

**EFFECT OF INTERNATIONAL ORGANIZATION FOR
STANDARDIZATION 9001:2008 PROCESSES ON
PERFORMANCE OF SUPPLY CHAIN DEPARTMENTS
OF GOVERNMENT MINISTRIES IN KENYA**

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2019

**Effect of International Organization for Standardization 9001:2008
Processes on Performance of Supply Chain Departments of
Government Ministries in Kenya**

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**A Thesis Submitted in Partial Fulfilment for the Degree of Doctor of
Philosophy in Business Administration in the Jomo Kenyatta
University of Agriculture and Technology**

2019

DECLARATION

This thesis is my original work and has not been presented for a degree in any other University

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DEDICATION

To my late parents Henry Kaibe Mukabi and Ruth Nasiche Mukabi for their tireless effort in bringing me up in a virtuous and industrious way and making me what I am today.

ACKNOWLEDGEMENT

I wish to first thank the Almighty Father and my God in taking me this far in my academic progress. Through prayers, He has seen me through some of the most challenging times during these studies. I will live to honour and worship Him.

Secondly, I sincerely thank my Supervisors Professor G.S. Namusonge, Professor Elegwa Mukulu and my corrections Supervisor Dr. Agnes Njeru for their invaluable guidance and support through the research. Your patience with me, words of encouragement and constant guidance has made this work a reality. Much appreciation also goes to my other lecturers Professor Daniel Kihoro, Professor Maurice Sakwa, Professor Henry Bwisa, Dr. Karanja Kabare, Dr. Willy Muturi, Dr. Anne Wekesa, Dr. Alice Simiyu and all other resource persons in the School.

Thirdly, may I thank the Ministry of Public Service, Youth and Gender Affairs, State Department of Public Service and Youth-Directorate of Public Service Management, the Management of Kenya School of Government and my work colleagues Dr. Anne Kangethe, Mr. Simiyu and the entire Kenya School of Government Embu fraternity for their immense support and encouragement throughout this endeavour.

Finally, I wish to sincerely thank my family members Milly, Joyce, Wendy, Winsley, Leslie, Lolah, Benar, Susan, Whitney and Ken for their support and encouragement throughout my study period.

Thank you all.

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LIST OF ACRONYMS ABBREVIATIONS

| | |
|----------------|---|
| ADB | African Development Bank |
| AGPO | Access to Government Procurement Opportunities |
| ANOVA | Analysis of Variance |
| CS | Cabinet Secretary |
| DPP | Directorate of Public Procurement |
| GOK | Government of Kenya |
| GRP | Government Regulations and Policies |
| HRD | Human Resource Development |
| ISO | International Standards Organization |
| KEBS | Kenya Bureau of Standards |
| KNBS | Kenya National Bureau of Statistics |
| KBV | Knowledge Based View |
| KPI | Key Performance Indicators |
| MDGs | Millennium Development Goals |
| MAIP | Measurement, Analysis and Improvement Processes |
| MRP | Management Responsibility Processes |
| NACOSTI | National Commission for Science Technology and Innovation |

| | |
|------------------|--|
| NQA | National Quality Control |
| PAS | Performance Appraisal System |
| PDCA | Plan, Do, Check, Act |
| PC | Performance Contracting |
| PMS | Performance Management System |
| PP&AD | Public Procurement and Asset Disposal |
| PPOA | Public Procurement Oversight Authority |
| PPCRP | Public Procurement and Capacity Reform Project |
| PRP | Product Realization Processes |
| PS | Principal Secretary |
| QMR | Quality Management Representative |
| QMS | Quality Management System |
| RBM | Results Based Management |
| RMP | Resource Management Processes |
| RoK | Republic of Kenya |
| RRI | Rapid Results Initiative |
| SCM | Supply Chain Management |
| SDGs | Sustainable Development Goals |

| | |
|-------------|--|
| SPSS | Statistical Package for Social Sciences |
| SWOT | Strengths Weaknesses Opportunities and Threats |
| TQM | Total Quality Management |
| VIF | Variance Inflation Factor |
| WB | World Bank |

DEFINITION OF TERMS

- Accreditation:** This is the formal recognition by an independent body, generally known as an accreditation body, that a certification body it operates according to international standards (United Nations, 2014).
- Conformity Assessment:** This according to International Quality of Standardization (2012) is “any activity concerned with determining directly or indirectly that relevant requirements are fulfilled.” It refers to a variety of processes whereby goods and/or services are determined to meet voluntary or mandatory standards or specifications.
- Government Departments:** According to Public Service Commission of Kenya (2017) these are specialized units within Ministries designed to provide specific services and which operate as entities but are coordinated centrally by the Ministry.
- ISO 9001: 2008/15:** According to International Quality of Standardization (2015) the ISO 9001:2008/15 Quality Management System is the internationally recognized standard for Quality Management Systems (QMS) in organizations that measures quality conformance.
- ISO 9001 Certification:** Certification ensures that an organization runs its business using international standards for products, services and processes. These can include business management, environmental policies, or they can be

standards that were developed by the ISO for specific business sectors. According to Hoyle (2009), this means an organization has met the requirements in ISO 9001:2008 or ISO 9001:2015 QMS. It is also the provision by an independent body of written assurance (a certificate) that the product, service or system in question meets specific requirements.

Measurement, Analysis and Improvement Processes: The measurement, analysis, and improvement process category summarizes processes by which we check product quality, ensure and constantly improve the quality of our internal processes, and measure customer satisfaction and finally how we monitor, measure and analyse our energy policy at scheduled time periods.

Management System:

A management system according to International Quality of Standardization (2015) is the way in which an organization manages the inter-related parts of its business in order to achieve its objectives. These objectives can relate to a number of different topics, including product or service quality, operational efficiency, environmental performance, health and safety in the workplace and many more.

Management Responsibility Processes: according to the International Quality of Standardization (2015) the processes entail the requirements related to Top Management activities such as commitment, communication, customer focus, management structure and mainstreaming ISO 9001:2008 quality system.

- Performance:** Performance in public service delivery according to the World Bank (2017) means that the public sector outputs efficiently contribute to policy objectives. Performance measurements focus on outcomes and outputs, not merely inputs. The study will focus on both financial and non-financial parameters of performance (processing time, employee PAS results, PC results)
- Product:** This as the actual realization of an organizational process and which could be a good or a service. In the Standard, it is used to mean both goods and services realized (International Quality of Standardization, 2015).
- Product Realization Process:** According to the International Quality of Standardization (2015) this is the planning of how the product or service will be processed or offered, customer related processes, how it will be designed and how monitoring and evaluation of its processes will be done.
- Resource Management Processes:** The International Quality of Standardization, (2015). Define these as the processes that entail the provision, maintenance and utilization of human resources, infrastructure, physical resources and an appropriate work environment as per the ISO 9001:2008 requirements.

Quality Management Representative: This is a senior staff appointed by an organization adopting ISO 9001 QMS to spearhead and maintain all the processes of quality within an organization (International Quality of Standardization, 2015).

Testing: According to International Quality of Standardization (2015) this is the determination of one or more of an object or product's characteristics and is usually based on established standards.

ABSTRACT

Since 2010, ISO 9001:2008 certification has become part of the performance management framework by the Government of Kenya to enhance realization of quality service provision within the public sector. Currently, 114 Ministries, Departments and Agencies (MDAs) have been certified. There should be interest as to the full effect of this certification on the performance of these MDAs. The study, focusing on Supply Chain Departments therefore purposed to investigate the effect of the ISO 9001:2008 dimensions on the performance of the certified Ministries. It was informed not just by the high cost of the certification process but also lack of empirical evidence as to the effect of this certification on performance of the Supply Chain Departments in the MDAs considering that various reports had indicated that public sector performance is still unsatisfactory. The Supply Chain Departments being a central component in sourcing, purchasing and distribution of public service goods presented an opportunity for the researcher to interrogate the effect of this ISO 9001:2008 certification in enhancing performance in these organizations. Using the ISO 9001:2008 process approach multidimensional constructs of Management Responsibility, Resource Management, Measurement, Analysis and Improvement and Product Realization as the independent variables, the researcher established empirically the extent to which these dimensions affect Performance of the Supply Chain Departments at the Ministries' Headquarters in Nairobi. The researcher also analysed the moderating effect of Government Procurement Policies and Regulations and its effect on both the independent, dependent variables and joint effects on the independent variables of the study. With a target population of 21 Government Ministries comprising 563 employees, and driven by a positivism research philosophy, the study was conducted through a descriptive research design that was randomized quasi experimental to analyze the pre and post certification conditions in which the influence of the independent variables and moderating variable were measured against the performance of these SCM departments in GOK Ministries. Using the purposive and systematic random sampling techniques, 224 members of staff and management from these Ministry Headquarters were sampled. Data was collected through questionnaires and observations after a pilot study representing 8% of the sample in four similar departments had been conducted and adjustments on the tools done. The Statistical Package for Social Scientists, Version 7.0 software was used to sort, code and analyze the data. Inferential data analysis was done using correlation analysis. Regression models were constructed using multiple regression analysis and hypothesis testing done using ANOVA. The findings were presented in tables, graphs and literal descriptions. The findings indicated that indeed Management Responsibility Processes, Measurement, Improvement and Analysis Processes and Product Realization Processes all had a $p < 0.05$ hence have a statistically significant effect on performance of SCM departments, and Resource Management Processes had a $p = 0.402$ hence having no effect on performance, while the moderating variable Government Procurement Regulations and Policies had $p > 0.05$ when interacted with MRP, RMP, MAIP and PRP respectively, and hence was found not to have a statistically significant effect on the performance of these departments. The study

concluded that three of the ISO 9001:2008 processes, Management Responsibility Processes, Measurement, Improvement and Analysis Processes and Product Realization Processes had a positive and significant effect on performance of Supply Chain Departments in Ministries while the Government Procurement Policies and Regulations do not have a significant moderating effect on the performance of the ISO dimensions. Therefore the study recommends that the Principal Secretaries of the various Ministries put emphasis on ISO Management Responsibility Processes through Performance Contracting, emphasise on Resources Management Processes that enhance productivity, enhancement of Measurement, Analysis & Improvement and the adoption of uniform Product Realization processes for the improved performance of the departments. The researcher recommends that more research on Government Procurement Policies and Regulations needs to be done to inform more appropriate policy guidelines and finally the independent variables within different geographical spaces particularly in the Counties' SCM departments operating within the ISO 9001:2008 quality framework equally needs further investigation.

CHAPTER ONE

INTRODUCTION

The chapter in the thesis opens with the background of the study with insights on global, regional and local perspectives on how ISO 9001:2008 certification of organizations has influenced their performance. The chapter also endeavours to introduce ISO 9001:2008 quality management systems and how it is related to its successor ISO 9001:2015 standard. The chapter also undertakes to define the problem under study review, highlighting the study objectives and hypotheses. It further pinpoints the justification of the study and ethical considerations the study followed.

1.1 Background of the Study

The International Organization for Standardization, (ISO) according to the International Organization for Standardization (2015), is a worldwide federation of national standards' bodies of all member countries established in February 23, 1947, and it certifies worldwide proprietary, industrial and commercial standards. ISO has various Standards for example ISO 1400-Environmental Management, ISO 22,000-Food Safety Management, ISO 45001-Occupational Health and Safety, ISO 50001-Energy Management and several others. ISO 9001:2008/2015 Quality Management System is the internationally recognized standard for Quality Management Systems (QMS). It is the most widely used Standard in the world, with over 1.1 million certificates issued to organisations in 184 countries. Currently we have ISO 9001:2008 and ISO 9001:2015 in use. According to an ISO Survey Report (2012), up to December 2012, at least 1,101,272 ISO 9001 QMS certificates had been issued in 184 countries.

Tricker (2016) says that the ISO 9000 family is an all encompassing series of standards that lay down requirements for incorporating the management of quality into the design, manufacture and delivery of products, services and software. The family consists of three primary standards namely ISO 9001:2015 Quality Management System which sets

out the requirements for a quality management system and a standard against which certification and registration is done, ISO 9001:2015 Quality Management Systems Fundamentals and Vocabulary which gives an overview of fundamentals and concepts around the management system and ISO 9004:2009 A Quality Management Approach to sustainable success of an organization which focuses on how to make a quality management system more efficient and effective by providing guidance on achieving sustainable quality management.

1.1.1 ISO Standards and ISO 9001:2008

The International Organization for Standardization being an international standard-setting body whose headquarters are in Geneva Switzerland is composed of representatives from various national standards organizations from member countries. Kenya is represented by Kenya Bureau of Standards (KEBS). According to the International Organization for Standardization (2015), an organisation could benefit from implementing ISO 9001:2008/2015 as its requirements are underpinned by the seven universal management principles which form the Principles of an ISO 9001:2015 QMS System. These are: a customer focused organisation; leadership; the engagement of people; ensuring a process approach; an improvement framework; evidence based decision-making; and relation management. The study utilizes the process approach dimensions in assessing performance of SCM departments. This is shown in Figure 1.1.

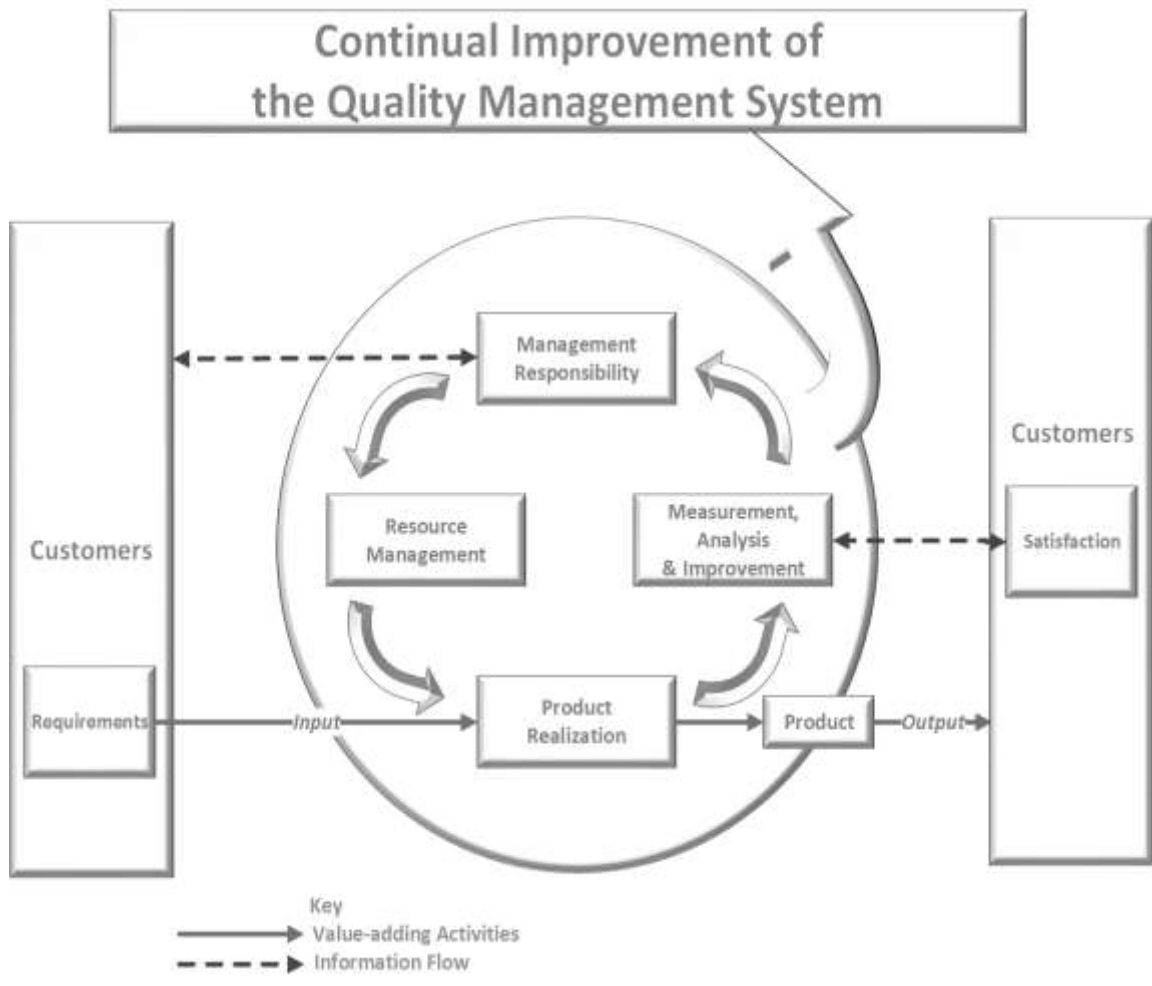


Figure 1.1: ISO 9001:2008 Process approach dimensions.

Note. Reprinted from the International Organization for Standardization (ISO, 2008).

The process approach is part of the eight quality management principles of which the entire ISO 9000 series of standards is anchored. This principle suggests a desired result is achieved more efficiently when activities and related resources are managed through a process. The word "process" is defined in ISO 9000:2000 clause 3.4.1 as "a set of interrelated or interacting activities that transforms inputs into outputs." Inputs to a process are considered in general terms as outputs of other processes (International Organization for Standardization, 2015). Processes in an organization are planned and

carried out through controlled conditions so as to add value. From the principle and process definition one realizes that the process approach is a powerful way of organizing and managing how work activities could create value. While a more traditional structure organizes and manages work activities vertically by function, with quality problems frequently occurring at the boundaries of the functional departments, the process approach is said to organize and manages work horizontally as the work activities create customer value. The process approach then directly links inputs sourced from suppliers to the outputs of the process that go to customers. This horizontal linkage between suppliers and customers is considered the best approach to manage and continually improve both the effectiveness (the amount of value created for the customers) and the efficiency of the process. Figure 1.0 shows these relationships.

According to the Standards for Quality Management Systems, (International Organization for Standardization, 2008), using the process approach, a QMS is comprised of the following four categories of interrelated processes as shown in Figure 1.1 These are Management Responsibility Processes (MRP); Resource Management Processes (RMP); Product Realization Processes (PRP); and Measurement, Analysis and Improvement Processes (MAIP). Each process is managed and improved using various process management and improvement techniques, though the managing of the interrelated processes as a system introduces improvement opportunities for organizations. Processes may be analyzed and improved together as mega-processes, increasing the opportunities for improvement.

1.1.2 ISO 9001:2008 and 9001:2015

According to the Standards for Quality Management Systems, (International Organization for Standardization, 2015), organisations can choose between applying for the 2008 or 2015 versions of ISO 9001. All organisations must transit to the 2015 version by the end of 2018. The 2015 version represents an up to date approach and best practice guidelines in the quality management system. It is recommended by countries' quality representatives' world over including Kenya Bureau of Standards (KEBS) in

Kenya. Kenya has adopted the ISO 9001: 2008 to help improve service provision through the performance improvement strategy framework and all Ministries and Departments are expected to adhere to this. The Kenya Government Ministry Headquarters are ISO 9001:2008 certified and according to KEBS prefer to remain so because they have an existing system compliant to the 2008 version.

Many world organizations would wish to gain certification before changing their QMS to the new 2015 Standard while others would like to attain certification now and allow industry understanding to develop before adopting the new standard into their QMS. ISO 9001 provides a framework and set of principles which ensure a common approach that management of an organisation could consistently satisfy customers and all other stakeholders. It provides the basis for effective processes and effective people to deliver an effective product continuously. The National Quality Accreditation (2012) articulates the benefits of ISO certification as: Customer satisfaction, that is it delivers products that consistently meet customer requirements; reduced operating costs and continual improvement of processes which results in operational efficiencies and this implies that money is saved; there are improved stakeholder relationships since it improves the perception of the organisation with staff, customers and suppliers; it also enhances legal compliance through an understanding of how statutory and regulatory requirements could impact on the organisation and its customers; it further leads to improved risk management as the consistency and traceability of products and services implies that problems become easier to avoid and correct; it also confirms proven business credentials through an independent verification against a globally recognized industry standard speaks volumes; and it enhances the ability to win more business since for example procurement specifications often require certification as a condition to supply, so certification opens doors.

The International Organization for Standardization (ISO, 2015) describes the process for management systems certification which follows a generic process consistent with the ISO management systems standards. It describes the three steps to certification namely that the application for registration which is made by completing the Quote Request

Form for the desired standard which can be found within the Standards and this provides information about your organisation and which enables an accurate definition of the scope of certification and the assessment duration; an assessment is undertaken by Quality Organization that is to certify against the specific requirements of your chosen Standard and this consists of two mandatory visits that form the Initial Certification Audit (ICA) as explained subsequent discussions here. The organization must be able to demonstrate that their management system has been fully operational for a minimum of three months and has been subject to a full cycle of internal audits; and certification is issued by Kenya Bureau of Standards (KEBS), Société Generale de Surveillance, Switzerland (SGS), National Quality Assurance (NQA) or any other prescribed certifying body on successful completion of the Stage 2 assessment. Certification is maintained through several programmes and annual surveillance audits. There are also three year recertification audit that organizations can opt for.

Globally, the public sector world over is facing the challenge of how to provide quality products and services to its customers in an efficient and effective way. This has necessitated the adoption of quality management systems as a strategy in many countries. The main concern of any firm is to get satisfaction through high quality goods and services, greater customer satisfaction, and overall reduction of service delivery costs which will lead to better optimization of benefits (Arauz & Suzuki, 2014). They summarize the recent pressures on the public sector that make quality management systems necessary such as: legislation that now gives more choice to consumers; through compulsory competitive tendering practices; increasing pressures on cost reduction; the demands of value for money and other financial reforms; and the ever increasing customer demands and requirements. Looking for ISO certification has been driven by globalization and markets that now demand that organizations develop well designed internal administrative systems for internationally accepted management policies such as ISO 9001:2008/15 (Karapetrovic & Wilborn, 2012). Research undertaken in the United States established that firms experience powerful significant improvement three years after certification according to Corbett et al. (2010).

Regionally, studies by Cheruiyot and Maru (2013) on service quality and relative performance of public universities in East Africa found that the different universities under unique cultural and contextual situations exhibited different quality attributes and levels which affected performance. Each had different quality systems with varying implications on their relative performance as public sector entities. Their research also provided insights on the relative importance of service quality dimensions and their effects on relative performance of these universities. This would therefore guide practitioners on prioritization of the service quality dimension central to relative performance.

A 2014 survey of certifications (International Organization for Standardization, 2015) implies that Kenya has the largest number of firms in East Africa that have attained ISO certification as indicated in Table 1.1, the majority of certifications are in the ISO 9001:2008 on Quality Management Systems. This is also an indication of how Kenya is taking a regional lead in having organizations certified for ISO 9001:2008/15.

Table 1.1: Number and categories of ISO certified firms in Kenya in 2013

| | Type of certification | No. of certified firms |
|----|--|-------------------------------|
| 1. | ISO 9001:2008 on Quality Management Systems | 485 |
| 2. | ISO 14001 on environmental management fields | 38 |
| 3. | ISO 22000 on food safety | 118 |

Note. Reprinted from International Organization for Standardization Report, 2015.

In Kenya, according to the Public Service Commission of Kenya, (PSCK, 2008), several methods have been employed to help improve process and service quality in the public sector. Results Based Management (RBM), Performance Contracting (PC), Service Delivery Charters (SDC) and Rapid Results Initiatives (RRI) were introduced to the public service to enhance focus on results. However, an according to a KPMG report,

(KPMG, 2011), it identified serious challenges and called for reforms in Kenya's public sector. The firm identified Public Private Partnerships (PPP), Business Process Re-engineering, Performance Contracting and ISO 9001:2008 as some of the strategies adopted in the public sector to help overcome these challenges. This is according to Kariuki and Kasomi (2011). ISO 9001:2008 which helps to guide organization's operations as a network of value-creating processes is also currently employed by the public sector to enhance service delivery. The Kenya Bureau of Standards (KEBS), a Government agency that is charged with the responsibility of regulating product certification schemes to ensure that the health and safety of Kenyans as well as the environment are protected enforces quality certification according to Kenyan statutes. It is also the Government lead agency in enhancing provision ISO 9001:2008 Certification of public and private institutions in conformity with International Standards. This is grounded in Chapter One, Article 46(1) of the Kenyan Constitution, 2010, where Consumer Rights are encapsulated. Other ISO certification bodies operating in Kenya according to the KEBS website are Societe Generale de Surveillance (SGS) International Certification Services (ICS), United Kingdom Accreditation Service (UKAS).

ISO certification ownership as a percentage of firms in Kenya was reported at 22.1 % in 2013, according to the World Bank collection of development indicators, compiled from officially recognized sources. This is as displayed in Figure 1.2. ISO certification ownership is the percentage of firms that have earned quality certification recognized by

ISO.

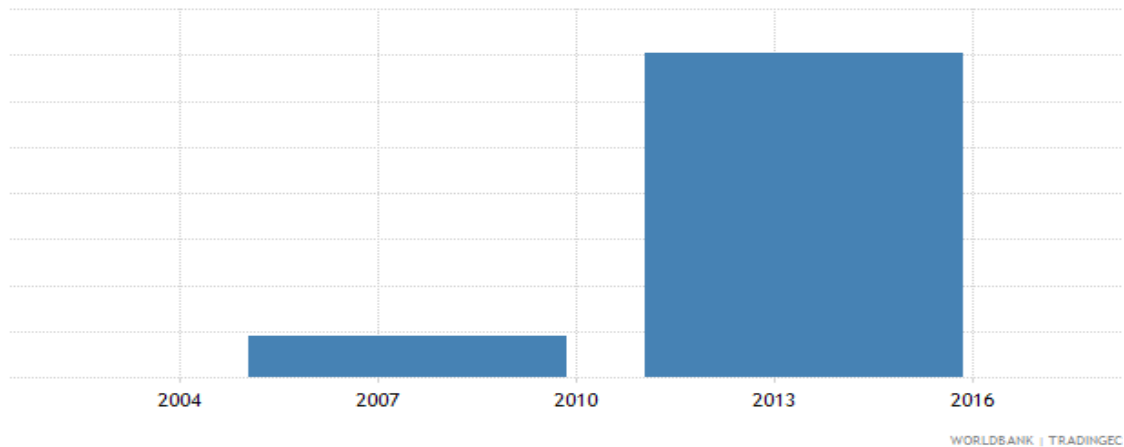


Figure 1.2: ISO Certification ownership in Kenya in 2013.

