption of SCM practices by research institutions. The respondents were asked to rate the level of agreement with various statements on SCM on a scale of 1 – 5. The mean ratings were then computed and ranked and the items with a mean rating less than 3.51 were considered to be indicators of possible challenges in that respect. The table below shows the results.

Table 4.7: Mean ratings of SCM adoption challenge indicators

	N	Minimum	Maximum	Mean	Std. Deviation
All committees relevant to procurement are in place	30	1.00	5.00	4.0333	1.29943
Tenders and quotations are handled efficiently	30	1.00	5.00	3.7000	.95231
Payments are promptly done	30	2.00	5.00	3.6333	.85029
There is top management support in SCM	30	1.00	5.00	**3.3333**	.95893
There is no political interference in SCM	30	1.00	5.00	**3.0667**	1.22990
All users are cooperative and understanding on issues relating to procurement of their products	30	1.00	4.00	**3.0333**	.99943
Suppliers are aware of contents of PPDA 2005 and Regulations 2006	30	1.00	5.00	**3.0000**	1.17444
Implementation of the Public Procurement and disposal Act has been easy	30	1.00	5.00	**2.9333**	1.08066
Suppliers have adhered to environmental Management Act and policies.	30	1.00	4.00	**2.8667**	.77608
All users are aware of procurement Policies, Procurement and Disposal Act	30	1.00	4.00	**2.7000**	.91539
Valid N (listwise)	30				

Source: Research data (2013)

From the table above, only 3 items out of the 10 items were ranked has applying to a great extent (mean lies between 3.51 and 5). The 3 items included: existence of relevant committees (mean, 4.03), efficient handling of tenders (mean, 3.70) and prompt payments (mean, 3.63). The other 7 items which were rated as applying to a moderate extent indicates that the organizations face challenges in those respects. These include: Top management support in SCM (Mean, 3.33), absence of political interference in SCM (mean, 3.07), Cooperativeness and understanding on issues relating to procurement of their products among users (mean, 3.03), Suppliers awareness of contents of PPDA 2005 and Regulations 2006 (mean, 3.00), Implementation of the Public Procurement and disposal Act has been easy (mean, 2.93), Suppliers have adhered to environmental

Management Act and policies (mean, 2.87), and the awareness of all users of procurement Policies, Procurement and Disposal Act (mean, 2.70).

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents summary of findings, conclusions and recommendations. It is organized as follows: first it presents the summary of findings organized as per research objectives, then the conclusions drawn from those findings and finally both policy recommendations and suggestions for further study.

5.2 Summary of Findings

The study was guided by three specific objectives namely, to establish the extent of supply chain management practices among public research institutions in Kenya; to determine the influence of SCM practices on firm performance and to evaluate the challenges faced by public research institutions in Kenya while adopting SCM. The following were the major findings obtained from the data analysis. Regarding SCM practices, it was found that while a number of SCM best practices had been adopted and implemented to a great extent, majority of the practices have been implemented to a moderate extent. It is worth noting that involvement of major suppliers in planning; an important best practice had been implemented only to a small extent. Thus few best practices had been fully implemented with majority still lagging behind.

Regarding the relationship between SCM practices and firm performance, three variables out of the seven, namely logistics, lean suppliers and information technology were found to have strong statistically significant relationships with performance. The other three variables, namely Green supply chain practices, Long term supplier relationships and

outsourcing were found to have weak relationships which were not statistically significant.

Finally, various setbacks face the public research institutions in their bid to implement SCM best practices. These include: low levels of support from top management, political interference in SCM, inadequate end user cooperation and understanding on issues relating to procurement, low supplier and end users awareness of PPDA 2005 and Regulations 2006, and low compliance among suppliers to the Environmental Management Act and policies.

5.3 Conclusions

From the above findings, the following conclusions were made. First, public research institutions have adopted some SCM best practices to a great extent and some to a moderate extent. This leaves a gap in the adoption of SCM practices. The main practices still yet to be fully implemented include: Provision of dependable Services, Quality outsourced services, Reduction of fuel consumption, Sharing of Information through Information Technology, Reduction of pollutant emissions, Prequalification of Suppliers that are aware of Environmental Issues, Formal partnerships with Suppliers, Setting up a SC data base, Operating with Lean supply base, Green Supply Chain Management Practices, Supplier Development, Preparation of specifications with Suppliers, development of an Outsourcing policy, Procurement of recyclable Material, Reverse logistics and Involvement of key suppliers in planning.