Note. Reprinted from World Bank Group *tradingeconomics.com* Report, (World Bank, 2013)

Public institutions in Kenya have been particularly compelled to move towards being certified to help meet the country's long term transformational goals in line with the country's development blue-print, the Kenya Vision 2030. Standards and conformity assessment systems are considered benchmarks for sustainable development and which therefore form the foundation for the realization of the Kenya Vision 2030. Many public institutions in Kenya today are now ISO 9001:2008 certified, including Ministries, Public Universities, Parastatals and regulatory bodies such as KEBS. As per Kenya Bureau of Standards website accessed on July 21, 2018, out of the one hundred and sixty seven organizations listed as being ISO 9001:2008 certified, one hundred and fourteen are public institutions and the number continues increasing. The main aim of the high rate of acquisition of the ISO certification in the public sector in Kenya is to improve public sector performance.

The Supply Chain Management Departments of the Ministry Headquarters play an important role towards sourcing, acquisition and distribution of goods and services to the

public. These Departments in the public sector therefore play a key role in service provision and economic development of Kenya. It is envisaged that these departments would help in the achievement of Kenya's economic blue print, Vision 2030 and Africa's Agenda 2063. According to Muthaura (2010) the public sector in Kenya plays a very critical role in service delivery and it is central to the country's socio-economic development since all sectors depend on it as a facilitative sector.

A report by Kenya National Bureau of Statistics (KNBS, 2012) indicates that in the 2011/2012 financial year, there were 681,100 employees in the public sector which accounted for 32% of the total employees in the country. In the same financial year, total wage expenditure for the sector was KES 863.6 Billion accounting for 74.1% of the total government expenditure. This wage bill translated to 28.5% of the country's GDP. These figures show how vital the public sector is to the country's economy and well-being.

1.1.3 Supply Chain Departments in the Kenyan Public Sector

Supply Chain entities in the Kenyan Public Service are perceived to be pivotal in enhancing service delivery and hence customer satisfaction through their intervening roles in procuring and supply of necessary goods and services in the sector (Muthaura, 2010) and the Directorate of Public Procurement (DPP), at the National Treasury is mandated to oversee all public procurement. One of its major roles amongst others is to the introduction of modern management techniques and approaches in the field of Supply Chain Management in public sector. This includes encouraging the Supply Chain Departments in Ministries and other state Departments to embrace best practices in Management and ISO 9001:2008 Quality Management System is one of the current approaches in use. Public Supply Chain Management entities are not stand alone organizations but are hosted in Ministries, Departments and other Kenya Government agencies. Procurement stands out as a significant component of the Supply Chain Management processes.

In 2012, a study conducted to evaluate public procurement systems in Kenya found that public procurement was not operating efficiently and that the state was losing a lot of money through shoddy deals according to a report by the Organization for Economic Co-operation and Development, (OECD, 2013). The report strongly indicated the need for reforming the public procurement system in the country. In 1997, the Government in collaboration with the World Bank commissioned another study to assess the country's procurement processes and systems. The World Bank (WB) supported the study through the Public Procurement and Capacity Reform Project (PPCRP). This study identified the need for a comprehensive review and an implementation of a reform process in the procurement systems. The study revealed that the public procurement system in Kenya lacked transparency and fair competition. It further revealed that procurement staff were not adequately trained and lacked professionalism. Lack of a professional body that would oversee and instil discipline among procurement officers made them vulnerable to corruption. One of the major recommendations from these two studies was that reforms in public procurement systems were paramount if government was to save resources otherwise lost through exorbitant procurement. According to Odhiambo and Kamau (2003) these studies by World Bank argued that improvement in procurement systems had a direct and beneficial effect on the overall economic situation in the country.

The World Bank and the African Development Bank (ADB), in conjunction with the Government of Kenya, initiated the public procurement reform process in the late 1990s. This reform process was meant to create a system that allowed, among other things, a proper delegation of authority, incentives, procurement thresholds, planning, and the development of supplies manuals (World Bank, 2000). Makori (2012) indicates that the reform process according to the World Bank report focused on addressing the issue of procurement laws, establishing appropriate procurement institutions and entities, as well as creating adequate and timely evaluation and monitoring mechanisms (Government of Kenya, 2011). The reforms would also increase transparency in procurement systems and create reputable agencies. The public procurement reforms also aimed at ensuring that the procurement laws were streamlined to conform to international procurement

laws and standards. A task force was established to take a lead in the reform process (Odhiambo & Kamau, 2003).

Therefore, under the operation of ISO 9001:2008 QMS, the government is expected consolidate authority with relevant responsibility through document control and standardization of operation processes. Transparency, efficiency, accountability and responsiveness to citizen's needs (Muthaura, 2010), which characterize qualities of a good public sector, can only be achieved when management of public sector institutions is viewed as systems which comprise of individual processes according to Kyallo (2013).

Currently, the Kenya Government has 21 Ministries with their Headquarters in Nairobi. All the Ministries or at least one of their respective State Departments is ISO 9001:2008 Certified. This is due to the fact that in the Grand Coalition Government (2008-2013), there were 43 Ministries most of which had been ISO 9001 certified while some Ministries were merged to become State Departments and therefore comprise the current 21. Each of the Ministries and/or their constituent Departments has a Supply Chain Management Department at their respective headquarters. The SCM Departments are staffed, organized and managed by The National Treasury through the Directorate of Public Procurement.

1.2 Statement of the Research Problem

Cognizant of the perceived importance of ISO 9001:2008 system certification, the Government of Kenya issued a directive in 2010 that all public agencies should begin the process of ISO9001:2008 certification and ensure that they are fully certified by 2012. The current 21 Ministries of GOK or at least one of the State Departments under them and some former Ministries in the Grand Coalition Government of 2008 have subsequently been ISO 9001:2008 certified. Out of the ISO certified firms in Kenya, 485 were certified with the ISO 9001: 2008/15 quality management systems with out of which 114 were from government Ministries, Departments and Agencies (KEBS, 2018).

It is therefore expected that the Supply Chain Management Departments in these Ministries, Departments and Agencies through their adherence to the ISO 9001:2008/15 Quality Management System processes are able to provide quality processes and services leading to improved performance and hence service delivery. The SCM Departments at the headquarters are a critical component of the Ministries' business processes and are therefore expected to have undergone process re-engineering through these certifications and therefore improved performance by offering quality services through adopting the ISO 9001:2008 Quality Management System Standard.

However, according to the Public Procurement Regulatory Authority report (PPRA, 2017), there are still persistent complaints from suppliers and users on bureaucracy (80%) and wastage (60%) in the Government procurement processes. Similarly, according to a report by the Institute of Economic Affairs report (IEA, 2018), audit reports of the Auditor General over the past successive years have consistently revealed irregularities in the use of public funds and glaring corruption in the public sector linked to breaches in the procurement requirements. For example, in the Ministry of Health Supply Chain Department, 63 cases of procurement violations were recorded between the 2013/14 and 2014/15 FY, arising from unsupported expenditure (22%), abuses of supplier quality, price and timing (22%), false accounting and cost misallocation (16%) and failure to budget realistically (5%), indicators of low customer satisfaction and hence performance. It is not clear therefore whether these Ministries' efforts towards adoption of the ISO 9001:2008 QMS has cascaded the expected positive results to these Supply Chain Departments such as improved work procedures and process, a reduction in wastage, quality supplies and customer satisfaction as expected considering that the Kenyan public service has been characterized by structural inefficiencies (Owino, 2010). This proposition is supported by a number of critics who argue that the extra costs and documentation efforts required by ISO 9001:2008 certification are time-consuming, and its adoption provides no real benefits to organizational business performance to reach all levels of the organization such as the SCM Departments. Colin, John and Marek (2000)

say that in reality, some of the benefits of ISO 9001:2008 certification are unclear while others are open to different interpretations or measuring problems.

A lot of research has been done on the effect of various forms of ISO certification and how they affect service delivery in various organizations, but none has focused on how ISO 9001:2008/15 adoption affects performance of the Supply Chain Management Departments of public service entities in Kenya. The problem at the core of this study therefore was that because there is limited knowledge as to the real extent with which ISO 9001:2008/15 adoptions enhances performance in Supply Chain Management entities within the public sector, and there was need to establish this. The purpose of this study therefore was to help provide empirical evidence on the actual effect of ISO 9001:2008 adoption through measuring the variables of management responsibility, resource management, product realization and measurement of performance and how this influences the service delivery of the Supply Chain Management Departments processes of the Kenyan Ministry/Department Headquarters in Nairobi. This study therefore embarked to fill this gap.

1.3 Objectives of the Study

The study was guided by the following general and specific objectives.

1.3.1 General Objective

The general objective of this research was to evaluate the effect of ISO 2001:9008 processes on the Performance of the Supply Chain Departments in Kenya Government Ministries.

1.3.2 Specific Objectives

The specific objectives of the study were to:

1. Assess the effect of Management Responsibility Processes (MRP) on the Performance of the Departments;
2. Establish the effect of Resource Management Processes (RMP) on the Performance of the Departments;
3. Assess the effect of Measurement, Analysis and Improvement Processes (MAIP) on the performance of the Departments;
4. Evaluate the effect of Product Realization Processes (PRP) on the Performance of the Departments;
5. Establish the effect of the joint relationship between the Supply Chain ISO 9001:2008 process dimensions and performance of the Departments; and
6. Assess the moderating effect of Government Procurement Regulations and Policies (GRP) on the relationship between Supply Chain ISO 9001:2008 process dimensions and performance of the Departments.

1.4 Hypotheses

The hypotheses discussed presumed that there are relationships between various research variables after review of literature. The conceptual framework in Chapter Two discussed the following hypotheses whilst Chapter Three described how the hypotheses were tested.

Based on the research objectives, the researcher hypothesized as follows:-

- H₀₁:** The Management Responsibility Processes has no significant effect on the Performance of the Departments;

H₀₂: The Resource Management Processes has no significant effect on the Performance of the Departments;

H₀₃: The Measurement, Analysis and Improvement Processes (MAIP) has no significant effect the performance of the Departments;

H₀₄: The Product Realization Processes has no significant effect on the Performance of the Departments;

H₀₅: The joint ISO 9001:2008 process dimensions have no significant effect on the performance of the Departments;

H₀₆: The Government Procurement Regulations and policies have no significant moderating influence on the relationship between Supply Chain ISO 9001:2008 process dimensions and the Performance of the Departments.

1.5 Significance of the Study

Among many other countries, Kenyan organizations both public and private have already taken on the ISO 9001:2008 standards as the norm to be followed while doing business.

The study is important to the following:

The Government of Kenya

The results of this study will benefit the Government of Kenya, the management at the Ministry Headquarters, the Supply Chain Management Departments and the entire Kenyan public sector, private organizations and researchers on ISO 9001:2008 certification and how effective it is on service delivery. For the Government Ministries, the entire SCM in the public sector, the study will inform management on whether the ISO 9001:2008 certification has led to adherence to the standard and if the Quality

Management System in place is benefiting the organization in terms of reduced costs, improved documentation, customer satisfaction and quality processes.

The Researchers

For researchers, this study will add to the growing body of knowledge on the impact of ISO 9001:2008 certification and its effectiveness in business processes. This will open up discussions on whether this relationship is worth the incurred costs and the documentation that the implementers go through. It will thus create awareness of the importance of similar studies in related organizations. The study will also offer room for further research about the relationship between organizations being ISO 9001:2008 certified and business performance.

The Policy Makers

The study will also assist in the regulation and policy makers of public sector Supply Chain Management in terms of policy formulation and implementation at The National Treasury and implementation. Based on the results of the study, they could for example decide to make it policy that all Supply Chain Management departments in all public entities to adopt ISO 9001:2008 QMS as a quality tool or suggest areas of improvement. Such a policy could be extended to the private sector that wishes to do business with the public sector.

This study is also meant to be of help to all those managing the organizations both public and private in Kenya that are contemplating the dedication of time, financial and human resources for the acquisition of the ISO 9001:2008 Certification with the ultimate goal of satisfying their business customers.

The International Standards Organization (ISO)

Finally, the study will also provide the ISO with a body of knowledge about the challenges and experiences of ISO 9001: 2008 QMS Certification within large public agencies in Kenya to inform appropriate review for effectiveness.

1.6 Scope of the Study

The study focused on the Supply Chain Management entities at Government Ministry/Department Headquarters that are ISO 9001: 2008 certified and which are situated in Nairobi, Kenya. This was used to represent the various SCM Departments in the National Government and hence Kenya as a whole. This is mainly because of resource limitations in carrying out a nationwide research. These were appropriate for the researcher since the Ministry/Department Headquarters were representative of all the Ministries in the Republic of Kenya. The offices at the headquarters also are fairly staffed Supply Chain Management Department entities from which the respondents were drawn. These employees of Supply Chain Management Departments alongside the Department's Management and Quality Management Representatives (QMRs) of the QMS provided a sampling frame from which the scientifically acceptable respondents for the research will be drawn.

1.7 Limitations and Delimitations of the Study

During the study, various challenges were experienced but were overcome:

Accessing the respondents

Accessing the supply chain offices was a difficult task despite having gotten clearance from NACOSTI, the researcher was still expected to make another formal application to the Principal Secretaries of the targeted Ministries before being allowed to collect the data. This delayed the process of data collection. However, the respective Principal Secretaries were able to authorize data collection in the respective Ministries.

Cooperation from respondents

Some of the respondents were reluctant to divulge information because of the sensitive nature of such information despite the researcher's assurance of confidentiality. Some could not provide responses in good time and caused delays in data collection. Through the intervention of their respective HODs/HOSs, the information was eventually collected.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The literature reviewed for this study focused on the background information on ISO 9001:2008 certification, the theoretical review and the conceptual framework guiding this study. The study also addressed the empirical and theoretical literature of other studies carried out in this area, the findings and conclusions. In this chapter, a critique of the earlier studies was undertaken by the researcher. This helped the researcher to identify the study gaps which in effect helped guide this study.

2.2 Theoretical Framework of ISO 9001 certification

The researcher reviewed the works of other researchers on ISO 9001 in relation to the study variables hypothesized. A review of their thoughts alongside a critique of the propositions was also done. The methodology employed and study gaps are also highlighted. The approach in this section is a brief analysis of the study variable and then discussion of the contributions of other authors in relation to the variables.

According to Hayden (2017) a theory is considered a set of statements or principles that are devised to explain a group of facts or phenomena especially one that has been repeatedly tested or is widely accepted and which could be used to make predictions about natural phenomena. Theories are perceived as analytical tools for understanding, explaining, and making predictions about a given subject matter. A formal theory (Hayden, 2017) is syntactic in nature and is only meaningful when given a semantic component by applying to it some content that is, facts and relationships of the actual historical world as it keeps unfolding.

According to Bwisa, Otieno and Kihoro (2012) a theoretical framework is a group of related ideas that provide guidance to a research project. It is an essay that inter relates

the theories involved in the research question. A theoretical framework according to Trochim (2006) guides research, determining what variables to measure, and what statistical relationships to look for. He states that there are two realms involved in research theory and observation. He further observes that theory is what goes on inside the heads of scientists while observation is what goes on in the real world or measures and observations. While conducting research, the researcher works between these two realms. Theories therefore guide every aspect of research, from formulation of the research question through operationalization and discussion.

The researcher used the Contingency Theory, Institutional Theory, the Resource-based View theory and the holistic model of all these theories that were used to help explain the relationship between the independent and dependent variables in this study.

2.2.1 Contingency theory

The Contingency theory as first described by Fred Fielder in 1958 is an organizational theory that claims that there is no best way to organize a corporation, to lead a company or to make decisions. According to the theory, the optimal course of action is contingent (dependent) upon the internal and external situations. Organizations therefore become open systems which need careful management so as to satisfy and balance internal needs and also adapt to environmental changes. The proponents further argue that there is no one best way of organizing and the appropriate form depends on the kind of task or environment one is dealing with. Management must be therefore concerned with achieving alignments and good fits in all its processes. The contingency theory of organizational structure according to Donaldson (1985) in Figure 2.1 provides a major framework that could be used for the study of organizational design. It postulates that the most effective organizational structural design is where the structure fits the contingencies.

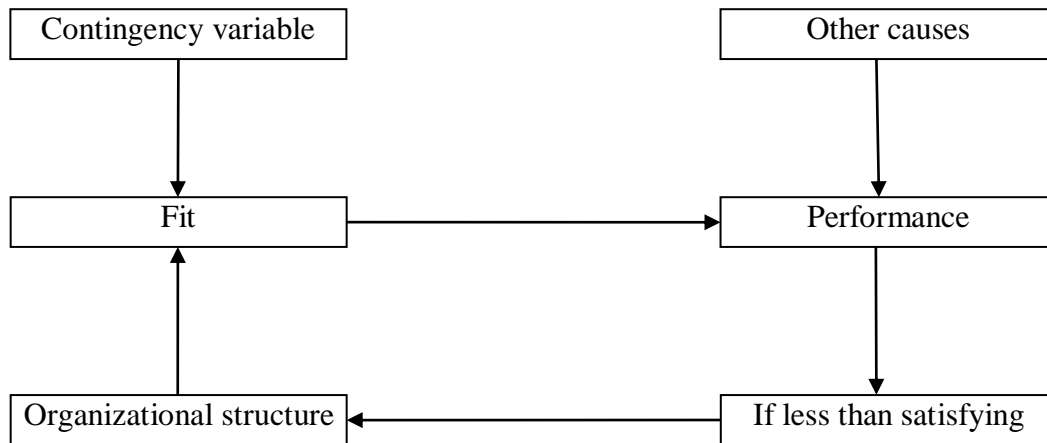


Figure 2.1: Fred Fielder’s Contingency Model.

Note: Reprinted from Donaldson (1985)

This model contains the relationship between leadership style and how favourable it could be of the situation. Situational favourableness was described by Fielder in terms of: leader-member relationship; degree of task structure; and leader’s position power. The contingency variable in this context is the ISO 9001 implementation while other causes are environmental.

This theory helped the researcher to understand the existing management structures, the responsibility and authority relationships the management culture and attitudes towards ISO 9001 implementation. This theory also helped the researcher in answering Research Objective One on assessing the effect of Management Responsibility Processes (MRP) on performance of the Supply Chain entities.

2.2.2 Institutional Theory

This theory suggests that external factors could influence an organizations decision to adopt a practice (Cai & Mehari, 2015). As such, external factors can be grouped in three different isomorphism processes: coercive, mimetic and normative. When applied to ISO certification, normative isomorphism arises when firms consider that certification is necessary for enhancing their reputation in the market. Mimetic isomorphism according

to Chua and Petty (2014) arises when firms seek certification in order to match their competitors who are seemingly successful. Coercive pressures result when a firm pursues certification in response to demands posed by customers, suppliers, trade unions or government to whom its businesses is largely dependent.

The pressures may make organizations not to consider the benefits from ISO 9001:2008 certification but their legitimacy of being certified (Daniel, 2011). The theory thus suggests that early adopters of a practice are motivated by opportunities for efficiency gains from implementing it (Cai & Mehari, 2015) before it becomes a norm. Martinez-Costa, Martinez-Lorente and Choi (2008) observe that having been implemented all over the world, ISO 9001:2008 has been institutionalized. This theory would therefore suggest that in our model, the product realization and measurement, analysis and improvement, and procurement policies and regulations enhance the continual improvement processes in the ISO 9001:2008 QMS on the basis of customer expectations and the ever changing environmental technologies as a principle in the ISO9001:2008 Quality Management system has an influence on service provision of SCM entities within organizations.

This theory therefore helped answer Research Objective Three which evaluated how the Product Realization Process (PRP) in ISO would influence performance of SCM entities, Objective Four which sought to assess the effect of measurement, improvement and analysis ISO processes on performance of the SCM entities and Objective Five which tried to establish the influence of Procurement Policies and Regulations on the performance of SCM entities in the Ministry headquarters.

2.2.3 Resource-Based View (RBV) theory

A Resource-Based View according to Padgett (2012) proposes that resource selection and accumulation are a function of both within-firm decision making and external strategic factors. Within firm managerial choices are guided by an economic rationality and by motives of efficiency, effectiveness and profitability. External influences are

strategic industry factors that impact the firm including buyer and supplier power, intensity of competition and industry product market structure. These factors influence resource selection and use. The theory also holds that an organization's success is based on the resources and capabilities it holds in control which may become a source of competitive advantage according to Boermans and Roelfsema (2012). For a resource to yield competitive advantage, it must be valuable, rare among competitors, imperfectly imitable and should not be substitutable by competitors. When these resources are socially complex, it takes time to acquire them. Once acquired, the organization develops a competitive advantage over others.

When adoption of ISO 9001:2008 is based on internal factors to enhance efficiency and improve processes, the knowledge and expertise gained according to Somsuk (2010) over time is a socially complex valuable resource that is not easily imitable or substitutable. This eventually creates opportunities for real competitive advantage according to Alcina and Inaki (2013). Martinez-Costa et al. (2008) noted that such organizations would have improved performance as compared to before certification. However if the motivation for the adoption of the standard is solely external, the organization would implement the standard to meet the external pressures and might not improve performance.

As applied in this study, this theory holds that the researcher expected the independent variables of Management Responsibility Processes and Resource Management Processes (RMP) to explain the dependent variable of service provision. This is because their acquisition and use would give the organization a competitive edge over other similar firms according to the resource-based theory, (Boermans & Roelfsema, 2012). These variables in our model and which are within the ISO 9001:2008 framework and when used by the SCM departments were therefore to have an effect on the service provision of such entities. The theory was to help the researcher to answer the Research Objective Two which sought to find out how Resource Management Process influences the performance of the SCM entities at the Ministry headquarters.

2.2.4 Models of Quality Management and Performance

2.2.4.1 Holistic Model of the Theories

Alcina and Inaki (2013), adopt a holistic model that combines the three theories to explain how ISO certification could lead to greater efficiency in productivity with realizations of both financial and non-financial gains. They developed a model of analysis to consolidate the view. This is as illustrated in Figure 2.2.

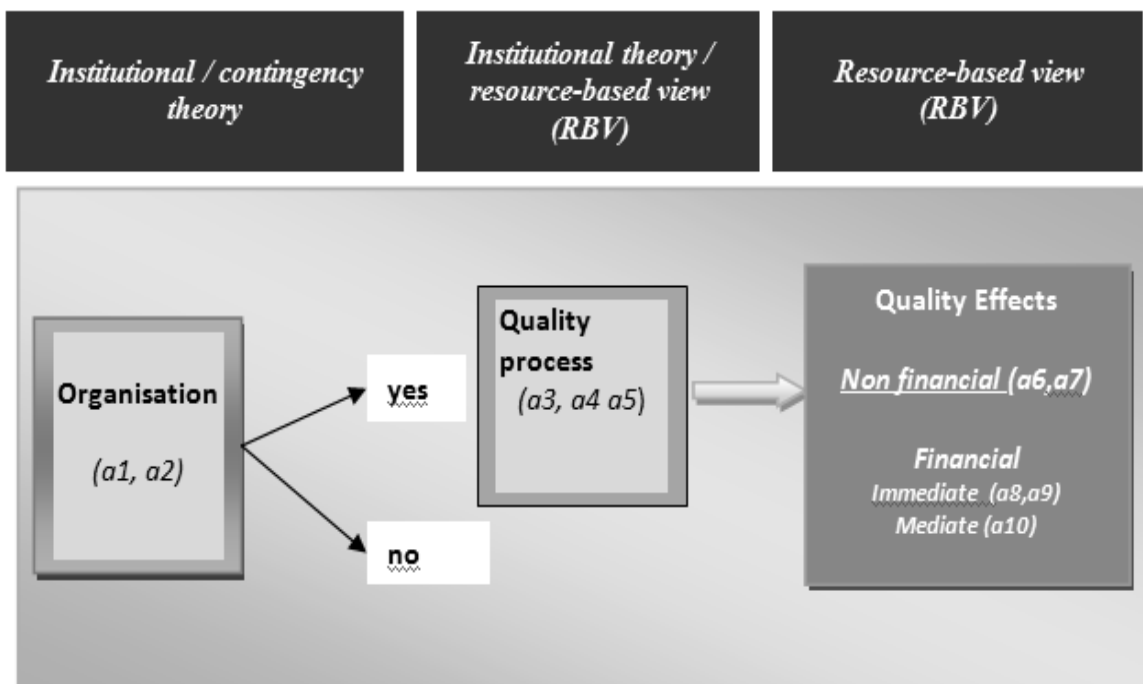


Figure 2.2: Theoretical Approach Model of Analysis.

Note: Reprinted from Alcina and Inaki (2013)

According to them, the interpretation of this model follows this flow of ideas: Institutional and/or contingency theory (a1- a2): thus, the organizational structure (a1) is connected to the cultural nature (a2). These elements may be of institutional or of contingent nature. Institutional theory/RBV (a3 - a5): the mentioned assertions (a3:a5) arise, referring to the implementation and motivation of good quality practices: after ISO 9001 certification, organisations can develop better management practices (a3) and a

more motivated human structure (a4) resulting in greater customer loyalty (a5). These facilities are of institutional or of a resources perspective. Resources View - RBV (a6 - a10): a large part of quality certification is driven by the market (a6) and the focus of quality should come from top management (a7).

Subsequently, the financial effects are a consequence of a quality process and costs related to quality may be significant (a8) but good practices of quality management may create conditions for a good management performance (a10).

This holistic theory was to help to relate the relationship between the five independent variables and how they individually and collectively influence each other and the dependent variable.

It would therefore be used to support the findings of the Research Objectives Four on Product Realization Processes and how they affect performance of the Supply Chain entities in the public sector.

Baldrige Criteria for Performance Excellence Model

The model is used by the US Malcolm Baldrige National Quality Award, which is administered by the American Society for Quality (ASQ) and managed by the National Institute of Science and Technology (NIST), an agency of the US department of Commerce. According to Breja, Banwet and Iyer (2011), this model is used as the basis for over 70 other National Business Excellence/Quality awards around the world. The model consists of seven categories namely Leadership; Strategic Planning; Customer and Market Focus; Measurement, Analysis and Knowledge Management; Workforce Focus; Process Management; and Business Results.

This model supports the study as Strategic planning supports the Management responsibility process variable, customer and market focus supports the Product Realization Process, workforce focus supports the Resource Management Processes

while Measurement, Analysis and Knowledge supports the Measurement, Analysis and Improvement Processes.

The model has the core concepts of Visionary leadership, Customer-driven excellence, Organizational and personal learning, valuing employees and partners, Agility, Focus on the future, managing for innovation, Management by fact, Social responsibility, focus on results and creating value and Systems perspective (Breja, Banwet & Iyer, 2011). All these core values support the Supply Chain dimensions of MRP, RMP, MIAP and PRP as discussed in the study.

Australian Business Excellence (ABEF) Model

The Australian Business Excellence Framework is the premier model for business excellence in Australia and provides the criteria for the Australian Business Excellence Awards (Nigel & Robin, 2008). The framework is administered by SAI Global. It is measured alongside these perspectives on Leadership, Customer and Market Focus, Strategy and Planning, People, Information and Knowledge, Process Management, Improvement and Innovation and Success and Sustainability. Nigel and Robin (2008) describe the framework as being built around eight business excellence principles and which the author has related to the study variables as follows.

Lead by example, provide clear direction, build organizational alignment and focus on sustainable achievement of goals. This supports the Management Responsibility process in the study by provision of an enabling environment to enhance ISO 9001:2008/15 quality management systems and provision of resources; Understand what markets and customers value, now and into the future, and use this to drive organizational design, strategy, products and services. This supports the Product Realization Processes variable in the study through helping to focus on the customer product requirements and specifications; Continuously improve the system. This principle supports the Measurement, Analysis and Improvement processes variable as it is through measurement and analysis that improvement is enhanced; Develop and value people's

capability and release their skills, resourcefulness and creativity to change and improve the organization. This principle supports the variable Resource Management Processes by enhancing human resources capabilities through capacity building and provision an innovation enhancing environment;

Develop agility, adaptability and responsiveness based on a culture of continual improvement, innovation and learning. This supports the variable on Product Realization Processes in the study and enhances productivity or sourcing based on the varying customer requirements and expectations; Improve performance through the use of data, information and knowledge to understand variability and to improve strategic and operational decision-making. This would support the Measurement, Analysis and Improvement dimension of the ISO 9001:2015 process on the basis that data from measurement, information and knowledge would enhance improved performance; Behave in an ethically, socially and environmentally responsible manner. This supports the MRP variable through management enhancement of an ethical and responsive culture within the Supply Chain entities. It would also support the existing Government Procurement Regulations and Policies as the moderating variable in the study; and

Focus on sustainable results, value and outcomes which supports the dependent variable on Performance that would enable realization of results as per the maximization of the various ISO dimensions adopted.

Business Performance Improvement Resource (BPIR) Model

The Business Performance Improvement Resource (BPIR) Model provides an alternative, comprehensive, and simple way to classify benchmarking and best practice information according to Henrich and Paech (2010). The model classifies information through over 250 business processes. The high level processes are: Understand markets and customers; Develop vision and strategy; Design products, processes and services; Market and sell; Produce and deliver for manufacturing-oriented organisations; Produce and deliver for service-orientated organisations; Invoice and service customers; Deliver

Leadership; Develop and manage human resources; Manage information and knowledge; Manage financial and physical resources; Execute environmental management program; Manage external relationships; Manage improvement and change; and Measures of Organizational Performance. All these aspects support the study variables of MRP, RMP, MAIP, PRP, GPRP and Performance.

2.3 Conceptual Framework

A conceptual framework is defined as a scheme of concepts or variables which the researcher would operationalize so as to be able achieve the research objectives. It is a schematic presentation of a theory presented as a model that research variables and their relationship is illustrated according to Serem, Boit and Wanyama (2013). In this study, the conceptual framework shows a schematic representation of the relationships between the independent, moderator and dependent variables.

An integrated schematic illustration of the variables based on the discussions and their relationships is shown in Figure 2.3 on the conceptual framework. This framework indicates that these five variables of Management responsibility Processes (MRP), Resource Management Processes (RMP), Measurement, Analysis and Improvement Processes (MAIP), Product Realization Processes (PRP) and Government Regulations and Policies (GRP) must be adopted in our study to fully appreciate the link between ISO Certification and enhanced Supply Chain Management Departments and hence general organizational performance.

Independent Variables

Moderating Variable

Dependent variable

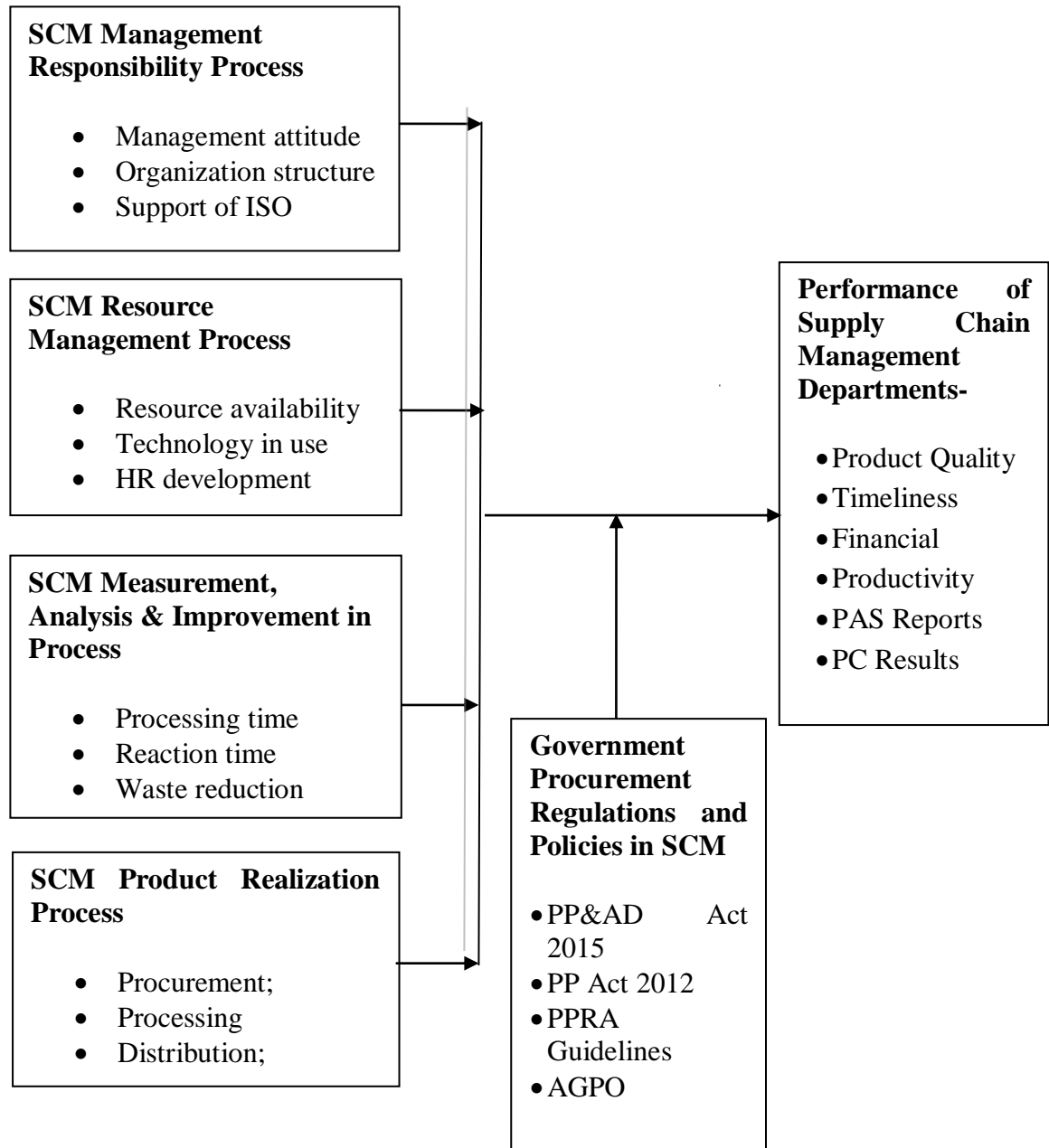


Figure 2.3: Conceptual framework.

2.3.1 Management Responsibility Processes (MRP)

In this study, SCM Management responsibility entails management commitment, management focus, quality policies and processes in place in relation to the ISO 9001, the administration of the Quality Management System, management review and the entire planning of the ISO QMS system. It therefore addresses the principle of Customer Focus and Leadership in the QMS. Top management support influences the extent to which the adoption of ISO 9001:2008 Standard would lead to improved performance in business according to International Organization for Standardization (2015). If top management is supportive, then it will provide the necessary resources that will enhance performance. This will be measured in terms of the level of support, the technology that management provides the management attitude towards ISO 9001:2008 and the management culture in the Ministries' SCM Headquarters. All these have an effect on the SCM process at all its stages of procurement, processing, distribution and customer feedback.

2.3.2 Resources Management Processes (RMP)

The key aspects of Supply Chain Resource Management include provision of quality material resources; provision of quality human resources; provision of quality infrastructure; and the provision of a quality, secure environment. Partly, it is drawn from Principle number 3 on 'Involvement of People', clause 6.2 of the QMS Standard (International Organization for Standardization, 2015). The principle states that, "Personnel performing work affecting conformity to product requirements shall be competent on the basis of appropriate education, training, skills and experience." It also touches on Principle 2 on 'Leadership', clause 5 that says, "Leaders establish unity of purpose and direction of the organization. They should be able to create and maintain the internal environment in which people can become fully involved in achieving the organizational objectives. It is important to note that conformity to product requirements can be affected directly or indirectly by those performing any task within the quality

management system. This variable measures all the stages of the SCM process since they are managed by the human resource and where material resources are used.

According to the International Organization for Standardization (2015) the following areas are of great significance in realizing this principle and will comprise the area of focus by the researcher on this variable. They are competence, training and awareness of staff. Heinrich and Paech 2010 argue that performance indicators to measure the effectiveness of the Human Resource is about determining competency and training needs of the workforce in the SCM Departments will include: employee performance (through PAS before and after ISO adoption); training and competency records; staff audits; and other resource audits records being maintained. The availability of the other necessary resources in the SCM Department, their condition, their level of technology and how effectively they are utilized will also inform the measurement of this variable.

2.3.3 Measurement, Analysis and Improvement Processes (MAIP)

This focuses on Supply Chain Management department's ability on planning, measurement and monitoring, control of non-conformities, analysis of data and improvement strategies. This is based on Principle number 1 of the QMS Standard, clause 5.2; 7.2; and 8.2.1 of the QMS Standard that talks of Customer Focus (International Organization for Standardization, 2015). Since this is also a process, it also embraces Principle number 4 of the Process Approach. It also focuses on the last stage of the SCM process which deals with customer related issues. However, it is noteworthy that customer related issues are at every stage of the SCM process, and hence must remain in focus. According to the ISO 9001; 2008 Standard, the aspects within an organization listed below will relate to customer processes and will inform the study on this variable.

Processes and products in the SCM Departments are subjected to measurement tools. Processes measurement focuses on: reaction time to respond to customer requests; cycle time in processing a service; utilization of new technology in SCM processes; waste

reduction in SCM processes; and cost reduction in SCM processes. For products the focus in measurement and analysis is on: inspection and testing of incoming and final products by the Department; product verification at delivery through the SCM Department; and product validation. After measurement, analysis is done to assess the levels of nonconformity for purposes of improvement.

2.3.4 Product Realization Processes (PRP)

Supply Chain Management Product or Service Realization process is associated with Principle number 5 on System Approach and Principle number 8 of mutually beneficial supplier relationships, clause 7.4 of the QMS Standard (International Organization for Standardization, 2015). This variable touches on the planning of the realization process, customer related processes, design and development, purchasing, product and service operations and control of measuring and monitoring equipment. This variable mainly measures all the stages in the SCM process that is procurement, processing, distribution and customer issues. In the purchasing process in SCM the following considerations are made: Receipt of materials in the right condition; if the materials are of the right quality as per the SCM Department specifications; if the products are in the right quantities as per the SCM Department specifications; and if they were received at the right time in the SCM Departments' specifications

2.3.5 Government Procurement Regulations and Policies (GPRP) on Supply Chain Management

Procurement policies entail a set of rules and regulations put in place to govern the process of acquiring goods and services needed by an organization to function efficiently. Bwisa, Otieno and Kihoro (2012) describe a moderating variable as that which helps to moderate the relationship between the dependent and independent variables. It explains a causal link between the two sets of variables. In this study, the existing procurement policies and regulations were the moderating variable. They helped to explain how Management Responsibility, Resource Management, Measurement

Analysis and Improvement and Product Realization processes, as independent variables are regulated by this variable to affect the performance of the SCM Departments in the Ministry Headquarters.

There are various Government Regulations and Policies in SCM that are in place within the Kenyan public service. This variable relates to the effects of these existing policies and systems in their support towards the realization of the full uptake of ISO 9001:2008 QMS and how this affects performance of the SCM Departments. It entails the various policies and regulations in place within the Kenyan public service. These are the Public Procurement and Assets Disposal Act No. 33 of 2015 (PPADA), Kenya Gazette Supplement No. 207 (Acts No. 33), Public Procurement Regulatory Authority (PPRA) guidelines, Public Procurement and Disposal Regulations and Access to Government Procurement Opportunities (AGPO) guidelines.

Public Procurement and Assets Disposal Act (PPADA)

In Kenya Supply Chain Management is governed by the Public Procurement and Asset Disposal Act 2015, as captured in Article 227 of the Constitution that is “to provide procedures for efficient public procurement and for assets disposal by public entities; and for connected purposes All state organs and public entities within Kenya are required to comply with this law in regard to planning and undertaking procurement, inventory management, asset disposal and contract management, except where the provisions of the Public Private Partnership Act of 2013 already apply to procurement and disposal of assets, or where procurement and disposal of assets takes place under bilateral or multilateral agreements between the Government of Kenya and any other foreign government or multilateral agency. The law provides for the National Treasury to be responsible for public procurement and asset disposal policy formulation.

Access to Government Procurement Opportunities (AGPO)

The Access to Government Procurement Opportunities (AGPO) law originally introduced in 2012, set aside 10% of government contracts to be awarded to disadvantaged groups that is enterprises owned by young people, women or persons with a disability) without competition from established firms. This percentage was increased to 30% in 2013. The AGPO policy also covers micro and small enterprises, local and citizen contractors and citizen contractors in joint ventures with foreign suppliers.

Public Procurement Regulatory Authority (PPRA) Circulars

This is the body mandated to oversee the implementation of procurement policies and regulations in the Kenyan public service. It has developed various circulars which guides the implementation of the various procurement laws and regulations. All government Ministries, Departments and agencies are expected to operate within the framework provided in the circulars.

Public Procurement Assets and Disposal Regulations (PPADR)

These guide the implementation of the procurement and asset disposal laws and policies in the country. They support the existing framework in the Supply Chain Management processes in the public service. They were developed to provide guidelines on asset procurement and their disposal within the Ministries, Departments and Agencies in the public service.

2.3.6 Performance of Supply Chain Management Departments

It is the factor whose variables were compared across different treatment conditions during research. The value of the dependent variable will tend to depend upon the value of another variable; the independent variable. This research was interested in determining if the value of the dependent variable varies when the independent variable is varied. It sought to establish whether a change or variation in the independent

variable cause or effect a change in the dependent variable (Serem, Boit & Wanyama, 2013). In this study, the dependent variable (Performance) was to be measured in terms of quality of services offered by SCM Departments (customer satisfaction survey results before and after ISO adoption), time taken in specific activities (for example lead times) and stages of the SCM process, the financial implications (in terms of cost cutting and revenue generation) in each of the stages and overall productivity in the Departments through PAS results from the pre ISO certification period and the current PAS results will also be used.

A demonstration of the relationship between the performance of the supply chain management departments and the adoption of Total Quality Management (TQM) alongside ISO 9001:2008 practices by Forker (2007) helps to highlight this. By means of a rigorous study in the electronic components industry, the researcher spelt out four aspects strongly related to quality management policies: maintain and improve the quality control department; provide the suppliers (and the suppliers of suppliers) with incentives to encourage quality; collect data on defects and get this information to all the company employees; and give employees training, recognition and other incentives for their full cooperation in total quality improvement.

2.4 Empirical Review of Literature

Here the researcher reviewed what had been done by others on the effect of ISO 9001:2008 on process quality in organizations, and more so in Supply Chain Management departments. The methodology employed by these researchers and study gaps are also highlighted.

2.4.1 Management Responsibility Processes (MRP)

It is significant to note that management style, attitude and appreciation of the ISO 9001:2008 Certification play a key role towards the realization of performance. Kyalo (2013) while studying on the effect of ISO 9001:2008 on process quality (which is a

function of Management responsibility) of Kenya Power and Lighting found out that there is a significant increase in process quality of design, way leaves acquisition, construction and metering sub-processes after the ISO 9001:2008 certification. According to the study, ISO 9001:2008 certification led to a significant improvement on overall process quality at 0.05 significance. Top management commitment in the implementation of a quality process seems fundamental according to the findings of Kujala (2002). Respondents confirmed the importance of top management about quality issues. Senior managers were unanimous in recognizing that quality must be inherent to the organizations' top hierarchy.

The Institutional Theory fits these perceptions (Scott, 2018). They observed that the institutional theory is used when studying the adoption of practices or strategies in the organisation in order to survive, knowing that it must adapt to environmental conditions. Top management strength therefore must be inherent to this whole change. In the findings in one company, it was observed that after quality certification, and under the scope of quality it had become a more facilitated action by the requirement of a clear definition of all functions - directly or indirectly while in another company they observed that they had such a description before, but after certification it became clearer, as it was embodied in procedures". This could be said that it is a rather institutional perspective according to Scott (2018).

In their analysis of the construction sector, they got somehow different results. They reported that one company stated that certification contributed to a clarification of functions. That the description and organisation of the functions has clearly been improved and systematized with the implementation of the Quality Management System" but in another company, they observed that quality certification was not the engine and lever of decision making in the organisation. The description and organisation of the functions had clearly been improved and systematized with the implementation of the Quality Management System, but already had it in place. Their findings reflect that this company did not seem willing to ascribe much importance to quality and its effects. The mastery of other management techniques such as Balanced

Scored Card (Hoque, 2003) seems to have contributed in a great extent to the successful implementation of quality certification. It could be asserted that, after this company had quality regardless of certification. It was interesting to note that non ISO certified companies indicated that the organization's culture should be changed after certification. In summary, for Management Commitment the case study revealed the following sequential order of positioning of the theories: institutional, resources and contingency. Whereas it was felt very important to have an orientation and involvement of the organization's top management to allow an easy adaptation to a new process, still it is relevant to use the resources to do so.

2.4.2 Resources Management Processes (RMP)

On Human Resources, Chapman, Sisk, Schatten, and Miles (2018) found out that due to ISO quality implementation; employees have more training and more knowledge. Culture in an organisation becomes a resource either as knowledge based or dynamic capability perspective resulting in higher competence and better performance. As to a greater involvement of organization's employees in consequence of ISO 9001 certification, literature (Deming, 1991; Juran, 1989; Garvin, 1988) argues that, there is a better training of employees. It was also observed that any quality process encompasses organisation employees through permanent audits of the process. However, it does not mean that, in their recruitment, a specific knowledge of this matter has been met.

Existing literature posits that that employee selection and recruitment in organisations should be done considering persons with an understanding and specialized in quality. In their study none of the certified companies in quality uses this form of recruitment, unless it is selecting someone for the specific area of quality clarifying that. Chapman, Sisk, Schatten, and Miles (2018) also argue that cultural aspects are really crucial in organizations' management. From those findings, culture also becomes a resource that can enhance knowledge or capacity, and may result in higher competence able to foster a better performance. The material resources consist of acquisitions necessary to implement the organization's daily routine, plus the process of quality management. Yet

they assume no significant values that may lead managers to consider such expenditure as an intangible asset. It was stated in the findings that the companies consider expenditure on quality as a compulsory investment. Quality costs do not assume significant relevance to be considered an asset. Yet, the need to consider these costs of the quality process as an intangible investment has not been felt (Wiele & Brown, 2002). It is now important to know how organisations see the adequate supply of their product/service considering an efficient use of resources.

2.4.3 Measurement, Analysis and Improvement Processes (MAIP)

In their research, Lin and Johnson (2009) wanted to know about the use of quality measurement as a management tool in companies, and it was established that only one company from the food sector and another from the construction sector used it. One was implementing Kaizen methodology, and the second was implementing the Balanced Scorecard (BSC) methodology as features that streamline processes. As to whether the process quality measurement could be defined as a quality management system, the following situations emerged from one company in the food sector which accepted that due to the fact that it had, in its metrics, some management indicators, thus allowing measuring its performance. The other company added that it helps measurement through indicators concerning the processes that compose the Quality Management System. In the construction sector, it was referred to as the Quality Management System, establishing operating rules and procedures, facilitates management. Another company also confirmed that that the Quality Management System may make management easier.

A study carried out to analyze efficiency of ISO 9001:2008 from a holistic theoretical approach where the Contingency Theory, the Institutional Theory and the Resource Based View Theory are integrated and carried out in different companies of different sectors of activity in Portugal by Dias and Heras (2013), found that on Measurement, Analysis and Improvement Companies with ISO 9001:2008, 75% of the opinions confirmed the quality process helps to measure the organization's performance. They found that if the organisation is using some tools of management control (special

resources) that acts upon the inner formality – mimetic isomorphism according to Lowrey 2005 then the objectives would be easily reached. However, these factors on measurement, analysis and improvement are regulated by mechanisms that appeal to the institutional theory. They established that in addition to this Institutional and RBV dualism, there are unexpected or Contingent elements that may occur and shift the path initially set.

2.4.4 Product Realization Processes (PRP)

In the analysis that quality is associated with organization's sales, Pal and Ghosh (2018) observed that all ISO quality certified companies and non-certified companies on digitization of product realization, respondents made some observations. Within the food sector, in one company, it was registered that certification makes a decisive contribution to sales, the other company stated that quality certification is related to the market; hence, sales reflect the market value. In the construction sector according to the findings, the company clarified that it is not directly, but rather indirectly linked, because "we often carry out public works where the final user is different from the contractor". The other organisation explained that sales and quality are closely linked, because the market requires certification (Pal & Ghosh, 2018). In these situations, there was almost like an invisible force pushing companies towards certification. The coercive isomorphism, (Phillips, 2003) that summarizes society's expectations, the stakeholders' expectations in general, is entirely framed. As to the question of whether certification could be considered a competitive advantage, the interviewees' in one company observed that it is possible to standardize processes and, consequently, products. It is also a competitive advantage, when communicated to the customers, because it certifies the accuracy and care of the product we launch. The insistence on companies in terms of meeting consumer expectations is considered a competitive advantage. The opinion of another company was that the market itself makes it be a competitive advantage. In the construction sector, it was stated that certification is a market advantage. For these companies, the fact of not being ISO certified is a situation that places the company out of the market. This calls for contingency theory.

Additionally, literature has it that quality certification is usually related to the product lifecycle according to Walsh (2006). The studies indicate that quality certification appeals the institutional perspective for the mimetic isomorphism but it is also associated with the contingency of the market and the quality process itself may be considered a resource as is in the Resources Based View (RBV). Thus they said that the preponderance of the theories from the theoretical framework is as follows: resources theory, contingency theory, institutional theory. This whole process, if viewed in terms of resources optimization, whether human or material, necessary to obtain a product/service, may help to improve processes, but only if the prospect of continuous measurement, analysis and improvement are taken into account.

2.4.5 Government Procurement Regulations and Policies (GPRP) on Supply Chain Management

In his research, Mutai (2015) on the relationship between procurement policies and procedures and supply chain performance, the researcher found out that ethics and supplier selection and management had a significant effect on supply chain performance while composition of procurement committees, procurement plans and strategies and tender evaluation did not have a significant effect on supply chain performance. The research also identified some of the challenges facing implementation of procurement policies and procedures among commercial banks in Kenya. The research confirmed that it was difficult for procurement policies and procedures to integrate with the overall organizations vision and mission, procurement policies and procedures cannot be relied on to cut costs for the organization, bank's operations not being flexible enough to allow for effective procurement policies and procedures. The cultural set up of most banks is viewed as an hindrance to the implementation of procurement policies and procedures, the number of projects and the nature of work being done has made it difficult for the implementation of procurement policies and procedures, lack of adequate resources both financial and human to implement procurement policies and procedures, The Procurement function in Commercial Banks still being under Operations Department had made it difficult to fully implement procurement policies and procedures and

changes in the environment and the market have made it impossible to implement procurement policies and procedures. Studies on how the moderating effect of public procurement policies and guidelines affect the supply chain management processes are however very limited.

2.4.6 Performance of Supply Chain Management Departments

A study carried out by Okibo and Kimani (2013) on the effectiveness of ISO 9001:2008 certification on service delivery of public universities in Kenya with an analysis of those that are certified established that the certification affected the service delivery of the universities to a great extent with 65% of those studied recording positively on clarity to responsibilities, improved communication, facilitated data management and processing and generally improved service delivery in these universities.

Ochieng, Muturi, and Njihia (2015) in their study on the impact of ISO 9001 on organization performance in Kenya which focused on private firms listed on the Nairobi Securities Exchange (NSE), they established the extent to which ISO 9001 certification had influenced specific attributes of organizational performance amongst the organizations surveyed. Differences were noted between companies that were certified and those that were not when it came to net profit change and turnover change but the analysis revealed that the variations are not significant.

However when it came to return on assets, there was significant differences realized between the two sets of companies with 80% of the certified firms recording increased Return on Assets (ROA) index. It was therefore be concluded that ISO 9001 certification had a positive influence on the organizations' return on assets thus improving its overall performance.

Fabrizio, Manus and Thomas (2010) carried out an empirical study in 164 industrial plants on their relationship with suppliers and customers. They established that in those relationships to do with Quality Management, the organization would indirectly improve

their time performance, which was delivering punctuality and speed of operations as a result of full mediation through internal practices in quality management, low management, inter-unit coordination and vertical coordination. On the other hand, in relationships to do with managing the flow of materials, the impact of time-related performances could either be completely or partially mediated by internal practices. Romano and Vinelli (2001) developed a study that described the case of a company from the textile sector to help understand how quality could be managed using an SCM perspective, and what the operative and strategic consequences for the company under study were and the chain to which it belonged. They demonstrated how SCM tended to improve the capacity of the companies to recognize the expectations of the end customers.

Studies were also carried out on the adoption of quality management systems in the logistics function. Marti Casadesus and Rodolfo de Castro (2007) carried out a survey in companies with ISO 9001:2000 and ISO 9001:1994 certifications. The results were based on five strategies, namely: how the ISO QMS could be used to manage inventory investment in the chain; how the ISO QMS could be used to establish supplier relationships; where the findings indicated that 95% of the certified companies establish long term relationships with their suppliers; how the ISO QMS could be used to increase customer responsiveness (predisposition); where it was found that 60% of the certified companies carry out surveys to find out how satisfied their customers are, and this is a standard practice for establishing bonds throughout the chain; how the ISO QMS could be used to build a competitive advantage for the channel; in which 80% of the certified companies indicated that they had reduced nonconformity costs and such a reduction contributes enormously to improving the flow of materials promulgated by the SCM philosophy; and how the ISO QMS could be used to introduce SCM solutions and enabling information technology. In this research, it was concluded that the majority of the certified companies do not use the appropriate ERP software, have not integrated automatic management systems with customers and suppliers.