Secondly, it was concluded that logistics, lean suppliers and information technology have strong positive relationships with firm performance among the publicly funded research institutions.

Thirdly, the study concluded that the institutions face a number of challenges in their bid to implement SCM best practices. These include: low levels of support from top management, political interference in SCM, inadequate end user cooperation and understanding on issues relating to procurement, low supplier and end users awareness of PPDA 2005 and Regulations 2006, and low compliance among suppliers to the Environmental Management Act and policies.

5.4 Recommendation

From the above conclusions, the following recommendations were arrived at:

The research institutions should strengthen their supply chain management by putting greater effort to the implementation of some key best practices. Specifically, the following practices should be improved on Provision of dependable Services, Quality outsourced services, Reduction of fuel consumption, Sharing of Information through Information Technology, Reduction of pollutant emissions, Prequalification of Suppliers that are aware of Environmental Issues, Formal partnerships with Suppliers, Setting up a SC data base, Operating with Lean supply base, Green Supply Chain Management Practices, Supplier Development, Preparation of specifications with Suppliers, development of an Outsourcing policy, Procurement of recyclable Material, Reverse logistics and Involvement of key suppliers in planning.

The research institutions should create awareness forums to educate users on applicable laws and regulations such as the PPDA.

The research institutions should enhance their technological capacity so as to accommodate greater collaboration and information sharing between the institution and suppliers as well as internally.

5.5 Limitations of the Study

The researcher had an uphill task to convince the respondents to participate in the study. Most of the respondents were Senior Managers who are busy and had no time to respond to the questionnaires. The findings of this study and application thereof are limited to Public Research Institutions in Kenya. It is therefore important to note that the findings can of this study can only only be used for comparative purposes.

5.6 Suggestions for further study

Owing to some limitations of this study, the following recommendations for future study were arrived at.

The present study used only publicly funded research institutions, future studies should consider expanding their scope to include other private research institutions.

The present study did not use quantitative measures of firm performance. It would be interesting to see whether similar results can be obtained using quantitative measures such as profitability.

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Appendix I:Questionnare

You are requested to answer all questions in this research study questionnaire. The information provided shall be treated with confidentiality and will be used purposely for this study. This study aims at investigating the impact of supply chain best practices on performance among public research institutions in Kenya.

NB: Do not write your name on this questionnaire

Section A:General Information

1. Indicate the nature of your institution
   i) Fully publicly funded ( )
   ii) Partially funded publicly ( )
   iii) Not publicly funded ( )

2. Gender: Male ( )

   Female ( )

3. What is your position in this organization?.....

4. How long have you been the current position
   i) 1-5 years ( )
   ii) 6-10 years ( )
   iii) 11-15 years ( )
   iv) Over 16years ( )

Section B: Determination of supply chain management practices.

Please indicate to what extent the following SCM practices have been implemented in your organization towards better service delivery. Use the scale 1 – 5 where 1 = Very small extent; and 5 = Very great extent

		1	2	3	4	5
1	Green Supply Chain Management Practices					
2	Existence of environmental Policy					
3	Reverse logistics					
4	Procurement of recyclable Material					
5	Reduction of fuel consumption					
6	Reduction of pollutant emissions					
7	Collaboration with Suppliers on long term relationships					
8	Preparation of specifications with Suppliers					
9	Formal partnerships with Suppliers					
10	Real time delivery					
11	Involvement of key suppliers in planning					
12	Sharing of Information through Information Technology					
13	Existence of a SC data base					
14	Existence SC of LAN and WAN					
15	Free Flow of information among members of staff and suppliers					
16	Sharing of Information with Suppliers					
17	Prequalification of Suppliers that are aware of Environmental Issues					

18	Supplier Selection					
19	Supplier Evaluation					
20	Supplier Development					
21	Operating with Lean supply base					
22	Outsourcing of services					
23	Existence of Outsourcing policy					
24	Provision of dependable Services					
25	Quality of outsourced services					

26. Any other? Please state

……
……
……
……
……

Part C: Determination of the impact of SCM practices on performance

1. To what extent do you agree with the following statements regarding green supply chain practices in your organization? The scale below will be applicable:

1= To a very large extent 2= Large extent 3= moderate extent 4= small extent 5=very small extent.