In his study on the effectiveness of ISO 9001:2008 in the public sector of Nova Scotia, Canada, Andrey and Mike (2009) noted most improvement in the implementation processes, continual improvement and involvement of people. The study established improvements in all the eight categories of the quality management system at a statistically confidence level of 95% with the five of the eight areas witnessing a level of statistical significance at the 99% confidence level. Similarly, process standardization, improved efficiencies, clarification of duties and responsibilities, establishment of process measurement and evaluation, improved documentation and control were noted as benefits of the standard in the Portuguese vocational schools in a study carried out by Gamboa and Melao (2012). A study in Australia of certified firms by Power and Terzioviski (2007) pointed out that organizations can use ISO 9001:2008 certification as a means of promoting and facilitating a quality culture.

In their survey in Australian and New Zealand based manufacturing and service companies, Feng, Terzioviski and Samson (2008) found out that ISO 9001:2008 certifications resulted into a positive and significant improvement on training and development activities of organizations operating in Singapore. Quazi and Jacobs (2004) cited improved quality records' management as a benefit of certification.

The independent variables of this study were derived from the Quality Management System process of the ISO 9001:2008. These are: Management Responsibility Processes (MRP); Resource Management Processes (RMP); Product Realization Processes (PRP); and Measurement, Analysis and Improvement Processes (MAIP). These independent variables for this study touch on one or more of the QMS Principles as discussed in Chapter 1. The variables were studied within the context of the various stages of the SCM process that involve procurement, processing, distribution/logistics and customer feedback.

2.5 Critique of Existing Literature

In one of the studies, Forker (2007) demonstrated the relationship between the performance of the supply chain management departments and the adoption of Total Quality Management (TQM) alongside ISO 9001:2008 practices. By means of a rigorous study in the electronic components industry, the researcher spelt out four aspects strongly related to quality management policies namely: Maintaining and improving the quality control department'; Provision to the suppliers (and the suppliers of suppliers) with incentives to encourage quality; Collecting data on defects and getting this information to the company employees; and giving employees training, recognition and incentives for their full cooperation in improvement.

Salvador et al. (2010) also carried out an empirical study in 164 industrial plants on their relationship with suppliers and customers. The study found that in those relationships to do with Quality Management, the organization would indirectly improve their time performance, which they found to be delivering punctuality and speed of operations as a result of full mediation through internal practices in quality management, low management, inter-unit coordination and vertical coordination.

On the other hand in relationships to do with managing the flow of materials, the impact of time-related performances could either be completely or partially mediated by internal practices. Romano and Vinelli (2001) did a study describing a case of a company from the textile sector, and which was used to help understand how quality could be managed using an SCM perspective, and what the operative and strategic consequences were for the company under study and the chain to which it belonged. They demonstrated how SCM improves the capacity of the companies to recognize the expectations of the end customers.

Studies have also been carried out on the adoption of quality management systems in the logistics function, Casadesus and Rodolfo (2007) carried out a survey in companies with ISO 9001:2000 and ISO 9001:1994 certifications. The results based on five strategies,

namely:- How the ISO QMS could be used to manage inventory investment in the chain; how the ISO QMS could be used to establish supplier relationships; where the findings indicated that 95% of the certified companies establish long term relationships with their suppliers; how the ISO QMS could be used to increase customer responsiveness (predisposition); where it was found that 60% of the certified companies carry out surveys to find out how satisfied their customers are, and this is a standard practice for establishing bonds throughout the chain; how the ISO QMS could be used to build a competitive advantage for the channel; in which 80% of the certified companies indicated that they had reduced nonconformity costs. Such a reduction contributes enormously to improving the flow of materials promulgated by the SCM philosophy; how the ISO QMS could be used to introduce SCM solutions and enabling information technology, where it was concluded that the majority of the certified companies do not use the appropriate ERP software, have not integrated automatic management systems with customers and suppliers. In his study on the effectiveness of ISO 9001:2008 in the public sector of Nova Scotia, Canada, Cartright (2012) noted most improvement in the implementation processes, continual improvement and involvement of people. The study established improvements in all the eight categories of the quality management system at a statistically confidence level of 95% with the five of the eight areas witnessing a level of statistical significance at the 99% confidence level. Similarly, process standardization, improved efficiencies, clarification of duties and responsibilities, establishment of process measurement and evaluation, improved documentation and control were noted as benefits of the standard in the Portuguese vocational schools in a study carried out by Gamboa and Melao (2012).

A study in Australia of certified firms by Terzioviski and Power (2007) pointed out that organizations can use ISO 9001:2008 certification as a means of promoting and facilitating a quality culture. In their survey in Australian and New Zealand based manufacturing and service companies, Feng, Terzioviski and Samson (2008) found out that ISO 9001:2008 certifications resulted into a positive and significant improvement on training and development activities of organizations operating in the countries. Quazi

and Jacobs (2004) cited improved quality records' management as a benefit of certification. Kyalo (2013) ,while studying on the effect of ISO 9001:2008 on process quality of Kenya Power and Lighting found out that there is a significant increase in process quality of design, way leaves acquisition, construction and metering sub-processes after the ISO 9001:2008 certification. According to the study, ISO 9001:2008 certification led to a significant improvement on overall process quality at 0.05 significance.

Adolfas (2010) also examined the rationale for establishing a quality management system through obtaining ISO 9001:2000 certifications in non-profit small to medium enterprises in the UK. He was able to show that through correct development of quality management systems organizations were able to generate bottom-line savings and business performance enhancement. The study was able to identify the process of the preparation for certification and demonstrated that when the quality management system was developed as part of a coherent initiative, lasting performance improvements were realized. The value of quality management systems, according to the 9001 standard, depends on the way they are implemented. The performance of quality management systems was found to improve, if companies consistently adopt the new standard rather than attempt to incorporate it into the existing quality management systems.

Leadership style also influences performance. The leadership styles seen to support the implementation of ISO 9000:2000 are empowerment and contingent reward, Naceur and Abdullah (2005). They suggest that a knowledge creating model for ISO 9001:2000 that an organization could use to gain the knowledge needed to enhance quality and performance and indicated that it also provides a prepared framework for ordering and structuring an organization's knowledge. As Llopis and Tarí (2013) in their study also suggest that companies focused with internal reasons were realized to be those which: obtain higher profits deriving from the implementation of a quality system; achieve better practical implementation of quality management principles; and were most likely to progress towards total quality management.

Adolfas (2010) studied the rationale for establishing a quality management system through obtaining ISO 9001:2000 certifications in non-profit small to medium enterprises in the UK and was able to show that through correct development of quality management systems organizations could be able to generate bottom-line savings and business performance enhancement. The study also identified the process of the preparation for certification and demonstrated that when the quality management system was developed as part of a broader coherent initiative, lasting performance improvements were realized.

The value of quality management systems, according to the 9001:2008 Standard, depends on the way they are implemented. The performance of quality management systems, it was established, could improve, if companies consistently adopt the new standard rather than attempt to incorporate it into the existing quality management systems, according to Michaela, (2007). As to the quality associated with the organization's current management, Dias and Heras (2013) established that only 50% of respondents confirmed this. And within negative responses, they noted that one company stated that quality certification took away some agility and the other said that they had to be innovative and creative agents, regardless of it. Of the companies without ISO 9001:2008 said that higher quality should translate into better results. On a financial level and taking in account the economic and financial benchmarking between the surveyed companies, they noted that it could not be said that there was a direct causal link between quality and financial performance. They therefore observed that with these findings, one is able to connect this research to the contingency theory, suggesting that unexpected events may affect the decision making process or even the market environment that is increasingly unpredictable (Dawson, 2009).

2.6 Summary

This section focused on the critical review of literature in relation to how the independent variables Management responsibility, resources management, product realization and measurement, improvement and analysis affect the dependent variable of

performance of organizations. Researchers established that Management responsibility through creation of a quality culture, establishment of a quality policy and enhancing of quality in all processes significantly improve organizational performance. They use of resources that have undergone quality checks and processes, enhancing employee development and inculcating a quality culture has improved the performance of institutions in the private sector. Product and service realization and measurement, improvement and analysis as variables have been found to have significant influence over the performance of organizations though in varying degrees depending on the type of the organization.

Various theories have been identified as relevant in conceptualizing this study. It was noted that the Institutional theory because it is associated with the formal structure of organizations and which through ISO 9001 influence quality. Resources Based View is applicable because the allocation of resources is crucial and the Contingency theory is relevant because market dynamism can affect any decision. The theories have underlying assumptions that management support is guaranteed since the ideas and principles of quality need top management involvement and determination

2.7 Research Gaps

After a thorough review of relevant literature on the variables under study, the researcher observed that most research on related variables in Kenya make a significant contribution in the area of study. However, these studies in Kenya do not clearly bring out the case of Supply Chain Management processes in the public sector and how significantly being ISO certified has influenced their performance. Earlier studies by Adolfas (2010) and Kyalo (2013) have not directly tried to link the ISO 9001:2008 quality processes dimensions of product realization; measurement, analysis and improvement; resource management; and Management responsibility and how they individually and collectively affect the performance of these departments. Therefore, the use of these dimensions to relate ISO 9001:2008/15 has not been tested. More so, the moderating effect of Government Procurement Regulations and Policies on these

individual ISO constructs and their effect on realization of improved performance in Supply Chain Management services has not been given adequate research attention. This study seeks to establish this relationship. For example, in the ISO Survey of Management System Standard Certifications, (2012), it was established that ISO 9001:2008 certification is used in global supply chains to provide assurance about suppliers' ability to satisfy quality requirements and to enhance customer satisfaction in supplier-customer relations. The researcher however is of the view that this should be carried out in Kenyan public service to ascertain the findings since most of the cases involve developed countries with automated systems.

The researcher further observes that most of the studies were primarily focused on one aspect of supplies, which is software in the private sector (Forker & Forker, 2007). It is therefore imperative that a similar study be conducted involving a variety of supply items in a department within the public sector so as to clearly appreciate the relationship between these ISO processes dimensions and performance of the SCM entities. The literature reviewed was also mainly of qualitative nature (Gamboa & Melao 2012; Adolfo, 2010). It also premised mainly on theoretical hypotheses. Consequently, there is need to carry out a quantitative research and carry out analysis to get empirical evidence of the relationship.

The researches so far reviewed mainly focus on private sector firms in Europe and Asia most of which are developed economies. There is need to establish whether the underlying findings and conclusions also apply to the public service within African contexts. The cases so far discussed are in developed economies like Portugal, America and Japan (Llopis & Tarí, 2013; Gamboa & Melao, 2012; Adolfo, 2010). Carrying out such studies in developing economies that are late adopters of the ISO 9001 certification is bound to give a more balanced perspective of the scenario. Most of these studies reviewed have been mainly carried out at macro organizational levels. The cases are mainly of companies in the developed nations. These studies fail to ascertain the level of conformity and compliance of quality culture expected from an ISO 9001 QMS at unit level of these fairly large organizations. There is limited research conducted at micro

levels of organizations such as in the Supply Chain Management Departments. Finally, most of the studies in Kenya however, do not clearly bring out the case of Supply Chain Management processes and how significantly being ISO certified has influenced their performance. The researcher however is of the view that this should be carried out in Kenya to ascertain the findings since most of the cases involve developed countries with automated systems. Based on the literature reviewed, it is there is need for this research to address the following gaps in knowledge: It needs to provide empirical evidence about the actual benefits of implementing ISO9001:2008 QMS in Supply Chain Management Government departments. This will be through the measurement of how each of the hypothesized variables affects the performance of such entities. No research has been undertaken in this area in Kenya before.

There is a knowledge gap over the extent to which current Government Procurement Regulations and Policies affect the implementation of ISO 9001:2008/15 QMS. These procurement regulations and policies are ever changing in dynamic economies. The research provided information of how the various government procurement laws and regulations affect performance of supply chain entities within the context of an ISO 9001 certified. Since the introduction of ISO certification in Kenya Government Ministries, there is inadequate knowledge as to the extent to which the various policies and regulations affect its.

There is a gap in knowledge as to the extent the Ministries and Departments adopt and practice quality processes after certification. The research will highlight the extent of implementation of ISO Standards within Kenya Government Ministries and Departments and how the study variables of resource management, Management responsibility; product realization; and measurement, analysis and improvement individually and collectively affect the realization of quality services in these departments. It will in effect help to assess empirically whether certification is merely for compliance or indeed there is changes in processes meant to improve quality.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methodology that was used in undertaking the study. It commences by describing the research design adopted. According to Sekaran and Boigie (2010) a central part of research is to develop an efficient research strategy. Based on the model developed and variables discussed in Chapter two, this chapter goes ahead to cover the research design and research methodology used to test the variables. Specifically, the research design, the population, the type of data that was collected, target population, sampling frame, sample and sampling techniques, data collection instrument, data collection procedure, pilot test, validity and reliability of the instrument, and the data analysis and presentation are discussed here. Lastly, the data analysis techniques used to test the hypotheses is also discussed.

3.2 Research Philosophy

Research philosophy outlines the way data of certain phenomena should be gathered and analyzed (Saunders, Lewis & Thornhill, 2007). According to Saunders et al. (2007), research philosophy can be divided into three categories namely positivism, interpretivism and realism.

The study took a positivism research philosophy. This philosophy of positivism according to Collins (2010) subscribes to the view that only factual knowledge gained through observation through the senses, including measurement, is reliable. Therefore, in positivism studies the role of the researcher is limited to data collection and interpretation in an objective way. In these types of studies research findings are usually observable and quantifiable. In positivism studies the researcher is independent form the study and there is no room for human interests within the study. Crowther and Lancaster (2008) also argue that as a general rule, positivist studies usually adopt deductive

approach. It also relates to the viewpoint that researcher needs to concentrate on facts. Positivism fully depends on quantifiable observations that will lead to statistical analyses. From a positivism perspective, it is noted that as a philosophy, positivism it is in accordance with the empiricist view that knowledge stems from human experience. It has an atomistic, ontological view of the world as comprising discrete, observable elements and events that interact in an observable, determined and regular manner, (Collins, 2010).

In this study therefore, the researcher was able to formulate hypothesis and subject them to testing during the research process to prove them right or wrong. This enabled gathering of reliable data which is a requirement for scientific methods to ensure measurability (Bryan & Bell, 2011). It allowed the use of statistical analysis of the ANOVA in the inferential statistics analysis section.

3.3 Research Design

The aim of the study was to investigate the effect of the ISO 9001: 2008/15 dimensions on the performance of SCM departments. To realize this, the researcher used the descriptive research design that has quantitative approaches. According to Kombo and Tromp (2009), a research design may be thought of as the structure of the research, which holds all the elements of the research together. Descriptive design is a method of collecting information by interviewing or administering a questionnaire to a sample of individuals according to Orodho and Kombo (2003) and the giving of a description of the state of affairs as it exists. The researcher then is able to make reports of the findings in a descriptive manner, according to Kombo and Tromp (2009). They say that descriptive studies involve measurement, classification, analysis, comparison and interpretation of data. In this regard, data was collected from SCM Departments of these Ministry Headquarters on ISO implementation, measured, classified, analysed and compared to enhance comparisons. The descriptive component aided the researcher to make observations in relation to whether ISO Certification has realized observable

changes in organizational performance, business processes and procedures in these SCM Departments.

The researcher used the quantitative research approach in the design. Quantitative research tends to rely on the principle of verifiability which means confirmation, proof, corroboration or substantiation, according to Kombo and Tromp (2009). It focused on measurement and established the cause-effect relationships in phenomena. In this study, the quantitative approach employed correlation studies that enabled the researcher to measure the statistical measures of association between the identified independent variables namely Management responsibility processes, resource management processes, measurement; improvement and analysis processes, product realization processes and the moderating variable government procurement regulations and policies.

3.4 Target Population

According to Mugenda and Mugenda (2013), a population is a group of individuals, objects, organizations or even items from which samples are taken for measurement. It refers to an entire group of persons, organizations or elements with something in common that is of interest to the researcher, (Kombo & Tromp, 2009). The study population was derived from the 21 Government Ministries in Kenya, (See Appendix III). The Heads of the SCM Departments in the 21 Ministries' Headquarters, the Quality Management Representative (QMR), and the staff at the Ministry Headquarters constituted the study population. (See Table 3.1)

3.5 Sampling Frame

The sampling frame consisted of all the employees working in the Supply Chain Departments at the Ministry headquarters. It is the set of units from which a sample is drawn by the researcher according to Namusonge (2010). In the ideal case, the sampling frame should coincide with the population of interest. It is defined as the source material or device from which a sample is drawn. It is a list of all those within a population who

have the probability of being sampled, and may include individuals, households or institutions (Mugenda & Mugenda, 2013). In this regard, information on all GOK Ministries was sourced from the Government Portal. The data on the staffing of these Ministries' SCM Departments at the Headquarters was got from the office of the Directorate of Public Procurement at National Treasury. However data from Defence and Tourism Ministries could not be availed. Therefore the researcher used the accessible population of nineteen (19) Ministries' data with a SCM department staff of 563 as the sampling frame.

3.6 Sample and Sampling technique

The study could not be carried out with all the accessible population of 563 because of the costs involved, speed of data collection and analysis required accuracy of collected data and the reliability of the quality of the data (Ader, Mellenbergh & Hand, 2008). Therefore, a sampling design, which is the process undertaken to come up with the sample to be investigated was therefore imperative according to Zikmund, Babin, Carr and Griffin (2010). This has been elaborated under the sub-topics on sample size determination and sampling technique.

3.6.1 Sample size Determination

Serem, Boit and Wanyama (2013) say that sampling is a process by which a subset of the population is selected and studied in order to obtain information regarding a phenomenon. This selected subset is a sample. According to them, the term "sample" refers to a portion of the population that is representative of the population from which it was selected. A sample must therefore be a representative of the population with minimum bias. A sample is a part of the population of interest, a sub-collection selected scientifically from a population. The sample was drawn from the population as indicated in Table 3.1.

There were a total of 563 staffs, HODs and QMRs inclusive in the SCM Departments at all the Ministry headquarters. Out of the 19 Ministries, 10 of them were fully ISO 9001:2008 certified and were identified for purposes of the study (See Table 3.2). The target population was hence sub divided into the 10 ISO 9001:2008 certified Ministries, the HODs of the SCM Departments in these Ministries, the Ministries' Quality Management Representatives (QMRs) and the staff in SMC Departments in the 10 Ministry Headquarters, from which samples were drawn.

With a total of 563 members of staff comprising the target population at this level and using published tables for $\pm 5\%$ precision with a 95% confidence level with a p value of 0.5, two hundred and sixty (260) respondents were randomly selected from the staff in the departments in this population. The staffs in the SCM Departments were selected through simple random sampling to get the sample and thirty percent of the total population was considered a fairly representative sample according to Serem, Boit and Wanyama, (2013). However because of limited staff in the departments, ninety percent were sampled randomly from the population category.

Purposive sampling was further used when the researcher targeted a group of people believed to be reliable and key resource persons for the study. It may be used if there are only limited numbers of primary data sources who can contribute to the study according to Saunders, Lewis, and Thornbill (2012). This is a non probability sampling design where a researcher relies on their own judgement when choosing members of a population to participate in the study and help answer research questions (Black, 2010). To his thinking, one Quality Management Representative (QMR) and the Head of Supply Chain Management services in each of the 10 Ministries were selected purposefully for this research totalling 20 key respondents A total of 280 (260+20) respondents were selected as the sample population. This procedure is summarized in Table 3.2

Table 3.1: Sampling Frame for SCM Employees in GOK Ministries' Headquarters

| GOK Ministry HQ | DEP | FNT | ENV | L | INTC | SLO | FA | EDU | PYG | LEA | MIN. | AGR | WAI | IND | ENP | ICT | SCA | TRIN | HLT. | TOTALS | |
|---------------------------------|-----|-----|-----|----|------|-----|----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|------|------|--------|----|
| Total Other Staff at SCM Depts= | 42 | 38 | 34 | 28 | 34 | 20 | 18 | 30 | 20 | 28 | 24 | 32 | 29 | 25 | 24 | 18 | 22 | 26 | 33 | 525 | |
| W | | | | | | | | | | | | | | | | | | | | | |
| QMR + SCM Head =Y | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 38 |
| Total (W+Y) = Z | 44 | 40 | 36 | 30 | 36 | 22 | 20 | 32 | 22 | 30 | 26 | 34 | 31 | 27 | 26 | 20 | 24 | 28 | 36 | 563 | |

Note. Key to Government of Kenya Ministries. Adapted from the Directorate of Public Procurement, 2014

| | | |
|-------------------------------|-------------------------------------|--------------------------------------|
| DEP-Devolution and Planning | FA-Foreign Affairs | ENP-Energy and Petroleum |
| FNT- National Treasury | EDU-Education | ICT-Inform. Communication Technology |
| ENV-Environment | PYG-Public Service Youth & Sports | IND.-Industrialization |
| WAI-Water and Irrigation | LEA-Labour and East African Affairs | SCA-Sports, Culture & Arts |
| L-Lands | MIN.-Mining | TRIN.-Transport & Infrastructure |
| INTC-Interior & Coordination. | AGR-Agriculture | HLT-Health |
| SLO-State Law Office | D-Defence (no data) | Tourism (no data) |

Table 3.2: Sample Population for the Study

| ISO | Certified | GOK | FNT | INT | SLO | EDU | AGR | WAI | ENP | ICT | TRIN | HLT | Totals |
|---------------------------|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|--------|
| Ministry HQ | | | | | | | | | | | | | |
| <hr/> | | | | | | | | | | | | | |
| Total of Other Staff at | | 38 | 34 | 20 | 30 | 32 | 29 | 24 | 18 | 26 | 33 | | 284 |
| SCM Depts= (W) | | | | | | | | | | | | | |
| Sample from rest of staff | | 34 | 31 | 22 | 27 | 29 | 26 | 22 | 16 | 23 | 30 | | 260 |
| 0.9*W=(X) | | | | | | | | | | | | | |
| Purposive Sample of QMR | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | 20 |
| + SCM Head= (Y) | | | | | | | | | | | | | |
| Total Sample (X+Y) = Z | | 36 | 33 | 24 | 29 | 31 | 28 | 24 | 18 | 25 | 32 | | 280 |

Note. Key to Government of Kenya Ministries

- FNT- Finance and National Treasury
- ENP- Energy and Petroleum
- INTC - Interior & National Coordination
- ICT- Inform Communication Technology
- SLO - State Law Office
- RIN.- Transport & Infrastructure
- EDU – Education
- HLT- Health
- AGR.- Agriculture
- WAI- Water and Irrigation

3.7 Data Collection Instruments

These are the methods purposed to collect relevant information from the respondents. The researcher made use of both primary and secondary sources of data. To collect primary data, the researcher used the questionnaire and through an observation guide for the observation method.

3.7.1 Questionnaire Method

The researcher used the questionnaire as the main tool of data collection of primary data to provide written answers to the written questions. This was with the support of two research assistants. The questionnaires are the most commonly used research instruments alongside interview tools, observation schedules and standardized tests (Mugenda & Mugenda, 2003). Questionnaires provide the researcher with relatively easy accumulation of data that is objective and relatively easy to analyze. A questionnaire is a research instrument that gathers data over a large sample, where the respondents after familiarization can do the self-administration of the tool, (Kothari, 2004).

In this study, the questionnaire consisted of both open and closed ended questions based on the variables under investigation. The target respondents of the questionnaire were the staff of the SCM Departments, their HODs and QMRs. Since the sample was fairly large and the respondents were all literate, therefore it made this tool appropriate to collect information from the staff in the SCM Departments who comprise the bulk of the respondents (Mugenda & Mugenda, 2003). The questionnaire (Appendix I) was divided into six sub-sections: Section One contained the general characteristics information of the individual respondent and their respective Ministry. This helped analyse and generalize the same onto the population under study. Sections Two to Six are based on the thematic issues of the study which correspond to the five variables of the study including the dependent variable (Performance of SCM Departments), four independent variables of Management Responsibility Processes (MRP), Resources Management

Processes (RMP), Measurement, Analysis and Improvement Processes (MAIP) and Product Realization Processes (PRP). The moderating variable on Government Policies and Regulations (GRP) questions also formed another section. The questionnaire's closed questions used a five point Likert scale for speedy data coding and analysis. According to Lindsay (2018), a Likert scale is a rating scale, often found on survey forms, that measures how people feel about something. It includes a series of questions that you ask people to answer, and ideally 5-7 balanced responses people can choose from. It often comes with a neutral midpoint (Likert, 1932). The independent variables were rated as follows on the Likert scale for the close-ended questions: (1) Strongly Disagree, (2) Disagree, (3) Don't Know, (4) Agree and (5) Strongly Agree. The open ended questions were also used to get more information on the thematic areas.

3.7.2 Observation method

The researcher also used observation guide as a technique of data collection. This is a method, according to Kombo and Tromp (2009) that provides information about actual behaviour. They say that observation involves recording the behavioural patterns of people, objects and events in a systematic manner. Direct observation is useful as some behaviour involves habitual routine which people are hardly aware. It allows the researcher to put the behaviour into context and thereby understand it better (Kothari, 2004). An observation guide was used. (See Appendix II). The researcher in this study employed disguised observation which the respondents were unaware that they were being observed and thus behaved naturally. This helped to gauge behavioural aspects that contribute to quality performance. An observation guide was used to capture relevant information for the study.

3.7.3 Review of Secondary Data

For secondary data, the researcher used content from historical documents such as customer satisfaction survey reports for customer satisfaction levels before and after certification, performance appraisal reports for staff performance before and after certification, expert newspapers commentaries on trends in certifications, speeches for and also staff records in the SCM Departments, statistics and relevant literature on staffing in SCM departments from the Directorate of Public Procurement at the National Treasury. According to Mugenda and Mugenda (2003), secondary information sources are data neither collected directly by the user, nor specifically for the user. It involved gathering and analysis of data of published material and information from internal sources. The researcher was also interested in past records in respect to the performance of these SCM Departments before and after ISO 9001:2008 certification. Performance Appraisal reports, customer satisfaction reports and ISO audits results were reviewed.

3.8 Operationalization of the Variables

Table 3.3 indicates how the study variables were operationalized and their corresponding sections in the questionnaires.

Table 3.3: Operationalization of the Study Variables

| Variable | Key Indicators | Questionnaire Appendix, Section and Number(s) |
|---|--|--|
| <p><u>Dependent Variable</u> Performance of supply chain entities at GOK ministries headquarters</p> | <ul style="list-style-type: none"> • Quality through customer satisfaction surveys before and after ISO; • Reduced time to perform specific activities such as Lead time • Financial that is a reduction in cost and increase in revenue in all the SCM drivers and processes. Use of available financial statements • Productivity in terms of PAS results before and after the uptake of PAS | <p>1, Sec. 6, 34-40. 2, Sec.6, 33-37</p> |
| <p><u>Independent Variables</u> ISO 9001:2008 Management Responsibility Processes</p> | <ul style="list-style-type: none"> • Management Attitude towards ISO QMS through management review meetings • Management Style and if it supports ISO QMS • Management Support on ISO QMS through provision of resources • Modern and relevant Technology for the implementation of ISO QMS in the SCM Department • Availability of mandatory documents | <p>1, Sec. 1, 1-5 2, Sec. 1, 1-5</p> |
| <p>ISO 9001:2008 Resource Management Processes</p> | <ul style="list-style-type: none"> • Human Skills inventory • Asset audits • Quality infrastructure • Human resource development through regular training • Talent management • Quality of materials used | <p>1, Sec. 2, 6-13 2, Sec. 2, 6-13</p> |
| <p>ISO 9001:2008 Measurement, analysis and improvement</p> | <ul style="list-style-type: none"> • Customer feedback records • Product requirement records • Corrective action records • Customer satisfaction surveys • Customer order records • Waste reduction initiatives | <p>1, Sec 3, 14-23 2, Sec 3, 14-22</p> |
| <p>ISO 9001:2008 Product realization Processes</p> | <ul style="list-style-type: none"> • Product information records • Purchasing records • Inspection plans • Supplier quality plans • Details of supplier premises • Evidence of verification of purchased products | <p>1, Sec. 4, 24-29 2, Sec. 4, 23-28</p> |
| <p><u>Moderating variable</u> Gov. Procurement Regulations & Policies</p> | <ul style="list-style-type: none"> • Awareness of the various government procurement regulations and policies • Availability of relevant regulations and policies within the department • Extent of compliance with each of the variables | <p>1, Sec. 5, 30-33 3, Sec. 5, 29-32</p> |

3.8.1 Interpretation of the Coefficients With Respect to the Study Variables

$$H_{0i} : \beta_i = 0 \text{ versus } H_{0i} : \beta_i \neq 0 \text{ (i=1,2,3,4)}$$

If the hypothesis is rejected then the independent variable X_i has a statistically significant effect on Y . For the moderation the hypotheses test:

$$H_{0z} : \beta_{iz} = 0 \text{ versus } H_{0z} : \beta_{iz} \neq 0 \text{ (i=5)}$$

If the hypothesis is rejected then the moderation term ($X_i \cdot X_5$) will be taken to be statistically significant.

3.9 Data Collection Procedures

To collect this data using the discussed instruments, the researcher obtained a letter of introduction from the Department at JKUAT and a permit from the National Commission for Science, Technology and Innovation (NACOSTI). Permission was also sought from each of the Ministries through their respective Principal Secretaries. The researcher identified two research assistants to support the process who were taken through a briefing of the contents of entire questionnaire and the data collection exercise before the actual data collection. The researcher reached out to the respective SCM Departments through the Ministry to inform on the purpose of the research exercise. This according to Mwituria (2012) minimizes bureaucratic bottlenecks at the time the tool is to be administered. The questionnaires were administered to the Heads of Supply Chain Departments in the Ministry Headquarters and the sampled staff in those Ministries and Departments. To increase the response rate, the respondents were allowed some time to fill the questionnaires which were collected on a specified date after the response time for tool administration was over.

3.10 Pilot test

To test the reliability and validity of the research instrument, piloting of the questionnaire was done. This according to Mwituria (2012), means that a trial to prove to oneself whether the questionnaire is obtaining the results that the study requires to make correct conclusions. According to Cooper and Schindler (2010), a pilot test is conducted to detect weaknesses in design and instrumentation and to provide proxy data for selection of a probability sample. Babbie (2004) says that a pilot study is conducted when a questionnaire is given to just a few people with an intention of pre-testing the questions. Pilot test is an activity that assists the researcher in determining if there are flaws, limitations, or other weaknesses within the interview design and allows him or her to make necessary revisions prior to the implementation of the study (Kvale, 2007). The rule of thumb is that at least one percent of the sample should constitute the pilot test (Cooper & Schilder, 2011; Creswell, 2003). Mugenda and Mugenda recommend that 1% to 10% of the sample is adequate for pilot testing. The proposed pilot test was therefore done within this recommendation.

A pilot study was undertaken on four accessible ISO certified SCM departments in government institutions to test the validity of the questionnaire. These were at Meru National Polytechnic, Kenya School of Government-Embu, University of Embu and Chuka University. 18 respondents constituting (6%) of the sampled respondents filled and returned the piloted questionnaire.

3.10.1 The Reliability Testing

Reliability test was carried out using Cronbach's Coefficient Alpha test which validated the measuring instrument to determine its portability, structure and reliability (Kothari, 2004).

Reliability is considered the consistency of a set of measurement items and on the other hand validity indicates that the extent to which the instrument is testing what it should

(Cronbach, 1951). Reliability is the level of consistency of the measurement instrument in use, or it is the degree to which an instrument is able to measure the same way through each time it is used under the same conditions and also with the same subjects. It is the probability of measurement. A measure is considered reliable only if a Person's score on the same test administered twice tends to be similar. Reliability is not measured, it is estimated and it does not, however, imply validity because while a scale may be measuring something consistently, it may not necessarily be what it is supposed to be measuring. The researcher used the most common internal consistency measure, the Cronbach's alpha (α). Variables that did not correlate strongly (less than 0.7) were removed from the measuring instrument. A Cronbach's coefficient alpha that was above 0.7, the value commonly required for descriptive research (Nunnally & Bernstein, 1994), it indicated satisfactory reliability. If not, then the researcher had to revise the questions to meet this threshold level.

According to Cronbach (1951) it indicates the extent to which a set of test items may be treated as those measuring a single latent variable. In this study, the recommended value of 0.7 was used as a cut-off of for reliabilities. Cronbach's alpha is a general form of the Kuder-Richardson (K-R) 20 formulas used to access internal consistency of an instrument based on split-half reliabilities of data from all possible halves of the instrument. Mugenda and Mugenda (2003), say that this testing reduces time required to compute a reliability coefficient while using other methods. The Kuder-Richardson (K-R) 20 is based on the formula;

$$KR_{20} = \frac{(K)(S^2 - \sum s^2)}{(S^2)(K-1)}$$

KR₂₀ *Reliability coefficient of internal consistency*

K *Number of item used to measure the concept*

S² *Variance of all score*

s² *Variance of individual items*

The pilot survey was able to draw responses from the interviewees on the design and content of the instrument and also attract suggestions for more efficient and practical way of administering it. The pilot testing was re-run till the researcher felt satisfied with the data collection instrument.

3.10.2 Validity Testing

The degree to which the tool correlated to other theoretical propositions which is the construct validity was examined into by the supervisors who were well versed with the topic of study. Validity is used by the researcher to check whether questionnaire is measured what it intended to measure. This is according to Bryman and Cramer (1997). Validity is the measure of strength of the conclusions, inferences or propositions that are made by the researcher. According to Patton (2002) validity is the best available approximation to the truth or falsity of a given inference, proposition or conclusion that is made by a researcher. The pilot study response guided on content and criterion validity checks as the respondents were asked to comment on the tool. This ensured content validity, which is the adequacy of coverage of the topic. They also commented on the relevance and any bias that could be on the tool to increase the criterion validity of the same (Kothari, 2004). Based on the responses, several adjustments were made on the tool.

3.10.3 Test for Multicollinearity

According to Bryman (2012), multicollinearity occurs when two or more variables are highly correlated thus creating shared variance between variables. Multicollinearity tends to reduce the efficiency of the estimates for the parameters. As multicollinearity increases, the net effect of each independent variable on the dependent variable decreases. To determine whether multicollinearity levels would pose a challenge to the study, regression analysis was conducted to generate the Variance Inflation Factor (VIF) value. A VIF of above 10 was interpreted by the researcher as indicating problems with multicollinearity.

This study indicated that all the variables had VIF of less than 10 (within the recommended range of 1-3) and tolerance of more than 0.1 ruling out the multicollinearity problem.

3.11 Data Processing and Analysis

3.11.1 Data Processing

After collecting the data, the researcher ensured that it was processed in some manner before carrying out the analysis. This pre-processing is meant to correct problems that were identified in the raw data (Kombo & Tromp, 2009). The researcher eliminated what was considered unusable data, interpreted ambiguous answers and tried to relate contradictory data from related questions. The data obtained was checked for omissions, legibility and consistency before being coded for analysis. The data was coded to organize it and also as a means of introducing interpretations. Thereafter a coding system for the collected data was developed and the data keyed and stored electronically. The Statistical Package for Social Sciences (SPSS) tool was used to organize, code and analyze both quantitative and qualitative data. Interactive software version 7.0 was used to plot the profile plots of the interactions. The main advantage of SPSS is that it includes many ways to manipulate quantitative data and contains most statistical measures, (Neuman, 2009).

Several descriptive and inferential statistics were used to analyze the data either on individual variable or all the variables together. The descriptive analysis included the mean, percentages and standard deviation. For the purpose of this study, a mean score of 4.2 implied that a particular ISO 9001:2008 process aspect was applied to a great extent. A mean of between 2.60 and 3.40 in the test was considered to be moderate while that below 1.80 indicated that a certain dimension had not been applied to a great extent. This helped present the value of the data collected for further analysis.

3.11.2 Data Analysis

Data analysis is the deliberate process of looking through and summarizing data with the intention of extracting useful information and developing logical conclusions, (Mwituria, 2012). It refers to orderliness in research data and involves putting the data in some systematic form, before it can be analysed. The Statistical Package for the Social Sciences tool (SPSS) version 24.0 was, used to analyse both quantitative and qualitative information. The key advantage of SPSS tool according to Neuman (2009) is that it includes many ways that a researcher can manipulate quantitative data and it also contains most statistical measures.

Quantitative data

The quantitative data analysis was composed of numerical values from which statistics such as the frequency, mean, standard deviation and percentage were obtained. This according to Kothari (2004) aids in presenting the face value of the data collected for further analysis. The data that was collected was observed for inconsistencies, incomplete questions and unusable data so as to ensure accuracy and that the objectives of the study were being met and addressed. It was then cleaned, edited and coded. Analysis was carried out with respect to of the study objectives through descriptive and inferential statistics including measures of central tendency through the Statistical Package for Social Sciences (SPSS). Inferential data was analyzed through correlation and regression analysis to establish the direction and intensity of the relationship between the independent and dependent variables. Simple regression was used to test the research hypothesis. The analyzed data was presented in form of tables and graphs.

Qualitative data

The qualitative data was collected from open-ended questions from the questionnaires and from the observation schedules. Qualitative data according to Mugenda and Mugenda (2003) support the responses in the Likert scale and constitutes open ended questions key to interrogating the respondents' feelings towards a phenomena. The information was analyzed by describing, structuring, categorizing and combining them into interpretable themes.

3.11.3 Measurement of Variables

(i) Measurement of the Independent Variables

The ISO 9001:2008 processes were measured using four constructs namely Management Responsibility Processes (MRP), Resources Management Processes (RMP), Measurement, Analysis and Improvement Processes (MAIP) and Product Realization Processes (PRP). Each of these was measured using a 5 point Likert Scale with responses on each of the variables ranging from 1 to 5 for Strongly Disagree (SD), Disagree(D), Don't Know (DK) to show indifference, Agree (A) and Strongly Agree (SA). See Table 3.4.

(ii) Measurement of the Dependent Variable

In measuring the performance of SCM departments, financial performance, Performance Appraisal reports, customer satisfaction survey reports, productivity and timeliness in the processes were used to comprehensively measure performance of the departments. In the words of Mwituria (2012), and Arasa et al. (2012) respondents in such a type of research tend to be more willing to indicate the range where their respective firms fall on the indicators as opposed to stating absolute figures or values.

Through a structured questionnaire, self-reported measures of the department's performance were derived. Waiganjo, Mukulu and Kahiri (2013) highlight the importance of the use of self-reported measures of performance owing to the difficulty in obtaining public financial data and the absence of formal verification mechanisms to corroborate the financial data since it is held in confidence by the firm/department managers. These variables were also measured using ordinal and nominal types of measurement. The ordinal measurement used a five point interval Likert Scale, whereby the level of agreement was ranked from strongly disagree, disagree, don't know, agree and strongly agree. Table 3.4 shows the Likert Scale used.

Table 3.4: Likert Scale Numerical Values

| Respondents selection | Numerical value |
|------------------------------|------------------------|
| Strongly Disagree | 1 |
| Disagree | 2 |
| Don't Know | 3 |
| Agree | 4 |
| Strongly Agree | 5 |

According to (Amin, 2005) these numbers in the ordinal scale depicted the relative position among the study variables. The nominal scale of measurement was used in cases that had common characteristics like Ministry, Designation, Age, Gender, Highest educational qualifications, Specialization and numbers of years that one had worked in the department.

3.11.4 Regression Analysis

The inferential statistic used was the regression model method. The assumptions relating to regression were carried out, the test for linearity, multicollinearity, homoscedasticity, and normality. The correct use of the multiple regression models requires that these assumptions be satisfied in order to apply the model and establish validity (Kothari, 2004). Simple linear regression was carried out so as to establish the rate of change of the variables in relation to changes in one another. Moderated multiple linear regression was used to establish the effect of the moderating variable on each of the independent variables on performance. From the outcome, the model of goodness of fit or how well the model fits the data was established and the significance of the coefficients established.

3.11.5 Statistical Models

The statistical model that was used in this study was the linear regression model as is shown below. Table 3.5 provides a breakdown of the regression model into the specific hypothesis under test.

$$Y = \beta_0 + \beta_i X_i + \varepsilon; \text{ where } (i=1, 2, 3, 4)$$

Where Y = Performance of supply chain departments

β_0 = Constant

β_i = Coefficients of the independent variables

Independent variables: (Management responsibility Processes (X_1), Resource Management Processes (X_2), Measurement, Improvement and Analysis Processes (X_3), Product Realization Processes (X_4))

ε = error term, which is assumed to be normally distributed with a mean of zero and a variance of σ^2 .

For the multiple regression model that has the independent variables on Performance

$$Y = \beta_0 + \beta_i X_i + \varepsilon; \text{ where } (i=1, 2, 3, 4)$$

Where Y = Performance of supply chain departments

β_0 = Constant

β_i = Coefficient of the independent variables

Independent variables: (Management responsibility Processes (X_1), Resource Management Processes (X_2), Measurement, Improvement and Analysis Processes (X_3), Product Realization Processes (X_4))

ε = error term, which is assumed to be normally distributed with a mean of zero and a variance of σ^2 . $N(0, \sigma^2)$

For the moderated multiple regression model that has the interaction of the independent variables with the moderating variable;

$$Y = \beta_0 + \beta_i X_i + \beta_z \cdot X_6 + \beta_{iz} \cdot (X_i X_M) + \varepsilon; \text{ where } (i=1, 2, 3, 4)$$

Where Y = Performance of supply chain departments

β_0 = Constant

β_i = Coefficient of the independent variables

Independent variables: (Management responsibility Processes (X_1), Resource Management Processes (X_2), Measurement, Improvement and Analysis Processes (X_3), Product Realization Processes (X_4))

B_Z = Coefficient of the moderating variable (Government Procurement Regulations and Policies)

β_{iZ} = Coefficient of the interacting variables (Independent variable and the Moderator) which measures the moderation effect.

$X_i X_6$ = The interaction term of the independent variable and the moderator variable.

X_M = Moderating variable (Government Procurement Regulations and Policies)

ε = error term, which is assumed to be normally distributed with a mean of zero and a variance of σ^2 . $N(0, \sigma^2)$

3.12 Test of Hypotheses

Table 3.5 shows the study objectives, hypothesis, the type of analysis and the corresponding coefficients in the multiple regression models. With respect to each study objective, the decision to reject or fail to reject the null hypothesis was based on the significance of the coefficients of β_i where (i=1, 2, 3, 4) with ($p < 0.05$) of each variable in the fitted regression equation.

Table 3.5: Objectives, Hypothesis, Type of Analysis and Interpretation of the Coefficients Summary

| Objective | Hypothesis | Analysis | Interpretation of β_i |
|---|---|---|--|
| To assess the effect of ISO 9001:2008 Management responsibility on the Performance in the Supply Chain Management Departments of GOK Ministries' Headquarters. | H ₀₁ : The adoption of the ISO 9001:2008 Management responsibility processes have no significant effect on the Performance of the Supply Chain Management Departments of the GOK Ministries' Headquarters. | 1. Pearson's Correlation 2. Simple Linear Regression (F-test, t-test) | if $p < .05$ <i>Reject the Null Hypothesis</i> $\beta_1 = 0$ |
| To establish the effect of ISO 9001:2008 Resource Management Process on Performance in the Supply Chain Management Departments of GOK Ministries' Headquarters. | H ₀₂ : The adoption of the ISO 9001:2008 Resource Management Process have no significant influence on the performance of the Supply Chain Management Departments of the GOK Ministries' Headquarters. | 1. Pearson's Correlation 2. Simple Linear Regression (F-test, t-test) | if $p < .05$ <i>Reject the Null Hypothesis</i> $\beta_2 = 0$ |
| To assess the effect of ISO 9001:2008 Measurement, Improvement and Analysis processes on Performance in the Supply Chain Management Departments of GOK Ministries' Headquarters. | H ₀₃ : The adoption of the ISO 9001:2008 Measurement, Improvement and Analysis Processes has no significant effect on the Performance of the Supply Chain Management Departments of the GOK Ministries' Headquarters. | 2. Simple Linear Regression (F-test, t-test) | if $p < .05$ <i>Reject the Null Hypothesis</i> $\beta_3 = 0$ |
| To evaluate the effect of ISO 9001 Product Realization Processes on Performance in the Supply Chain Management Departments of GOK Ministries' Headquarters. | H ₀₄ : The adoption of the ISO 9001:2008 Product Realization Processes have no significant effect on the performance of the Supply Chain Management Departments of the GOK Ministries' Headquarters. | 1. Pearson's Correlation 2. Simple Linear Regression (F-test, t-test) | if $p < .05$ <i>Reject the Null Hypothesis</i> $\beta_4 = 0$ |
| To establish the joint effect of the relationship between the supply chain ISO 9001:2008 processes dimensions and Performance of SCM Departments at GOK Ministry Headquarters. | H ₀₅ : The joint ISO 9001:2008 process dimensions have no significant effect on performance of the departments. | 1. Pearson's Correlation 2. Moderated Multiple Linear Regression (F-test, t-test) | if $p < .05$ <i>Reject the Null Hypothesis</i> $\beta_i = 0$ ($i=1,2,3,4$) |
| To establish the moderating effect of Government regulations and policies on ISO 9001:2008 Management Responsibility, Resource management, Measurement, Improvement, Analysis, Product Realization and Performance of SCM Departments at GOK Ministry Headquarters. | H ₀₆ : The Government procurement regulations and policies does not significantly moderate between ISO 9001:2008 Management Responsibility, Resource Management, Product Realization and Measurement, Analysis, Improvement Processes on the Performance of the SCM departments at the GOK Ministries Headquarters | 1. Pearson's Correlation 2. Moderated Multiple Linear Regression (F-test, t-test) | if $p < .05$ <i>Reject the Null Hypothesis</i> $\beta_{iz} = 0$ |

3.13 Ethical Considerations

Ethical considerations in research should be done in terms of informed consent, confidentiality and consequences, (Fontana & Frey, 2000). The three considerations were dully addressed through having a Research Permit from NACOSTI, clearance for research from the University and an introductory part of the questionnaire that indicated that the questionnaire would be filled on voluntary grounds. Confidentiality by having the identity of the respondent optional and the fact that all the information filled would be used strictly for research purposes was also adhered to. On the consequences, the questions were designed to focus on organizational and not personal issues that could be used to penalize the respondent as a consequence.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter outlines the details of the study findings performed to test the hypotheses. It outlines the response rate, assesses the reliability and confirms the validity of the study constructs and the demographic information of the respondents who were involved in the study. The descriptive data was analysed by the use of descriptive statistics where the mean, standard deviations and percentages were evaluated and presented in table form it further explores the analysis and presentation of the results of the study performed to test the study model and hypotheses. The tests on the assumptions that are required before carrying out a regression were also carried out. These tests included linearity, multicollinearity, homoscedasticity and normality. The inferential statistical analysis was also carried out on the study variables in order to determine the relationship among the study variables when performance was regressed on them. The chapter shows the results of the statistical analysis as well as the test of the hypotheses and concludes with broad discussions of the results and findings of the study.

4.2 Response Rate

This represents the percentage of questionnaires that were fully filled from the total that was returned from the field. On collection of the questionnaires from the respondents, the questionnaires were serialized and the respective variables coded and keyed into SPSS. The data was examined carefully so as to identify any inconsistencies. These inconsistencies were in the form of omissions and double entries by the respondent on filling in the questionnaire hence leading to the elimination of the questionnaire. The study had targeted 280 respondents from the study population that were eligible. Two hundred and thirty four were collected. On cleaning the data in the questionnaires, 224 remained as shown in Table 4.1 which represented a response rate of 78%.

Table 4.1: Response Rate

| | Administered Questionnaires | Returned Questionnaires | On cleaning data | Percentage Remaining |
|----------------------------------|--|------------------------------------|-----------------------------|---------------------------------|
| Number of Respondents | 288 | 234 | 224 | 78% |

According to Mugenda and Mugenda (2008) a response rate of more than 50% was enough to analyze and draw conclusions. Babbie (1990) suggested that a response rate of 60% is good and 70% is very good. Thus a response rate of 78% was very good and was considered valid and reliable for analysis. Green (1991) recommends that a minimum of sample size $104 + k$, where k is the number of predictor variables when one is testing the individual predictors in a regression model. Hence with five predictors we had $(104 + 5) = 109$. Hence our sample size of 224 was sufficient for the purpose of further analysis and reporting.

4.3 Validity of the Research Instrument

Validity refers to the degree to which empirical evidences and theoretical rationales support the adequacy and appropriateness of interpretations and actions based on test scores. According to Mugenda and Mugenda (2008) it is the degree to which the results obtained from the analysis of the data actually represents the phenomenon under study. Face validity was carried out through relevant literature review, peer review and also through the use of accepted methods used in other relevant studies. Content and construct validity was also ensured by pre testing the preliminary questionnaire with a sample of similar SCM departments in other public entities through a pilot test. A pilot test was therefore carried out so as to test for the reliability and validity of the research instrument. An over 50% response rate was realized in the pilot data collection and this was found adequate for the final administration of the tool. The noted corrections were made in the final tool that was administered. The reliability test was done using the Cronbach's alpha test. The variables that did not correlate within the required minimum

of 0.7 were removed from the instrument. The validity test was examined and approved in collaboration with the supervisors who are knowledgeable in the area under study. Corrections were made as appropriate in the final tool.

4.4 Descriptive Statistics Analysis

Descriptive analysis data is expected to depict the background of the study before further analysis is to be carried out. This was done by extracting frequencies, percentages, means and standard deviations and presentations in the form of tables, pie chart and bar charts.

4.4.1 Respondents from Ministries

The researcher collected data from 10 Ministries. From Table 4.2, out of the total 224 respondents, Immigration had 29 (13%), Education had 27 (12%), ICT had 24 (11%), Treasury had 24 (11%), State Law Office 23 (10%), Agriculture 20 (9%), Transport 28 (13%), Health 17 (8%), Water and Irrigation 23 (10%) and Energy 9 (4%). The response from the Ministries is considered adequate for analysis as it was above 70% which is recommended as adequate by Mugenda and Mugenda (2008).

Table 4.2: Respondents Ministry

| Ministry | Frequency | Percentage |
|----------------------------------|-----------|------------|
| Interior & National Coordination | 29 | 13.0 |
| Education | 27 | 12.0 |
| ICT | 24 | 11.0 |
| Treasury | 24 | 11.0 |
| State Law | 23 | 10.0 |
| Agriculture | 20 | 9.0 |
| Transport | 28 | 13.0 |
| Health | 17 | 8.0 |
| Water And Irrigation | 23 | 10.0 |
| Energy | 9 | 4.0 |
| N | 224 | 100.0 |

Note. ICT= Information Communication Technology

4.4.2 Respondents' Designation

On designation, the researcher established that 187 (83%) of the respondents were Supply Chain Management officers serving at different levels, 12 (5%) were Office Administrators at different levels working within the SCM Department, 2 (1%) were Senior Deputy Directors Supply Chain Management, 2 (1%) were Human Resource Officers, 2 (1%) were Personal Assistants to the Directors in SCM, 4 (2%) were Transport Officers attached to the SCM Department and 4 (2%) were attachees to the Department as shown in Table 4.3.

Table 4.3: Respondents Designation

| Designation | Frequency | Percentage |
|----------------------------|------------------|-------------------|
| SCM Officers | 187 | 83.0 |
| Office Administrators | 12 | 5.0 |
| Senior Deputy Director-SCM | 2 | 1.0 |
| Attaches | 4 | 2.0 |
| HR Officer | 2 | 1.0 |
| Personal Assistant | 2 | 1.0 |
| Transport Officer | 4 | 2.0 |
| Total | 213 | 95.0 |
| No Response | 11 | 5.0 |
| N | 224 | 100.0 |

Note. SCM= Supply Chain Management, HR= Human Resource

4.4.3 Age of the Respondents

In the survey, the respondents were asked to state the age category they were in. Out of the targeted respondents, (12%) of the respondents were between 20-29 years, (31%) were between 30-39 years, (35%) were between 40-49 years, (21%) of them were between 50-59 years, while only (1%) were over 60 years as shown in Table 4.4 and Figure 4.1. This result the staff working within the SCM Departments and involved in the implementation of ISO are generally within the ages of 40-49 which is the most productive age and is in agreement with the study findings by Price (2006) who

maintained that there are two natural age peaks correlated to entrepreneurship, namely the late twenties and mid-forties.