Green Supply Chain Practices	**1**	**2**	**3**	**4**	**5**
The environmental policy has been fully implemented within the Institute					
Suppliers have adhered to supply of environmental friendly goods					
Suppliers are informed of the need to supply recyclable goods					

Staff are sensitized on environmental awareness					
Staff are able to determine goods that are environmentally friendly					

2. To what extent do you agree with the following statements regarding Long Term Relationships with suppliers in your organization?

The scale below will be applicable:

1= To a very large extent 2= Large extent 3= moderate extent 4= small extent 5=very small extent.

Long Term Relationships	1	2	3	4	5
Suppliers have become part of the Institution					
Suppliers have helped the Institution in preparation of specifications					
Suppliers provide goods prior to payment					
Meetings are frequently held between customers and suppliers					
There is joint planning between customers and suppliers					

3. To what extent do you agree with the following statements regarding SC-related Information Technology in your institution?

The scale below will be applicable:

1= To a very large extent 2= Large extent 3= moderate extent 4= small extent 5=very small extent.

Information Technology	1	2	3	4	5
There is efficient internal communication					
There is adequacy of IT systems throughout the supply chain					
Exchange of information between suppliers and the Institute is reliable					
Data is shared between the organization and the suppliers to enhance productivity					

There is an automated ordering system to major suppliers					

3. To what extent do you agree with the following statements regarding supply base reduction in your organization?

The scale below will be applicable:

1= To a very large extent 2= Large extent 3= moderate extent 4= small extent 5=very small extent.

Lean Suppliers/Supply base reduction	1	2	3	4	5
The Institute has few suppliers which are manageable					
The suppliers understand well the requirements of the Institute					
The suppliers deliver quality goods and products					
There is shorter lead time towards service delivery					
All pre-qualified suppliers participate in tendering process					

5. To what extent do you agree with the following statements regarding outsourcing of services in your organization?

The scale below will be applicable:

1= To a very large extent 2= Large extent 3= moderate extent 4= small extent 5=very small extent.

Outsourcing of Services	1	2	3	4	5
There is improvement on service delivery					
There is improvement in decision making					
There is cost cutting due to outsourced services					
Outsourced services are excellently performed					
The supplier and customer meets regularly to discuss issues that relate to outsources services					

6. To what extent do you agree with the following statements regarding Logistics in your organization?

   The scale below will be applicable: 1= To a very large extent 2= Large extent 3= moderate extent 4= small extent 5=very small extent.

Logistics	1	2	3	4	5
Customers receive goods and services at the right quality, quantity, time& place,					
There is Increased capacity to offer services to customers					
There exists a vehicle maintenance policy					
Surplus items are sold and there is reuse of recyclable materials/products					
Services/products are distributed to customers					

7. To what extent do you agree with the following statements regarding the performance of your organization?

   The scale below will be applicable:

1= To a very large extent 2= Large extent 3= moderate extent 4= small extent 5=very small extent.

Performance	1	2	3	4	5
Services offered are good					
Decision making is efficient					
There has been an overall reduction in costs incurred					
There is improved levels of professionalism					
There is real time delivery of goods and services					
There is avoidance of product reject/return					
Customers requirements are met in terms of quality					

Part D: Challenges that public sector in Kenya face while adopting SCM practices

To what extend do you with the following statements regarding implementation of SCM practices

1= To a very large extent 2= Large extent 3= moderate extent 4= small extent 5=very small extent.

Challenges	1	2	3	4	5
Tenders and quotations are handled efficiently					
Payments are promptly done					
All users are aware of procurement Policies, Procurement and Disposal Act					
Implementation of the Public Procurement and disposal Act has been easy					
Suppliers have adhered to environmental Management Act and policies.					
There is top management support in SCM					
All users are cooperative and understanding on issues relating to procurement of their products					
Suppliers are aware of contents of PPDA 2005 and Regulations 2006					
There is no political interference in SCM					
All committees relevant to procurement are in place					

In your opinion, what are the major challenges that your organization has faced in the implementation of SCM practices?

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Thank You for participating.

Appendix II: List of Public Research Institutions in Kenya

1	Kenya Agricultural Research Institute
2	Kenya Veterinary Vaccine Production Institute
3	Kenya Industrial Research and Development Institute
4	Kenya Medical Research Institute
5	Kenya Institute of Public Policy & Research Analysis
6	Kenya Sugar Research Foundation
7	National Crime Research Centre
8	Tea Research Foundation
9	Coffee Research Foundation
10	Kenya National Bureau of Statistics
11	Kenya Marine and Fisheries Research Institute
12	Kenya Forestry Research Institute

Source: *GoK, 2013*