Table 4.4: Respondents Age

| Age Bracket | Percentage |
|-------------|------------|
| 20-29 | 12.0 |
| 30-39 | 31.0 |
| 40-49 | 35.0 |
| 50-59 | 21.0 |
| Over 60 | 1.0 |
| N | 100.0 |

n=224

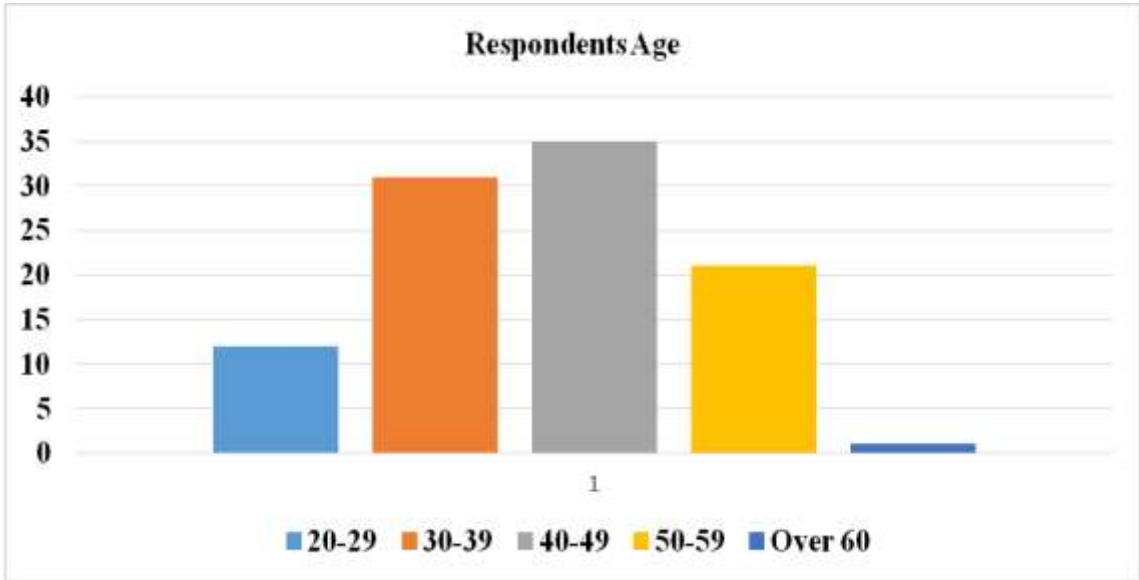


Figure 4.1: Respondents' age.

4.4.4 Respondents’ Gender

On gender, the findings established that 121 that is 54% of the staff in the SCM Departments were male while 103, that is 46% were female. There seems to be fair distribution of gender in the Supply Chain Management Departments as shown in Table 4.5 and Figure 4.2.

Table 4.5: Respondents Gender

| Gender | No. | Percentage |
|---------------|------------|-------------------|
| Male | 121 | 54.0 |
| Female | 103 | 46.0 |
| N | 224 | 100.0 |

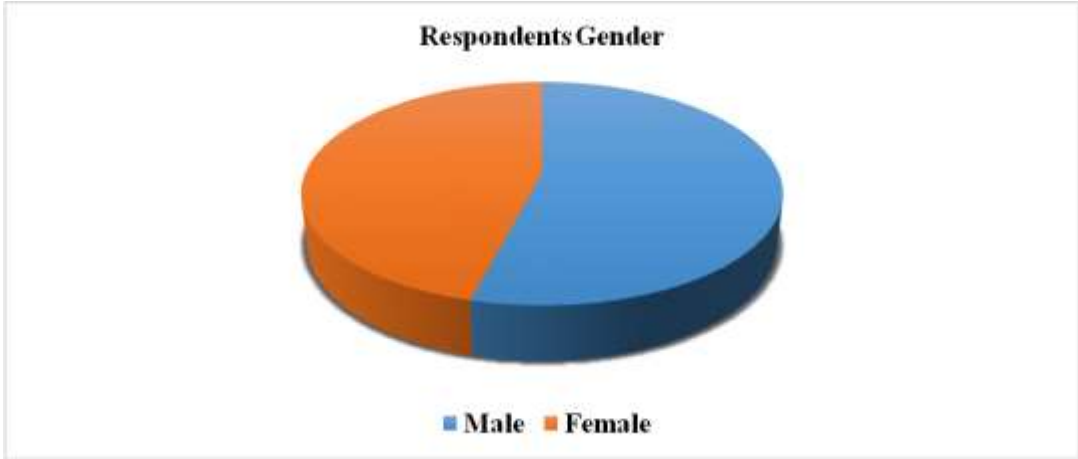


Figure 4.2: Respondent’s gender.

4.3.5 Highest Academic Qualification

The study looked at the level of education of the respondents. This is presented in Table 4.6. The level of education of a person is an indicator of the technical skills and capacity of the person and hence important. The study found that only 1% of the respondents were certificate holders, 27% were Diploma holders, 52% had an undergraduate degree and 20% possessed post graduate qualifications. These findings indicate that most employees in the SCM Departments are degree holders, an indicator that most of the Ministry Headquarters have skilled and competent managerial staff.

Table 4.6: Respondents Highest Qualifications

| Qualification | Percentage |
|----------------------|-------------------|
| Certificate | 1.0 |
| Diploma | 27.0 |
| Degree | 52.0 |
| Postgraduate | 20.0 |
| N | 100.0 |

n=224

The findings of the study agree with Muturi, Kimuyu and Sakwa (2013) that educational level significantly affects performance and hence would have a significant effect on enhancing the ISO 9001:2008 processes within the SCM Department. The implication of this finding is that since most of the respondents have a university degree, then they were capable of understanding the research tool and able to provide appropriate responses.

4.4.6 Cross tabulation of Respondents Gender and Highest Qualification

When gender was cross tabulated with the highest qualification achieved, it became apparent that most of the respondents from either gender had attained a university degree

with males and females having 55.7% and 53.9% respectively. The least qualifications by both genders were Certificate holders who were at 0.8% and 2.0% for males and females respectively. However, in post graduate qualifications category only 13.1% of the males as opposed to 24% of the females had attained these qualifications. Hence there were more females than males with postgraduate qualifications. The difference in the qualifications could be explained through the various female empowerment strategies currently ongoing in Kenya and the world all over in which various societies have encouraged more women to attain higher academic qualifications for professional growth in both the public and private sectors, according to Mwitura (2012). This cross tabulation is shown in Table 4.7. This therefore means the research could not be affected by gender bias since both gender were evenly represented and with adequate education in the form of university education.

Table 4.7: Respondents Gender * Respondents Highest Qualification Cross Tabulation

| | | Respondents Highest Qualification | | | | N |
|-----------------------|-----------------------------------|-----------------------------------|---------|--------|--------------|--------|
| | | Certificate | Diploma | Degree | Postgraduate | |
| Respondents Gender | N | 1 | 37 | 68 | 16 | 122 |
| | % within Male | 0.8% | 30.3% | 55.7% | 13.1% | 100.0% |
| | Respondents Gender | 0.4% | 16.5% | 30.4% | 7.1% | 54.5% |
| | % of Total | 0.4% | 16.5% | 30.4% | 7.1% | 54.5% |
| Respondents Gender | N | 2 | 20 | 55 | 25 | 102 |
| | % within Female | 2.0% | 19.6% | 53.9% | 24.5% | 100.0% |
| | Respondents Gender | 0.9% | 8.9% | 24.6% | 11.2% | 45.5% |
| | % of Total | 0.9% | 8.9% | 24.6% | 11.2% | 45.5% |
| N | N | 3 | 57 | 123 | 41 | 224 |
| | % within Respondents Gender | 1.3% | 25.4% | 54.9% | 18.3% | 100.0% |
| | Respondents Gender | 1.3% | 25.4% | 54.9% | 18.3% | 100.0% |
| | % of Total | 1.3% | 25.4% | 54.9% | 18.3% | 100.0% |

n=224

4.4.7 Respondents Area of Specialization

The study also sought to identify the respondents' areas of specialization of the respondents. Table 4.8 shows the respondents' areas of specialization whereby 90% of the respondents were found to be in the line of procurement while 3% were in Business Management (Procurement option). The other respondents were in Human Resource (1%), Strategic Management (1%), Secretarial Studies (1%), Administration (1%), Logistics (1%), Book keeping (1%) and Accounting (1%). Most respondents were therefore found to be having a procurement background.

Table 4.8: Respondents Area of Specialization

| Area of Specialization | Percentage |
|-------------------------------|-------------------|
| Procurement | 90.0 |
| HR and Administration | 1.0 |
| Strategic Management | 1.0 |
| Business Management | 3.0 |
| Secretarial Studies | 1.0 |
| Administration | 1.0 |
| Logistics | 1.0 |
| Record Keeping | 1.0 |
| Accounting | 1.0 |
| N | 100.0 |

n=224. *Note.* HR= Human Resource

From this analysis, it can be concluded that the Ministry headquarters are staffed with people who are specialized in procurement which is important for any supply chain entity. Other supporting staffs to this function are found to be in minimal numbers representing 3% for business management and 1% for all the other areas of specialization. This therefore means that the respondents were competent enough to comprehend and respond to the research tool appropriately on the basis of their understanding the technical area of Supply Chain that the tool addressed.

4.3.8 Respondents Years of Work in Department

On the respondents' experience in the Department, 37% were found to have worked for between 0-5 years, 31% between 6-10 years, 24% between 11-20 years while only 8% had worked for over 20 years. Table 4.9 represents this analysis.

Table 4.9: Respondents Years of Work in Department

| Years | Percentage |
|--------------|-------------------|
| 0-5 | 37.0 |
| 6-10 | 31.0 |
| 11-20 | 24.0 |
| Over 20 | 8.0 |
| N | 100.0 |

n = 224

Therefore, majority of respondents were fairly experienced in the Department (0-10 years) with a cumulative percentage of 68% (37+31). Since most of the respondents had worked in the department for quite some time, between 6-10 years, then they had adequate knowledge about the various processes in the department and were able to give well informed responses.

4.3.9 Descriptive Analysis of the Effect of Management Responsibility Processes (MRP) on Performance

To assess the effect of Management Responsibility Processes on the Performance of supply chain entities at GOK ministries headquarters, the study measured various Management Responsibilities Processes indicators observed among the respondents. The respondents indicated on their extent of agreement with Management Responsibility Processes parameters presented to them on a Likert Scale, where (1) represented Strongly disagree, (2) Disagree, (3) Don't Know (4) Agree and (5) Strongly Agree.

The extent of Management Responsibility Processes was indicated by the percentages, mean and standard deviation. A mean between 3.4 and 5.0 was considered to be in the agreeing range. A high standard deviation was an indication of a higher variation with respect to that response. From Table 4.10 a majority 53% of the respondents agreed and another 10% strongly agreed that ISO Management Review meetings had been held in the ongoing financial year with ($M = 3.64, SD = .792$). 83% agreed that there was in place a management style that supports the implementation of the ISO QMS with ($M = 4.00, SD = .673$). Likewise, 85% concurred that there was in place an organisation structure that supports the ISO QMS, this was also verified with ($M = 4.12, SD = .653$). 91% concurred that Management has provided modern technology such as e-Procurement enhancing activities of the SCM Department with ($M = 4.17, SD = .597$).

Table 4.10: Management Responsibility Processes and Performance Descriptive Statistics

| Parameters on Management Responsibility Processes | SD | D | DK | A | SA | M | S. Dev |
|---|------------|---|-----|------|------|------|--------------|
| | Percentage | | | | | | |
| 1. ISO Management Review meetings have been held in the ongoing financial year. | 1.0 | | 7.0 | 29.0 | 53.0 | 10.0 | 3.64 .792 |
| 2. There is in place a management style that supports the implementation of the ISO QMS. | - | | 2.0 | 15.0 | 63.0 | 20.0 | 4.00 .673 |
| 3. There is in place an organisation structure that supports the ISO QMS. | - | | 1.0 | 11.0 | 63.0 | 25.0 | 4.12 .653 |
| 4. Management has provided modern technology such as e-Procurement that enhances the activities of the SCM Department. | - | | 1.0 | 8.0 | 64.0 | 27.0 | 4.17 .597 |
| 5. Management insists on the safe custody of all mandatory QMS documents and records. | - | | - | 6.0 | 70.0 | 24.0 | 4.17 .556 |
| 6. The application of the identified aspects of Management responsibility a-e has improved the performance of the SCM department. | 1.0 | | - | 5.0 | 70.0 | 24.0 | 4.15 .607 |

n = 224, SD=Strongly Agree, DK=Don't Know, A=Agree, SA= Strongly Agree, M=Mean, S. Dev=Standard Deviation

From Table 4.10, it can be concluded that a majority with 94% agreed that Management insists on the safe custody of all mandatory QMS documents and records with ($M = 4.17$, $SD = .556$). Similarly 94% agreed that the application of the identified aspects of Management responsibility a-e have improved the performance of the SCM department with ($M = 4.15$, $SD = .607$).

4.3.10 Descriptive Analysis of Resource Management Processes on Performance

To establish the effect of Resource Management Processes on the Performance of supply chain entities at GOK ministries headquarters, the study examined various parameters of the Resource Management Process among the respondents in the departments. The respondents indicated on their extent of agreement with Resource Management Processes parameters presented to them on a Likert Scale, where (1) presented Strongly disagree, (2) Disagree, (3) Don't Know (4) Agree and (5) Strongly Agree. The extent of Resource Management Processes was indicated by the percentages, mean and standard deviation. A mean between 3.4 and 5.0 was considered to be in the agreeing range. A high standard deviation was an indication of a higher variation with respect to that response. From Table 4.11 the key parameters explored on Resource Management Processes were skills inventory, asset register, quality of infrastructure, strategies of developing and retaining talent, regular maintenance and servicing of machines, adequacy of resources for maintaining the ISO QMS, software upgrades, Modern technology in the SCM processes, protection of assets, regular audits and any other aspects of Resource management processes that have improved Performance.

From the findings, 85% agreed that there is a Human Skills Inventory in place within the SCM Department with ($M = 3.96$, $SD = .638$). 88% agreed that there is an assets register that is kept in place within the SCM Department with ($M = 4.06$, $SD = .6$). 84% agreed that there is an updated employee training register in place within the SCM Department with ($M = 4.05$, $SD = .691$). 86% agreed that Management had provided quality infrastructure for the SCM Department with ($M = 4.07$, $SD = .788$). 87% agreed that the department and management had put in place strategies to develop and retain talent with

($M = 4.02$, $SD = .758$). 92% agreed that the machines in the department are regularly serviced and maintained with ($M = 4.11$, $SD = .566$). 88% agreed that Management has put in place adequate resources for the ISO QMS implementation in the department with ($M = 4.08$, $SD = .648$). 92% agreed that the software used in the computers used is regularly upgraded with ($M = 4.11$, $SD = .619$). 94% agreed that there is Modern technology in the SCM processes with ($M = 4.16$, $SD = .629$). 90% agreed that there is protection of assets from physical or and/or electronic attacks using passwords, firewalls and other security systems with ($M = 4.08$, $SD = .654$). 93% agreed that there are regular asset audits in the SCM department with ($M = 4.15$, $SD = .539$). 95% agreed that the adoption of the identified aspects of resource management processes a-j have improved the performance of the SCM department.

Table 4.11: Resource Management Processes Descriptive Statistics

| Parameters on Resource Management Processes | SD | D | DK | A | SA | M | S. Dev |
|---|------------|-----|------|------|------|------|--------|
| | Percentage | | | | | | |
| 1. There is a Human Skills Inventory in place within the SCM Department. | 1.0 | 1.0 | 13.0 | 71.0 | 14.0 | 3.96 | .638 |
| 2. An assets register is kept in place within the SCM Department. | - | 2.0 | 10.0 | 69.0 | 19.0 | 4.06 | .600 |
| 3. There is an updated employee training register in place within the SCM Department. | - | 3.0 | 13.0 | 60.0 | 24.0 | 4.05 | .691 |
| 4. Management has provided quality infrastructure for the SCM Department. | 1.0 | 4.0 | 9.0 | 60.0 | 26.0 | 4.07 | .758 |
| 5. The department and management have put in place strategies to develop and retain talent. | - | 4.0 | 9.0 | 66.0 | 21.0 | 4.02 | .708 |
| 6. The machines in the department are regularly serviced and maintained. | - | 1.0 | 7.0 | 71.0 | 21.0 | 4.11 | .566 |
| 7. Management has put in place adequate resources for the ISO QMS implementation in the department. | - | 3.0 | 9.0 | 66.0 | 22.0 | 4.08 | .648 |
| 8. The software used in the computers used is regularly upgraded. | - | 3.0 | 5.0 | 70.0 | 22.0 | 4.11 | .619 |
| 9. Modern technology in the SCM processes. | 1.0 | 1.0 | 4.0 | 69.0 | 25.0 | 4.16 | .629 |
| 10. There is protection of assets from physical or and/or electronic attacks using passwords, firewalls and other security systems. | 1.0 | 1.0 | 8.0 | 68.0 | 22.0 | 4.08 | .654 |
| 11. There are regular asset audits in the SCM department. | - | 1.0 | 5.0 | 71.0 | 22.0 | 4.15 | .539 |
| 12. The adoption of the identified aspects of resource management processes a-j has improved the performance of the SCM department. | - | - | 5.0 | 75.0 | 20.0 | 4.15 | .493 |

n=224, SD=Strongly Agree, DK=Don't Know, A=Agree, SA= Strongly Agree, M=Mean, SDev=Standard Deviation

From the discussion, it may be concluded that majority of respondents 95% agree that the various Resource Management Processes (RMP) have an effect on the performance of these SCM departments and have indeed led to improved performance. Majority also believe that the resource management parameters have a significant effect on performance.

4.3.11 Descriptive Analysis of Measurement, Analysis and Improvement Processes (MAIP) on Performance

To assess the effect of Measurement, Improvement and Analysis on the Performance of supply chain entities at GOK ministries headquarters, the study examined various parameters of the Measurement, Analysis and Improvement among the respondents in the departments.

The respondents indicated on their extent of agreement with Measurement, Improvement and Analysis Processes parameters presented to them on a Likert Scale, where (1) presented Strongly disagree, (2) Disagree, (3) Don't Know (4) Agree and (5) Strongly Agree.

The extent of Measurement, Improvement and Analysis Processes was indicated by the percentages, mean and standard deviation. A mean between 3.4 and 5.0 was considered to be in the agreeing range. A high standard deviation was an indication of a higher variation with respect to that response.

From Table 4.12 the key parameters explored on Measurement, Analysis and Improvement Processes were the presence of a customer feedback mechanism, adherence to the service charter, availability of product requirement specifications, use of quality materials in all SCM processes, corrective action record being kept, carrying out of customer satisfaction surveys, formalization of continuous improvement program, ways of measuring improvement, customer order records, reduction in waste after certification and adoption of product measurement, improvement and analysis. From

Table 4.12, 91% agreed that the Department and management had put customer feedback mechanisms and records in place with ($M = 4.04$, $SD = .463$). 93% agreed that the Department adhered to its service charter in provision of timely services with ($M = 4.08$, $SD = .526$). 91% agreed that the Department and every Department in the organization had put in place its product requirement specifications and records with ($M = 4.15$, $SD = .624$). 93% agreed that Quality materials are used in the SCM processes with ($M = 4.13$, $SD = .573$). 93% agreed that there is corrective action record kept in the Department with ($M = 4.13$, $SD = .565$). 90% agreed that the Department has carried out customer satisfaction surveys with ($M = 4.10$, $SD = .658$). 92% agreed that the SCM Department has formalized continuous improvement program with ($M = 4.10$, $SD = .568$). 95% agreed that there is a systematic way of measuring improvement in the Department with ($M = 4.10$, $SD = 4.67$). 98% agreed that the Department keeps in place customer order records with ($M = 4.17$, $SD = .432$). 95% agreed that after certification, the Department has realized a significant reduction in waste with ($M = 4.13$, $SD = .536$). 96% agreed that the adoption of identified aspects of product measurement, analysis and improvement a-j improved the performance of the SCM Department with ($M = 4.16$, $SD = .481$).

Table 4.12: Measurement, Analysis and Improvements Descriptive Statistics

| Parameters on Measurement, Analysis and Improvement | S.D | D | DK | A | S.A | M | S. Dev. |
|---|------------|-----|-----|------|------|------|---------|
| | Percentage | | | | | | |
| 1. The Department and management have put customer feedback mechanisms and records in place. | - | - | 9.0 | 79.0 | 12.0 | 4.04 | .463 |
| 2. The Department adheres to its service charter in provision of timely services. | - | 1.0 | 6.0 | 76.0 | 17.0 | 4.08 | .526 |
| 3. The Department and every Department in the organization has put in place its product requirement specifications and records. | - | - | 9.0 | 65.0 | 26.0 | 4.15 | .624 |
| 4. Quality materials are used in the SCM processes | - | 2.0 | 5.0 | 71.0 | 22.0 | 4.13 | .573 |
| 5. There is corrective action record kept in the Department | - | 1.0 | 6.0 | 71.0 | 22.0 | 4.13 | .565 |
| 6. The Department has carried out customer satisfaction surveys | 1.0 | 1.0 | 8.0 | 67.0 | 23.0 | 4.10 | .658 |
| 7. The SCM Department has formalized continuous improvement program | 1.0 | 1.0 | 6.0 | 73.0 | 19.0 | 4.10 | .568 |
| 8. There is systematic way of measuring improvement in the Department | - | - | 5.0 | 79.0 | 16.0 | 4.10 | .467 |
| 9. The Department keeps in place customer order records | - | - | 2.0 | 79.0 | 19.0 | 4.17 | .432 |
| 10. After certification, the Department has realized a significant reduction in waste | - | - | 5.0 | 75.0 | 20.0 | 4.13 | .536 |
| 11. The adoption of identified aspects of product measurement, analysis and improvement a-j have improved the performance of the SCM Department | - | - | 4.0 | 76.0 | 20.0 | 4.16 | .481 |

n=224, SD=Strongly Agree, DK=Don't Know, A=Agree, SA= Strongly Agree, M=Mean, SDev=Standard Deviation

From the analysis, it can therefore be concluded that majority of the respondents, (96%) believe that the MAIP processes have improved the performance of these SCM departments and that all the parameters have significantly contributed to this performance.

Customer Satisfaction levels

On the customer satisfaction levels before certification, it was realized that the score ranges with the highest frequency were falling between 31-40 with a 40%, while the over 71 had the lowest frequency of seven percent, the least being over 90 which had a frequency of two percent as shown in Table 4.13. This suggests that customer satisfaction levels before certification had a fairly low mean.

Table 4.13: Departmental Customer Satisfaction Level Scores Before Certification

| Scores | Percentage |
|---------|------------|
| 10-30 | 18.0 |
| 31-50 | 40.0 |
| 51-70 | 33.0 |
| 71-90 | 7.0 |
| Over 90 | 2.0 |
| N | 100.0 |

n=224

On customer satisfaction levels after certification, the study established that the score with the highest frequency of 46% was found within the 71-90 band, an indicator that the departments registered a significant improvement in customer satisfaction levels after ISO certification. The range of 51-70 registered the lowest frequency with a 26%, while the over 90 range also scored a low of 28% as shown in Table 4.14.

Table 4.14: Departmental/Organizational Customer Satisfaction Level Scores After Certification

| Scores | Percentage |
|---------------|-------------------|
| 51-70 | 26.0 |
| 71-90 | 46.0 |
| Over 90 | 28.0 |
| N | 100.0 |

Savings

On savings before certification, it was established that the highest percentage of respondents 46% gave the level as falling between 51-70 range whereas those who felt that it was over 90% were two percent, suggesting that before certification, the savings level was very low, that is below 50% as shown in Table 4.15.

Table 4.15: Savings before Certification

| Scores | Percentage |
|---------------|-------------------|
| 10-30 | 26.0 |
| 31-50 | 26.0 |
| 51-70 | 46.0 |
| Over 90 | 2.0 |
| N | 100.0 |

n=224

On savings after ISO certification, most respondents felt that the level of savings by the SCM department in the Ministries rose to the 71-90 range with 46% of them alluding to that fact. Similarly a good proportion of the respondents, 31% indicated that savings levels rose above 90% after certification. A small percentage of 13% and 10% felt that the savings level after certification was between 31-50 and 51-70 ranges respectively as shown in Table 4.16.

Table 4.16: Savings after certification

| Scores | Percentage |
|---------------|-------------------|
| 31-50 | 13.0 |
| 51-70 | 10.0 |
| 71-90 | 46.0 |
| Over 90 | 31.0 |
| N | 100.0 |

n=224

4.3.12 Descriptive Analysis of Product Realization Processes (PRP) on the Performance

To evaluate the effect of Product Realization Processes on the Performance of supply chain entities at GOK ministries headquarters, the study examined various parameters of the Product Realization Processes among the respondents in the departments. The respondents indicated on their extent of agreement with Product Realization Processes parameters presented to them on a Likert Scale.

The extent of Product Realization Processes was indicated by the percentages, mean and standard deviation. A mean between 3.4 and 5.0 was considered to be in the agreeing range. A high standard deviation was an indication of a higher variation with respect to that response.

From Table 4.17 the key parameters explored on Product Realization Processes were product information records, availability of purchasing records, inspection plans, supplies quality plans, supplier premises details, goods verification and the application of the identified aspects of product realization processes having improved the performance of the SCM Department.

From Table 4.17 97% agreed that the Department keeps product information records with ($M = 4.11$, $SD = .461$). 96% agreed that there are purchasing records of all Departments in the SCM Department with ($M = 4.14$, $SD = .461$). 94% agreed that the Department keeps inspection plans and records for all goods received with ($M = 4.18$, $SD = .522$). 94% agreed that the Department keeps supplier quality plans for all goods with ($M = 4.14$, $SD = .530$). 98% agreed that the Department keeps all details of supplier premises with ($M = 4.20$, $SD = .501$). 97% agreed that the Department verifies all goods received and keeps records with ($M = 4.21$, $SD = .500$). 98% agreed that the application of the identified aspects of product realization a-g have improved the performance of the SCM department with ($M = 4.20$, $SD = .470$).

Table 4.17: Product Realization Processes (PRP) Descriptive Statistics

| Parameters on Product Realization Processes | SD | D | DK | A | SA | M | S. Dev |
|---|------------|-----|-----|------|------|------|--------|
| | Percentage | | | | | | |
| 1. The Department keeps product information records | - | - | 3.0 | 81.0 | 16.0 | 4.11 | .461 |
| 2. There are purchasing records of all Departments in the SCM Department | - | - | 4.0 | 77.0 | 19.0 | 4.14 | .461 |
| 3. The Department keeps inspection plans and records for all goods received | - | - | 6.0 | 70.0 | 24.0 | 4.18 | .522 |
| 4. The Department keeps supplier quality plans for all goods | - | 1.0 | 5.0 | 73.0 | 21.0 | 4.14 | .530 |
| 5. The Department keeps all details of supplier premises | - | - | 2.0 | 75.0 | 23.0 | 4.20 | .501 |
| 6. The Department verifies all goods received and keeps records | - | - | 3.0 | 72.0 | 25.0 | 4.21 | .500 |
| 7. The application of the identified aspects of product realization a-g have improved the performance of the SCM department | - | - | 2.0 | 75.0 | 23.0 | 4.20 | .470 |

n=224, SD=Strongly Agree, DK=Don't Know, A=Agree, SA= Strongly Agree, M=Mean, SDev=Standard Deviation

From the analysis it can be concluded that majority of the respondents 98% believe that the product realization processes (PRP) through the identified parameters have a significant effect on performance.

4.3.13 Descriptive Analysis of Government Regulations and Policies (GRP) and Performance

The study used various parameters of Government Procurement Regulations and Policies among the respondents used in the study. The respondents indicated on their extent of agreement with Government Procurement Regulations and Policies parameters presented to them on a Likert Scale, where (1) presented Strongly disagree, (2) Disagree, (3) Don't Know (4) Agree and (5) Strongly Agree. The extent of Government Procurement Regulations and Policies was indicated by the percentages, mean and standard deviation. A mean between 3.4 and 5.0 was considered to be in the agreeing range. A high standard deviation was an indication of a higher variation with respect to that response.

From Table 4.18 the key parameters explored on Government Procurement Regulations and Policies (GPRP) were that the SCM department keeps all relevant government procurement regulations and policies, that these policies are complied with, that these policies have enhanced the adoption of ISO within the department and that the adoption of the identified aspects of government policies and regulations have improved performance of the SCM Department. 93% agreed that the SCM Department keeps all relevant government procurement regulations and policies with ($M = 4.10$, $SD = .568$). 96% agreed that the Government Procurement Regulations and policies are complied with, with ($M = 4.15$, $SD = .577$). 95% agreed that the Government Procurement Policies and Regulations have enhanced the adoption of ISO within the Department with ($M = 4.18$, $SD = .548$). 98% agreed that the adoption of the identified aspects of Government Policies and Regulations a-j have improved the performance of the SCM department with ($M = 4.16$, $SD = .542$).

Table 4.18: Government Procurement Regulations and Policies (GPRP) Descriptive Statistics

| Parameters on Government Procurement Regulations and Policies | SD | D | DK | A | SA | M | SDev |
|--|------------|-----|-----|------|------|------|------|
| | Percentage | | | | | | |
| 1. The SCM Department keeps all relevant government procurement regulations and policies | - | 2.0 | 5.0 | 74.0 | 19.0 | 4.10 | .568 |
| 2. The Government Procurement Regulations and policies are complied with | - | 2.0 | 2.0 | 74.0 | 22.0 | 4.15 | .577 |
| 3. The Government Procurement Policies and Regulations have enhanced the adoption of ISO within the Department | - | - | 5.0 | 71.0 | 24.0 | 4.18 | .548 |
| 4. The adoption of the identified aspects of Government Policies and Regulations a-j have improved the performance of the SCM department | - | 1.0 | 1.0 | 76.0 | 22.0 | 4.16 | .542 |

n=224, SD=Strongly Agree, DK=Don't Know, A=Agree, SA= Strongly Agree, M=Mean, SDev=Standard Deviation

From this analysis, it can be concluded that a majority 98% of respondents believe that the government procurement regulations and policies (GPRP) and policies have a significant influence on performance. This is based on the parameters provided for this evaluation.

4.3.14 Reliability Testing and Analysis

The researcher carried out the reliability testing prior to the final data analysis. Reliability is the degree to which a test of consistency measures whatever it measures. Various estimates of reliability are used but the Cronbach's Alpha is the most frequently used reliability coefficient. It estimates test score reliability from a single test administration using information from the relationship among the test items. It is a measure of squared correlation between observed scores and true scores (Ali, 2017). Nachmias and Nachmias (2006) say that a Cronbach coefficient alpha value of 0.7 means an instrument is sufficiently reliable. After testing the study observed that all the variables were able to meet the minimum Cronbach's alpha value of 0.7, an indication that they were fully reliable. Management responsibility Processes had a reliability coefficient of 0.811 from 6 items, while Resource Management Processes had a reliability coefficient of 0.827 from 12 items and Measurement, Analysis/Improvement Processes and Government Procurement Regulations and Policies both observed Cronbach's coefficients of 0.86 with 11 items and 4 items respectively. Product Realization Processes had a coefficient of .864 with 7 items.

The five variables therefore realized reliability coefficients greater than 0.700 (0.811, 0.827, 0.860, .864 and 0.860), an indication that the factors had high consistency and ability to measure the views of the respondents and could be generalized to reflect opinions of all respondents in the target population. According to Nunnally et al. (1994), a coefficient of reliability of 0.7 is acceptable. In this case all the coefficients are greater than 0.7. The items that met the threshold based on Cronbach's alpha were aggregated by taking their averages. Table 4.19 is a summary of the study variables descriptive.

Table 4.19: Reliability Coefficients of the Independent Variables

| Variable | Number of Items | Cronbach's α | Remarks |
|---|-----------------|---------------------|-----------|
| Management responsibility Processes (X ₁) | 6 | .811 | Very Good |
| Resource Management Processes (X ₂) | 12 | .827 | Very Good |
| Measurement, Analysis and Improvement (X ₃) | 11 | .860 | Very Good |
| Product Realization Processes (X ₄) | 7 | .864 | Very Good |
| Government Procurement Regulations and Policies (X _M) | 4 | .860 | Very Good |

n = 224

4.3.15 Aggregation of the Independent variables

After the reliability testing and confirmation of acceptability, the items corresponding to each variable were aggregated by taking the average that is the mean and Standard Deviation. This was on the basis that the interpretation of the regression coefficients could be improved by centering the continuous independent variables. Centering is obtained by subtracting the mean from each of the study variables. Hence, a centred score is a deviation score Cohen and Aiken (2003) recommended that continuous independent variables be centred before interaction terms are computed. From Table 4.20 it was found that Management Responsibility Processes had the lowest rating with ($M = 4.04$, $SD = .467$). Resource Management Processes had ($M = 4.08$, $SD = .371$), while Measurement Analysis and Improvement Processes had ($M = 4.12$, $SD = .348$). Product Realization Processes had the highest rating and lowest deviation with ($M = 4.17$, $SD = .366$). Government Procurement Regulations and Policies had the second highest rating with ($M = 4.15$, $SD = .469$). The findings are presented in Table 4.20. These findings indicate that the independent variable of MRP having the lowest rating was the worst predictor followed by RMP, then MAIP, while PRP had the highest rating hence being the best predictor of the regression coefficients followed by GPRP.

Table 4.20: Aggregation of the Study Variables

| Variable | N | Mean | Standard Deviation |
|--|----------|-------------|-------------------------------|
| Management responsibility Processes (X_1) | 224 | 4.04 | .467 |
| Resource Management Processes (X_2) | 224 | 4.08 | .371 |
| Measurement, Analysis and Improvement (X_3) | 224 | 4.12 | .348 |
| Product Realization Processes (X_4) | 224 | 4.17 | .366 |
| Government Procurement Regulations and Policies (X_M) | 224 | 4.15 | .469 |

n=224

4.4 Inferential Statistical Analysis

In order to establish the effect of Management responsibility Processes, Resource Management Processes, Measurement Improvement and Analysis Processes, Product Realization Processes and Government Procurement Regulations and Policies on Performance Simple linear regression analysis was utilized after the assumptions required for carrying out the regression were met. To test the hypotheses on whether to Reject or Fail to Reject the Null hypothesis, inferential statistics was applied at the 5% level of significance. The Null hypothesis was rejected when *p-value* was < 0.05. SCM Performance in the departments was aggregated as both financial and non-financial measures of performance.

4.4.1 Analysis of Regression Assumptions

The assumptions of regression identified as being of a primary concern in this study were linearity, multicollinearity, homoscedasticity and normality. According to (Santos-Caballero, 2018) linear regression needs the relationship between the independent and

dependent variables to be linear. It is also important to check for outliers since linear regression is sensitive to outlier effects. The linearity assumption can best be tested with scatter plots, the following two examples depict two cases, where no and little linearity is present. Secondly, the linear regression analysis requires all variables to be multivariate normal. This assumption can best be checked with a histogram or a Q-Q-Plot. Normality can be checked with a goodness of fit test, for example, the Kolmogorov-Smirnov test (Santos-Caballero, 2018). When the data is not normally distributed a non-linear transformation for example, log-transformation might fix this issue. Thirdly, linear regression assumes that there is little or no multicollinearity in the data. Multicollinearity occurs when the independent variables are too highly correlated with each other.

4.4.2 Test for Linearity

Linearity defines the dependent variable as a linear function of the independent variables (Darlington, 1968). Multiple Regression can accurately estimate the relationship between the dependent and the independent variables when the relationship is linear in nature (Osborne & Waters, 2002). If linearity is violated, all the estimates of the regression, the regression coefficients, standard errors and tests of statistical significance may be biased (Keith, 2006).

From Figure 4.3 there is no systematic pattern or clustering of the residuals, hence an indication that the Linearity test is not being violated, hence the dependent variable Performance is a linear function of the independent variables, Management responsibility Processes, Resource Management Processes, Measurement, Analysis/Improvement Processes, Product Realization Processes and Government Procurement Regulations and Policies.

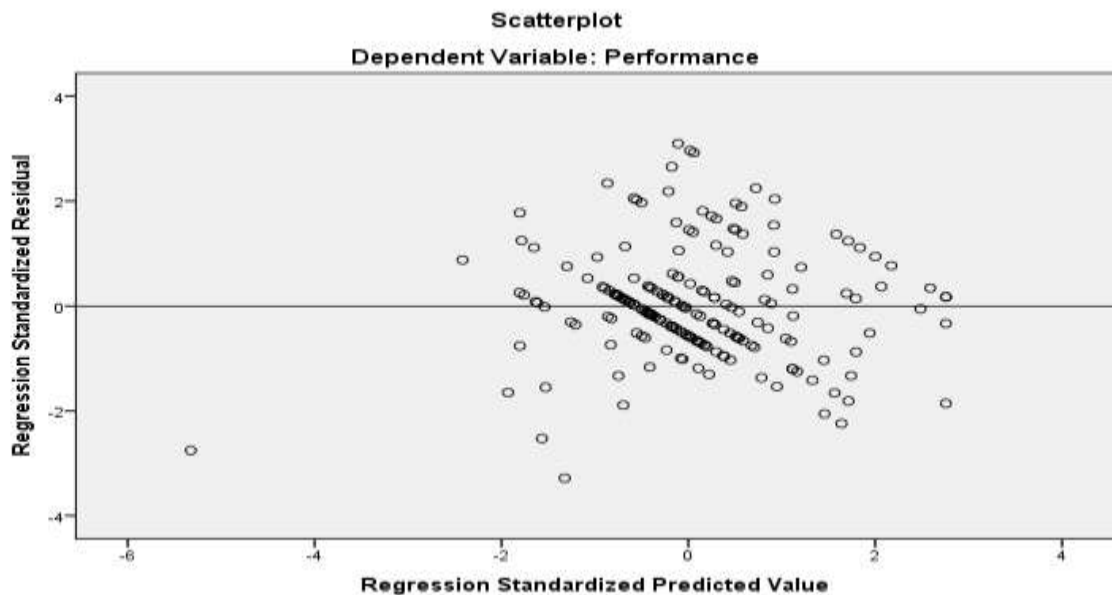


Figure 4.3: Scatter Plot of Standardized Predicted Value against Standardized Residual.

4.4.3 Test for Multicollinearity

Multicollinearity, also referred to as collinearity refers to the assumption that the independent variables are uncorrelated (Darlington, 1968; Keith, 2006).

A test for multicollinearity was carried out on the five variables by running the collinearity statistics. Multicollinearity occurs when several independent variables correlate at high levels with one another, or when one independent variable is a linear combination of other independent variables (Keith, 2006). Pearson's Product Moment Coefficient was used for the correlation analysis; the (r) was used to determine the linear relationship between the variables of interest to the study, the r^2 , the coefficient of determination was equally meant to identify the goodness of fit. The correlation coefficient (r) yields a statistic that varies in ranges between -1 to 1 according to Mugenda (2003). A zero value of (r) indicates that there is no association between the two variables. When $r = (+) 1$, it indicates a perfect positive correlation and when it is $(-) 1$, it indicates a perfect negative correlation (Kothari, 2004). From Table 4.21 the

correlations between the independent variables were less than 0.8 hence appropriate for regression analysis.

Table 4.21: Pearson’s Correlation Matrix of the Independent Study Variables (N = 224)

| Variable | Y | X₁ | X₂ | X₃ | X₄ | X_M |
|---|----------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 1. Performance (Y) | 1 | | | | | |
| 2. Management responsibility Processes (X₁) | .430** | 1 | | | | |
| 3. Resource Management Processes (X₂) | .417** | .527 | 1 | | | |
| 4. Measurement, Analysis & Improvement Processes (X₃) | .563** | .495 | .588 | 1 | | |
| 5. Product Realization Processes (X₄) | .563** | .342 | .482 | .583 | 1 | |
| 6. Government Procurement Regulations and Policies (X_M) | .564** | .267 | .417 | .346 | .482 | 1 |

**p< 0.01

n=224

To further test for multicollinearity and see if the data satisfied the assumption of multicollinearity, the values of the Tolerance and Variance Inflation Factor were obtained for each of the independent variables. Tolerance of less than 0.2 is a violation (Menard, 1995) and VIF was found to be within the recommended range of 1-3 (Bryman, 2012). From Table 4.22, (Management Responsibility Processes, Tolerance = 0.67, VIF = 1.493; Resource Management Processes, Tolerance = 0.535, VIF= 1.870; Measurement, Analysis and Improvement Processes, Tolerance = 0.506, Tolerance = 1.978; Product Realization Processes, Tolerance = 0.563, VIF= 1.776; Government Procurement Regulations and Policies, Tolerance = 0.723, VIF = 1.384), thus ruling out the problem of multicollinearity among the five study variables.

Table 4.22: Autocollinearity Statistics of the Independent Variables

| Variable | Collinearity Statistics | |
|---|-------------------------|-------|
| | Tolerance | VIF |
| (Constant) | - | - |
| Management responsibility Processes (X ₁) | .670 | 1.493 |
| Resource Management Processes (X ₂) | .535 | 1.870 |
| Measurement, Analysis & Improvement Processes (X ₃) | .506 | 1.978 |
| Product Realization Processes (X ₄) | .563 | 1.776 |
| Government Procurement Regulations and Policies (X _M) | .723 | 1.384 |

Note. Dependent variable: Performance (Y). n = 224

4.4.4 Test for Homoscedasticity

The assumption of homoscedasticity refers to equal variance of errors across all levels of the independent variables (Osborne & Waters, 2002). This assumption means that the variance around the regression line is the same for all values of the predictor variable. Homoscedasticity can be checked by the visual examination of a plot of the standardized residuals by the regression standardized predicted values. From Figure 4.3 the residuals are randomly scattered around zero (the horizontal line) providing an even distribution hence no violation of this assumption.

4.4.5 Test for Normality

Multiple regression assumes that the variables have normal distributions (Osborne & Waters, 2002). This means that errors are normally distributed, and that the plot of the values of the residuals will approximate the normal curve (Keith, 2006). From Figure 4.4 the assumption was met as the errors followed a normal distribution.

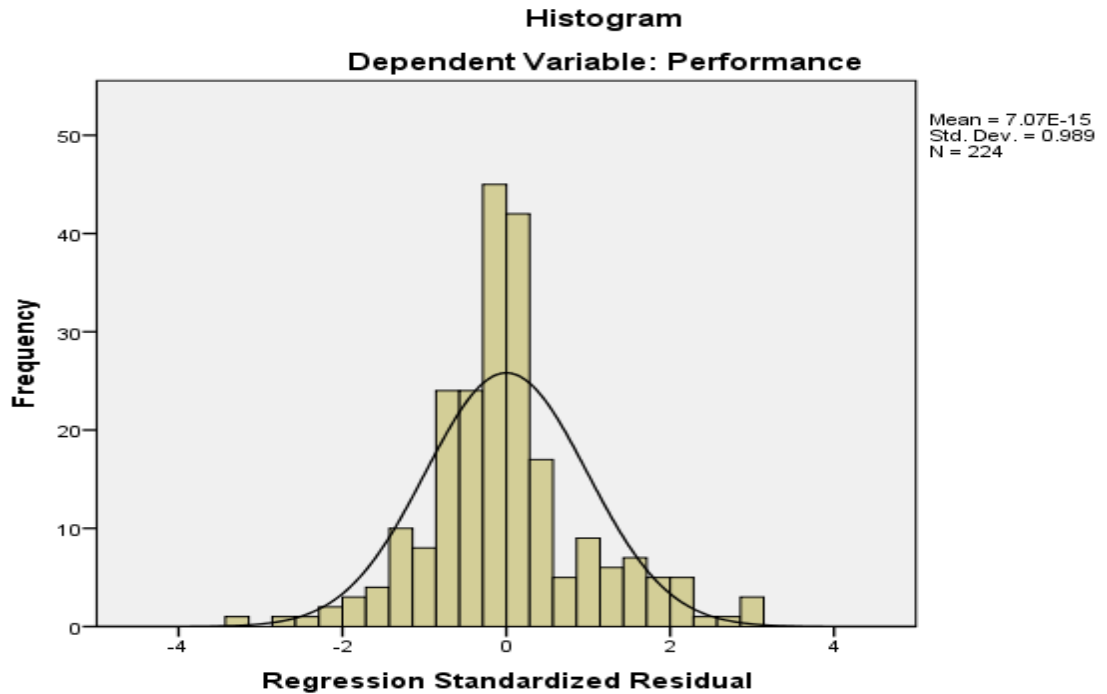


Figure 4.4: Histogram of standardized residual plot with normal curve.

4.5 Regression Analysis of the Study Variables

The study employed simple linear regression analysis and hierarchical multiple regression analysis in order to establish the linear statistical relationship between the independent variables, moderating variable and the dependent variable. The five null hypotheses of the study were initially tested using simple linear regression models. The coefficient of determination (r^2) was used to provide the models goodness of fit. The Analysis of Variance (ANOVA) was used to provide the models overall significance in the prediction of the dependent variable. The values of the regression coefficients were used to represent the change in the dependent variable, resulting from a unit change in the independent variable and also whether had a statistically significant effect on the ability to predict. Students-t test was used to determine whether the regression coefficients were different from zero at the 5% level of significance and larger relative to its standard error.

In hierarchical multiple regression analysis, the independent variables were entered in two stages. In the first stage, the independent variables that were controlled were entered into the regression. In the second stage, the independent variables whose relationship the researcher wanted to examine after the controls had been entered. A statistical test of the change in R^2 from the first stage was used to evaluate the importance of the independent variables that were entered in the second stage.

4.6 Management Responsibility Processes (MRP) on Performance

This section focused on the study Objective One (1) which was to assess the effect of ISO 9001:2008 Management Responsibility Processes on the Performance of the Supply Chain Management Departments. A simple linear regression model $Y = \beta_0 + \beta_1 X_1 + \varepsilon$ was used to assess the relationship between Management responsibility Processes (X_1) (independent variable) and Performance (Y) (dependent variable) of supply chain entities at GOK ministries headquarters (dependent variable). This provided the output of the model summary, ANOVA and the regression coefficients (regressors).

4.6.1 Inferential Statistics of Management responsibility Processes (MRP) on Performance

Hypothesis One

H_{01} : *The Supply Chain Management Responsibility Processes has no significant effect on the Performance of the Departments.*

From Table 4.23 (A) the correlation between Performance (Y) and Management Responsibility Processes (X_1) was statistically significant $r(224) = 0.430, p < 0.001$.

The study found that there was a moderate positive correlation between Management Responsibility Processes and Performance among the departments. Therefore, the null hypothesis ($H_{01}: \beta_1=0$) that “*The Supply Chain Management Responsibility Processes has no significant effect on the Performance of the Departments*” is rejected.

Table 4.23: Model Summary of Management Responsibility Processes

| (A): The Model Summary^b of Management Responsibility Processes ($N = 224$) | | | | | | | | | |
|---|--------------------|----------|-------------------|--------------------------------|-----------------|----------|-----|-----|---------------|
| Model | R | R Square | Adjusted R Square | Standard Error of the Estimate | R Square Change | F Change | df1 | df2 | Sig. F Change |
| 1 | 0.430 ^a | 0.185 | 0.182 | 0.361 | 0.185 | 50.463 | 1 | 222 | 0.000 |

a. Predictors: (Constant), Management Responsibility Processes (X_1)

From Table 4.23 (B) the simple linear regression of Performance (Y) on Management Responsibility Processes (X_1) the results show that the model was found to be statistically significant ($F(1,222) = 50.463, p < 0.001$) in predicting Performance (Y) with a goodness of fit of 18.2% (Adjusted R Square = .182) as shown in Table 4.23 (A). This shows that the coefficient of determination of 18.2% was the variation in Performance (Y) that was accounted for and explained by the dimension of Management Responsibility Processes (X_1) in International Organization for Standardization 9001:2008 Processes.

(B): ANOVA^a for Management Responsibility Processes and Performance ($N = 224$)

| Model | Sum of Squares | Df | Mean Square | F | Sig. (p value) | |
|--------------|-----------------------|-----------|--------------------|----------|-----------------------|--------------------|
| 1 | Regression | 6.594 | 1 | 6.594 | 50.463 | 0.000 ^b |
| | Residual | 29.008 | 222 | 0.131 | | |
| | Total | 35.602 | 223 | | | |

a. Dependent Variable: Performance (Y)
b. Predictors: (Constant), Management Responsibility Processes (X₁)

From Table 4.23 (C) the findings showed that Management Responsibility Processes (X₁) had an effect on the Performance (Y) of supply chain entities at GOK Ministries in Kenya, since the observation was found to be statistically significant ($\beta_1 = 0.369$, $t = 7.104$, $p < 0.001$).

From Table 4.23 (C) the beta coefficient (β_1) for Management Responsibility Processes was found to be statistically significant ($\beta_1 = 0.369$, $t = 7.104$, $p < 0.001$), which implies that one unit increase in dimension of Management Responsibility Processes (X₁) in International Organization for Standardization 9001:2008 Processes increases Performance (Y) by an index of 0.369 units. The fitted simple linear regression model of this relationship is:

$$Y = 2.672 + 0.369X_1$$

Where Y is the Performance of supply chain entities at GOK Ministries and X₁ is Management Responsibility Processes.

(C) Coefficients^a of Management Responsibility Processes (N = 224)

| Model | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. (<i>p</i> value) | Collinearity Statistics | |
|---|-----------------------------|----------------|---------------------------|--------|---------------------------|-------------------------|-------|
| | B | Standard Error | Beta | | | Tolerance | VIF |
| (Constant) | 2.672 | 0.211 | | 12.671 | 0.000 | - | - |
| 1 Management Responsibility Processes (X ₁) | 0.369 | 0.052 | 0.430 | 7.104 | 0.000 | 1.000 | 1.000 |

a. Dependent Variable: Performance (Y)

4.6.2 Discussion of Findings of Management Responsibility Processes (MRP) on Performance

This section discusses the research findings based on the study Objective One (1) that focused on assessing the effect of Management responsibility Processes on the Performance of supply chain entities at GOK Ministries. The Pearson's Correlation Coefficient for Management responsibility Processes and Performance was positive, moderate and statistically significant $r(224) = 0.430, p < 0.001$. From the simple linear regression analysis one unit increase in dimension of Management responsibility Processes (X₁) in International Organization for Standardization 9001:2008 Processes increases Performance (Y) by and index of .369 units.

The inferential statistics showed that Management responsibility Processes had an effect on the Performance of supply chain entities at GOK Ministries in Kenya, as the relationship was observed to be statistically significant ($p < 0.001; t = 7.104$). The statistics showed that when Performance (Y) was regressed on Management responsibility Processes the model was found to be statistically significant ($F(1,222) = 50.463, p < 0.001$) as shown in Table 4.23 (B) with a goodness of fit of 18.2% (Adjusted R Square = 0.182) as shown in Table 4.23 (A). Hence the dimension of Management

responsibility Processes (X_1) has a positive effect on the Performance of Supply Chain entities at GOK Ministries in Kenya.

The management attitude was confirmed to be positive towards ISO implementation as evidenced by the findings with a significant percentage agreeing that management meetings were being conducted to support ISO, while many felt that the leadership style in place supported ISO implementation. Majority of those interviewed also confirmed that the organization structure in place was equally supportive of ISO processes and hence had a significant effect on performance. Managerial support towards the implementation of ISO was also evidenced by acquisition of technology that promotes the realization of standards as noted to being in place in most of the Ministries contacted and hence this has a bearing on the performance of the SCM Departments. Management also provided safe custody of ISO documentation is also emphasized in these departments on the basis of the majority opinion in this research and this is considered an attribute of management support for ISO. The descriptive analysis established that ISO

Management Review meetings were being held with ($M = 3.64$, $SD = .792$) and that there was in place a management style and organizational structure that supported the implementation of the ISO QMS. In addition, the management had provided modern technology to aid the SCM departmental activities and the insistence of safe keeping of records.

These findings are corroborated by similar studies by Ogbonna and Harris (2011) in their study on Leadership style, organizational culture and performance with empirical evidence from UK companies. They established that the leadership style and organization culture of the companies researched on in the United Kingdom had a significant influence on the performance of these companies though at varying levels. They felt that managers need to possess strong leadership qualities that blend with the organization culture for greater industrial performance. A similar study by (Haakonsson, Burton, Obel, & Laurisdane, 2008) found out that misalignments between work

environment and leadership style are problematic to organizational performance. They provided empirical evidence which showed that the three had a significant effect on each other and when the work environment and leadership experience a mismatch, then there's need to change one of the two.

4.7 Resource Management Processes (RMP) on Performance

This section was embroiled on Objective Two which was to establish the effect of Supply Chain Resource Management Processes on the Performance of the departments of GOK Ministries' Headquarters. A simple linear regression model $Y = \beta_0 + \beta_2 X_2 + \varepsilon$ was used to assess the relationship between Resource Management Processes (X_2) (independent variable) and Performance (Y) of supply chain entities at GOK ministries headquarters (dependent variable). This provided the output of the Model Summary, ANOVA and the Regression Coefficients.

4.7.1 Inferential Statistics of Resource Management Processes on Performance

Hypothesis Two

H₀₂: *The Supply Chain Resource Management Processes has no significant effect on the Performance of the Departments.*

From Table 4.24 (A) the correlation between Performance (Y) and Resource Management Processes (X_2) was statistically significant $r(224) = 0.417, p < 0.001$. The study found that there was a moderate positive correlation between Resource Management Processes and Performance among the departments.

Table 4.24: Model Summary of Resource Management Processes

| (A) The Model Summary^b of Resource Management Processes (N = 224) | | | | | | | | | |
|---|--------------------|-----------------|--------------------------|---------------------------------------|------------------------|--------------------------|------------|-----|----------------------|
| Model | R | R Square | Adjusted R Square | Standard Error of the Estimate | R Square Change | Change Statistics | | | Sig. F Change |
| | | | | | F | df1 | df2 | | |
| 1 | 0.417 ^a | 0.174 | 0.170 | 0.364 | 0.174 | 46.683 | 1 | 222 | 0.000 |

a=Predictors: (Constant), Resource Management Processes (X₂)

From Table 4.24 (B) the simple linear regression of Performance (Y) on Resource Management Processes (X₂) the equation was found to be statistically significant ($F(1,222) = 46.683, p < 0.001$) in predicting Performance (Y) with a goodness of fit of 17.0% (Adjusted R Square = 0.170) as shown in Table 4.24 (A). This shows that the coefficient of determination of 17.0% was the variation in Performance (Y) that was accounted for and explained by the dimension of Resource Management Processes (X₂) in International Organization for Standardization 9001:2008 Processes.

(B) ANOVA^a for Resource Management Processes and Performance (N = 224)

| Model | | Sum of Squares | Df | Mean Square | F | Sig.(p-value) |
|--------------|------------|-----------------------|-----------|--------------------|----------|----------------------|
| 1 | Regression | 6.186 | 1 | 6.186 | 46.683 | 0.000 ^b |
| | Residual | 29.416 | 222 | 0.133 | | |
| | Total | 35.602 | 223 | | | |

b= Dependent Variable: Performance (Y)
b= Predictors: (Constant), Resource Management Processes (X₂)

From Table 4.24 (C) the findings showed that Resource Management Processes (X₂) had an effect on the Performance (Y) of supply chain entities at GOK Ministries in Kenya, since the observation was found to be statistically significant ($\beta_2 = 0.449, t = 6.833; p < 0.001$).

Therefore, the null hypothesis ($H_{02}: \beta_2=0$) that “*The Supply Chain Resource Management Processes has no significant effect on the Performance of the Departments*” is **REJECTED**.

From Table 4.24 (C) the beta coefficient (β_2) for Resource Management Processes was found to be statistically significant ($\beta_2 = 0.449, t = 6.833; p < 0.001$), which implies that one unit increase in dimension of Resource Management Processes (X_2) in International Organization For Standardization 9001:2008 Processes increases Performance (Y) by and index of 0.449 units. The fitted simple linear regression model of this relationship is:

$$Y = 2.33 + .449X_2$$

Where Y is the Performance of supply chain entities at GOK Ministries and X_2 is Resource Management Processes.

(C) Coefficients^a of Resource Management Processes ($N = 224$)

| Model | Unstandardized Coefficients | | Standardized Coefficients Beta | T | Sig. | Collinearity Statistics | |
|---------------------------------------|-----------------------------|----------------|--------------------------------|-------|-------|-------------------------|-------|
| | B | Standard Error | | | | Tolerance | VIF |
| (Constant) | 2.330 | 0.269 | | 8.657 | 0.000 | - | - |
| Resource Management Process (X_2) | 0.449 | 0.066 | 0.417 | 6.833 | 0.000 | 1.000 | 1.000 |

a=Dependent Variable: Performance (Y)

4.7.2 Discussion of Findings of Resource Management Processes on Performance

This section discusses the research findings based on the study Objective Two (2) that focused on establishing the effect of ISO 9001:2008 Resource Management Processes on Performance in the Supply Chain Management Departments of GOK Ministries’ Headquarters. The Pearson’s Correlation Coefficient for Resource Management

Processes and Performance was positive, moderate and statistically significant $r(224) = .417, p < 0.001$. From the simple linear regression analysis one unit increase in dimension of Resource Management Processes (X_2) in International Organization for Standardization 9001:2008 Processes increases Performance (Y) by an index of .449 units. The inferential statistics showed that when Resource Management Processes was regressed on Performance the model was found to be statistically significant ($F(1,222) = 46.683, p < 0.001$) as shown in Table 4.24 with a goodness of fit of 17.0% (Adjusted R Square = .17) as shown in Table 4.24. Hence the dimension of Resource Management Processes (X_2) has a positive effect on the Performance of Supply Chain entities at GOK Ministries in Kenya.

The descriptive analysis suggests that the Resource Management processes support ISO implementation. This was attested by resource availability which was confirmed by the departments maintaining a human skills inventory, an assets register, regular asset audits and quality infrastructure. The technology in use was also established to be supportive of the ISO quality management system and this was confirmed through regular servicing of machines in the department, regular updating of the software in use, modern technology being embraced and protection of the assets from physical and/electronic attacks. There is also evidence of the human resource development which was established through a human skills inventory being in place, an updated employee training register and strategies to develop and retain talent. These human resource development aspects were seen to be supporting the ISO implementation in the SCM departments.

These findings agree with those of Katou (2015) on the mediating effects of psychological contracts on the relationship between human resource management systems and organizational performance. The study found that the impact of HRM process on organizational performance was strong. The study also established that psychological contract partially and positively mediates the HRM process–performance relationship, whereby the impact of HRM processes on organizational performance through employee promises fulfilment is stronger.

The findings are also in line with the results of the research conducted by Roca-Puig and Cipres (2011) on the combined effect of human capital, temporary employment and organizational size on firm performance. The study examined how temporary employment and organizational size moderate the effect of human capital on firm performance. It concluded that the positive effect of human capital on return of sales is greater in large firms with low temporary employment than in small firms with high temporary employment. In addition, this positive effect was not found to be universal because in some scenarios it was not significant. The large companies with a high level of human capital and a low use of temporary employment seemed to maximize this situation and hence realized higher performance.

These findings are also further corroborated by the works of (Sabiu, Ringim, Mei, Mohd & Joarder, 2019) The results revealed that there is a strong support for the mediating role of Ethical Climates on the relationship between Human Resource Management practice that involves recruitment and selection and the operational performance of an organization.

4.8 Measurement, Analysis and Improvement Processes (MAIP) on Performance

This section covered Objective Three (3) which was to assess the effect of Supply Chain Measurement, Improvement and Analysis Processes on the Performance of the departments of GOK Ministries' Headquarters. A simple linear regression model $Y = \beta_0 + \beta_3 X_3 + \varepsilon$ was used to assess the relationship between Measurement, Improvement and Analysis Processes (X_3) (independent variable) and Performance (Y) of supply chain entities at GOK ministries headquarters (dependent variable). This provided the output of the model summary, ANOVA and the regression coefficients.

4.8.1 Inferential Statistics of Measurement, Analysis and Improvement Processes (MAIP) on Performance

Hypothesis Three

H₀₃: *The Supply Chain Measurement, Improvement and Analysis Processes has no significant effect on the Performance of the Departments.*

From Table 4.25 (A) the correlation between Performance (Y) and Measurement, Improvement and Analysis Processes (X₃) was statistically significant $r(224) = .563, p < .001$. The study found that there was a moderate positive correlation between Measurement, Improvement and Analysis Processes and Performance among the departments.

Table 4.25: Model Summary of Measurement, Improvement and Analysis

| (A): The Model Summary^b of Measurement, Improvement and Analysis (N = 224) | | | | | | | | | |
|--|-------------------|-----------------|--------------------------|---------------------------------------|------------------------|--------------------------|------------|-------------|-----------------|
| Model | R | R Square | Adjusted R Square | Standard Error of the Estimate | R Square Change | Change Statistics | | | |
| | | | | | F | df1 | df2 | Sig. | F Change |
| 1 | .563 ^a | .317 | .314 | .331 | .317 | 103.015 | 1 | 222 | .000 |

a= Predictors: (Constant), Measurement, Improvement and Analysis Processes (X₃)

From Table 4.25 (B) the simple regression of Performance (Y) on Measurement, Improvement and Analysis Processes (X₃) the equation was found to be statistically significant ($F(1,222) = 103.015, p < .001$) in predicting Performance (Y) with a goodness of fit of 31.4% (Adjusted R Square = .314) as shown in Table 4.25 (A). This shows that the coefficient of determination of 31.4% was the variation in Performance (Y) that was accounted for and explained by the dimension of Measurement,

Improvement and Analysis Processes (X_3) in International Organization for Standardization 9001:2008 Processes.

(B): ANOVA^a for Measurement, Improvement and Analysis ($N = 224$)

| Model | | Sum of Squares | Df | Mean Square | F | Sig.(p-value) |
|-------|------------|----------------|-----|-------------|---------|-------------------|
| 1 | Regression | 11.284 | 1 | 11.284 | 103.015 | .000 ^b |
| | Residual | 24.318 | 222 | .110 | | |
| | Total | 35.602 | 223 | | | |

a= Dependent Variable: Performance (Y)

From Table 4.25 (C) the findings showed that Measurement, Improvement and Analysis Processes (X_3) had an effect on the Performance (Y) of supply chain entities at GOK Ministries in Kenya, since the observation was found to be statistically significant ($\beta_3 = .646$, $t = 10.150$, $p < .001$). The beta coefficient for Measurement, Improvement and Analysis Processes (X_3) was found to be statistically significant ($\beta_3 = .646$, $t = 10.150$, $p < .001$), which implies that one unit increase in dimension of Measurement, Improvement and Analysis Processes (X_3) in International Organization For Standardization 9001:2008 Processes increases Performance (Y) by an index of .646 units. Therefore, the null hypothesis ($H_{03}: \beta_3=0$) that “*The Supply Chain Measurement, Improvement and Analysis Processes has no significant effect on the Performance of the Departments*” is **REJECTED**. The fitted simple linear regression model of this relationship is:

$$Y = 1.501 + .646X_3$$

Where Y is the Performance of supply chain entities at GOK Ministries and X_3 is Measurement, Improvement and Analysis Processes.

(C): Coefficients^a of Measurement, Improvement and Analysis (N = 224)

| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. | Collinearity Statistics | |
|-------|--|-----------------------------|----------------|---------------------------|--------|------|-------------------------|-------|
| | | B | Standard Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | 1.501 | .263 | | 5.709 | .000 | - | - |
| | Measurement Analysis & Improvement Processes (X ₃) | .646 | .064 | .563 | 10.150 | .000 | 1.000 | 1.000 |

b= Dependent Variable: Performance (Y)

4.8.2 Discussion of Findings of Measurement, Analysis and Improvement Processes on Performance

This section discusses the research findings based on the study Objective Three (3) that focused on assessing the effect of ISO 9001:2008 Measurement, Improvement and Analysis Processes on Performance in the Supply Chain Management Departments of GOK Ministries' Headquarters. The Pearson's Correlation Coefficient for Measurement, Improvement and Analysis Processes was moderate and statistically significant $r(224) = .563, p < .001$. The study found that there was a moderate positive correlation of Measurement, Improvement and Analysis Processes on Performance among the departments. From the simple linear regression analysis one unit increase in dimension of Measurement, Improvement and Analysis Processes (X₃) in International Organization for Standardization 9001:2008 Processes increases Performance (Y) by and index of .646 units. The inferential statistics showed that when performance was regressed on Measurement, Improvement and Analysis Processes the model was found to be statistically significant ($F(1,222) = 103.015, p < 0.001$) as shown in Table 4.25 (B) with a goodness of fit of 31.4% (R square adjusted = .314) as shown in Table 4.25(A). Hence the dimension of Measurement, Improvement and Analysis Processes (X₃) has a positive effect on the Performance of Supply Chain entities at GOK Ministries in Kenya.

The findings suggest that the departments were keen to undertake measurement, improvement and analysis in a bid to improve performance through this ISO processes. Efforts to adhere to the service charter and the establishment of customer feedback mechanisms were efforts to improve on the processing time of customer requests and hence quality service provision. This aspect of measurement leads to improved performance of these departments. A reduction of wastes through provision of quality materials, keeping a corrective action record, and the keeping of customer order records as an ISO process was also found to significantly affect the performance of these departments. There was also evidence of analysis of customer requirements and complaints to ensure that customer satisfaction levels are monitored hence maintaining performance.

The findings agree with research studies by Prajogo, Huo and Han (2012) on the effects of different aspects of ISO 9000 implementation on key supply chain management practices and operational performance. They wanted to empirically test a model of different aspects of ISO 9000 implementation in terms of their relationships with three key supply chain (SC) management practices of internal processes, supplier relationships, and customer relationships and how the three key SC activities affect operational performance. The results showed that advanced implementation of ISO 9000 positively related to all three aspects of SC activities of internal, customer, and supplier process management, while supportive implementation was positively related to internal and customer process management. However, they established that the basic implementation of ISO had no direct influence on any SC management practices. The results also indicated that supplier and internal process management both have a positive effect on operational performance, while customer process management had no significant impact on operational performance.

Similar studies by Pavlov and Bourne (2011) showed that Performance Measurement had three distinct effects on the organizational processes that deliver performance. Measurement triggered performance, it could provide the requisite guidance towards key

performance indicators and it also had the intensification effects which resulted in increased effort towards the realization of the performance goals.

Other studies that have been done by Koufteros Verghese and Lucianetti (2014) have findings that suggest that there is sufficient evidence that the use of performance measurement systems through adaptive use and interactive use leads to improved capabilities, which then impact performance. They highlighted that diagnostic use appears to be the most constructive explanatory variable for increased capabilities in performance. From a longitudinal study perspective however, they also found out that diagnostic use of performance measurement experienced depreciating returns as far as the objective financial measures are concerned. They went ahead to indicate that when high levels of diagnostic use were coupled with low levels of interactive use of performance measurement, they eventually produced the lowest levels of organizational capabilities. Conversely, they concluded that high levels of both types of performance measurement system use generated extraordinary high levels of performance capabilities. Hence they concluded that there was sufficient evidence to suggest that organizations could not merely rely on diagnostic use of Performance Measurement systems, but equally with interactive use of the systems.

4.9 Product Realization Processes (PRP) and Performance

This section covered Objective Four (4) which was to assess the effect of Supply Chain Product Realization Processes on the Performance of the departments of GOK Ministries' Headquarters. A simple linear regression model $Y = \beta_0 + \beta_4 X_4 + \varepsilon$ was used to assess the relationship between Measurement, Improvement and Analysis Processes (X_4) (independent variable) and Performance (Y) of supply chain entities at GOK ministries headquarters (dependent variable). This provided the output of the model summary, ANOVA and the regression coefficients.

4.9.1 Inferential Statistics of Product Realization Processes and Performance

Hypothesis Four

H₀₄: *The Supply Chain Measurement, Product Realization Processes has no significant effect on the Performance of the Departments.*

From Table 4.26 (A) the correlation between Performance (Y) and Product Realization Processes (X₄) was statistically significant $r(224) = .563, p < .001$. It was a moderate and positive correlation.

Table 4.26: Model Summary of Product Realisation Processes

| (A): The Model Summary^b of Product Realization Processes (N = 224) | | | | | | | | | |
|--|-------------------|----------|-------------------|--------------------------------|-----------------|----------|-----|-----|---------------|
| Model | R | R Square | Adjusted R Square | Standard Error of the Estimate | R Square Change | F Change | df1 | df2 | Sig. F Change |
| 1 | .563 ^a | .316 | .313 | .331 | .316 | 102.764 | 1 | 222 | .000 |

a= Predictors: (Constant), Product Realization Processes (X₄)

From Table 4.26 (B) the simple regression of Performance (Y) on Product Realization Processes (X₄) the equation was found to be statistically significant ($F(1,222) = 102.674, p < .001$) in predicting Performance (Y) with a goodness of fit of 31.3% (Adjusted R Square = .313) as shown in Table 4.26(A). This shows that the coefficient of determination of 31.3% was the variation in Performance (Y) that was accounted for and explained by the dimension of Product Realization Processes (X₄) in International Organization for Standardization 9001:2008 Processes.

(B): ANOVA^a for Product Realization processes and Performance (N = 224)

| Model | | Sum of Squares | Df | Mean Square | F | Sig.(p-value) |
|-------|------------|----------------|-----|-------------|---------|-------------------|
| 1 | Regression | 11.265 | 1 | 11.265 | 102.764 | .000 ^b |
| | Residual | 24.337 | 222 | .110 | | |
| | Total | 35.602 | 223 | | | |

a= Dependent Variable: Performance (Y)

b= Predictors: (Constant), Product Realization Processes (X₄)

From Table 4.26 (C) the findings showed that Product Realization Processes (X₄) had an effect on the Performance (Y) of supply chain entities at GOK Ministries in Kenya, since the observation was found to be statistically significant ($\beta_4 = .615, t = 10.137, p < .001$). The beta coefficient (β_4) for Product Realization Processes (X₄) was found to be statistically significant ($\beta_4 = .615, t = 10.137, p < .001$), which implies that one unit increase in dimension of Product Realization Processes (X₄) in International Organization For Standardization 9001:2008 Processes increases Performance (Y) by and index of .615 units. Therefore, the null hypothesis (**H₀₄**: $\beta_4=0$) that “*The Supply Chain Product Realization Processes (X₄) has no significant effect on the Performance of the Departments*” is rejected. The fitted simple regression model of this relationship is:

$$Y = 1.598 + .615X_4$$

Where Y is the Performance of supply chain entities at GOK Ministries and X₄ is Product Realization Processes.

(C): Coefficients^a of Product Realization Processes on Performance (N = 224)

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Collinearity Statistics | |
|-------|---|-----------------------------|----------------|---------------------------|--------|------|-------------------------|-------|
| | | B | Standard Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | 1.598 | .254 | | 6.300 | .000 | | |
| | Product Realization Processes (X ₄) | .615 | .061 | .563 | 10.137 | .000 | 1.000 | 1.000 |

a= Dependent Variable: Performance (Y)

4.9.2 Discussion of Findings of Product Realization Processes on Performance

This section discusses the research findings based on the study Objective Four (4) that focused on evaluating the effect of ISO 9001:2008 Product Realization Processes on Performance in the Supply Chain Management Departments of GOK Ministries' Headquarters. The Pearson's Correlation Coefficient for Product Realization Processes was positive, moderate and statistically significant $r(224) = .563, p < .001$. The study found that there was a moderate positive correlation between Product Realization Processes and Performance among the departments. From the simple linear regression analysis, one unit increase in dimension of Product Realization Processes (X₄) in International Organization for Standardization 9001:2008 Processes increases Performance (Y) by an index of .615 units.

The inferential statistics showed that when Performance was regressed on Product Realization Processes the model was found to be statistically significant ($F(1,222) = 10.137, p < .001$) as shown in Table 4.26(B) with a goodness of fit of 31.3% (Adjusted R Square = .313) as shown in Table 4.26(A). The inferential statistics showed that when Performance (Y) was regressed on Product Realization Processes (X₄) the model was found to be statistically significant ($F(1,222) = 10.137, p < .001$) as shown in Table

4.26(B) with a goodness of fit of 56.3% (Adjusted R Square = .563) as shown in Table 4.26(A). Hence the dimension of Product Realization Processes (X_4) has a positive effect on the Performance of Supply Chain entities at GOK Ministries in Kenya. The product realization process was measured against the parameters of procurement processes, distribution processes and customer processes. The findings suggest that procurement processes were adhered to in the departments through the keeping of the product information records, the purchasing records, product verification records and inspection records to fulfil the ISO 9001:2008 requirements. The maintenance of product inspection plans is also an indicator that the departments adhere to customer related issues and hence affecting the performance of these departments significantly. On distribution, the supplier premises details and channels of distribution records were also found to be in place.

These findings agree with similar studies by Kuloba (2016) in his study on the effect of procurement procedures of tendering procedures, product inspection and maintenance of inspection plans on performance in Moi Teaching and Referral Hospital, which indicated that tendering procedures do have a direct effect on the performance of the organization. The findings implied that adopting tendering procedures do give organizations some bases of performance. This was to be attributed to the fact that tendering procedures not only saves transaction cost, increasing competitive sourcing opportunities and enhancing inter-organizational coordination but also affect organizational performance. The findings also agree with related studies by Prajogo, Huo and Han (2012) on the effects of different aspects of ISO 9000 implementation of internal processes, customer processes, and supplier process management (product realization processes in this context) on key supply chain management practices and operational performance. The findings suggested that the implementation of ISO 9000 processes had a significant effect on organizational performance.

4.10 Regression Model for the Joint Relationship between ISO 9001:2008 Dimensions and Performance

4.10.1 Joint Effects Model Summary

This section covered Objective Five (5) which was to assess the effect of the joint relationship between Management responsibility Processes, Resource Management Processes, Measurement, Improvement and Analysis Processes and Realization Processes on the Performance of departments of GOK Ministries' Headquarters.

A simple linear regression model $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$ was used to assess the joint relationship between Management responsibility Processes (X_1), Resource Management Processes, Measurement (X_2), Measurement, Improvement and Analysis Processes (X_3) and Realization Processes (X_4) (independent variables) and Performance (Y) of supply chain entities at GOK ministries headquarters (dependent variable). This provided the output of the model summary, ANOVA and the regression coefficients.

4.10.2 Inferential Statistics of ISO 9001:2008 Dimensions on the Performance

H₀₅: *The ISO 9001:2008 Dimensions have no significant effect on the Performance of the Departments*

From Table 4.27(A) the correlation between Performance (Y) and ISO 9001:2008 Dimensions was statistically significant $r(224) = .651, p < .001$. It was a strong and positive correlation.

Table 4.27: Model Summary of ISO 9001: 2008 Dimensions

| (A): Model Summary of ISO 9001:2008 Dimensions (N = 224) | | | | | | | | | |
|---|-------------------|-----------------|--------------------------|---------------------------------------|------------------------|--------------------------|------------|-----|----------------------|
| Model | R | R Square | Adjusted R Square | Standard Error of the Estimate | R Square Change | Change Statistics | | | Sig. F Change |
| | | | | | F | df1 | df2 | | |
| 1 | .651 ^a | .424 | .413 | .306 | .424 | 40.264 | 4 | 219 | .000 |

a. Predictors: (Constant), X₁,X₂,X₃,X₄

From Table 4.27(B) the simple regression of Performance (Y) on ISO 9001:2008 Dimensions, the equation was found to be statistically significant ($F(1,219) = 4.2364$, $p < .001$) in predicting Performance (Y) with a goodness of fit of 41.3% (Adjusted R Square = .413) as shown in Table 4.27(A). This shows that the coefficient of determination of 41.3% was the variation in Performance (Y) that was accounted for and explained by the dimensions of International Organization for Standardization 9001:2008 Processes. The fitted simple regression model of this joint relationship is:

$$Y = .694 + .153X_1 - .006X_2 + .320X_3 + .374X_4$$

(B): ANOVA^a for ISO 9001:2008 Dimensions and Performance (N = 224)

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|--------------|------------|-----------------------|-----------|--------------------|----------|-------------------|
| | Regression | 15.087 | 4 | 3.772 | 40.264 | .000 ^b |
| 1 | Residual | 20.515 | 219 | .094 | | |
| | Total | 35.602 | 223 | | | |

From Table 4.27(C) the findings showed that Management responsibility Processes (X_1) had an effect on the Performance (Y) of supply chain entities at GOK Ministries in Kenya, since the observation was found to be statistically significant ($\beta_1 = .153$, $t = 2.852$, $p < .001$). Hence the Null Hypothesis is rejected. The findings showed that Resource Management Processes (X_2) had no effect on the Performance (Y) of supply chain entities at GOK Ministries in Kenya, since the observation was found to be statistically insignificant ($\beta_2 = -.006$, $t = -.083$, $p > .001$) as shown in Table 4.27 (C). Hence we fail to reject the Null Hypothesis. The findings showed that Measurement, Improvement and Analysis Processes (X_3) had an effect on the Performance (Y) of supply chain entities at GOK Ministries in Kenya, since the observation was found to be statistically significant ($\beta_3 = .320$, $t = 3.866$, $p < .001$) Table 4.27 (C). Hence the Null Hypothesis is rejected. The findings showed that Product Realization Processes (X_4) had an effect on the Performance (Y) of supply chain entities at GOK Ministries in Kenya, since the observation was found to be statistically significant ($\beta_4 = .374$, $t = 5.294$, $p < .001$) Table 4.27(C). Hence the Null Hypothesis is rejected.

(C): Coefficients^a of ISO 9001:2008 Dimensions on Performance (N = 224)

| Model | Unstandardized | | Standardized | T | Sig. | Collinearity | | |
|------------|----------------|----------------|--------------|-------|-------|--------------|------|-------|
| | Coefficients | | Coefficients | | | Statistics | | |
| | B | Standard Error | Beta | | | Tolerance | VIF | |
| (Constant) | .694 | .282 | | 2.458 | .015 | | | |
| 1 | X ₁ | .153 | .054 | .179 | 2.852 | .005 | .670 | 1.492 |
| | X ₂ | -.006 | .074 | -.006 | -.083 | .934 | .558 | 1.792 |
| | X ₃ | .320 | .083 | .279 | 3.866 | .000 | .506 | 1.977 |
| | X ₄ | .374 | .071 | .342 | 5.294 | .000 | .631 | 1.585 |

a. Dependent Variable: Y

4.10.3 Discussion of Findings of ISO 9001:2008 Dimensions on Performance

The objective was to evaluate the joint effect of ISO 9001:2008 Dimensions that were aggregated as Management Responsibility Processes, Resource Management Processes, Measurement, Improvement and Analysis Processes and Product Realization Processes on Performance. Management Responsibility Processes (X_1) had ($\beta_1 = .153$, $t = 2.852$, $p < .001$) providing a positive and significant effect on Performance (Y). From the simple linear regression analysis one unit increase in dimension of Management Responsibility Processes (MRP) (X_1) increases Performance (Y) by an index of .153 units when the others are held constant.

These findings support similar studies by Bititci, Garengo, Dörfler and Nudurupati (2012) on how managerial processes influence business process that sustain performance. Their research findings suggested that the five managerial processes and their constituent managerial activities, highlighted through the empirical research, influence performance of organisations. This is as an interconnected managerial system rather than as individual processes and activities. They also established that the execution and maturity of this managerial system is influenced by the perceptions or the personal characteristics of the managers who organize it. Similarly, Ntayi, Namugenyi and Eyaa (2010) in their studies on supplier delivery performance in Uganda Public Procurement contracts found that contracts in procurement do not necessarily result into good performance. Other factors such as work processes and management commitment were found to play a significant role.

Resource Management Processes (RMP) (X_2) had ($\beta_2 = -.006$, $t = -.083$, $p > .001$) providing a negative and insignificant effect on Performance (Y). From the simple linear regression analysis, one unit increase in dimension of Resource Management Processes (X_2) decreases Performance (Y) by an index of .006 units when the others remain constant. These findings contradict similar studies by Valmohammadi and Kalantari

(2015) in their study on the moderating effect of staff (resource) motivations on the relationship between obtaining ISO 9001 certification and organizational performance. Their results demonstrated that ISO 9001 certified companies show better organizational performance than non-certified ISO 9001 companies and internal motivations play more important role in improving performance. They went ahead to verify that ISO 9001 certified companies with high scores of internal motivations show better levels of performance than those ISO 9001 certified companies with low scores of internal motivations.

Measurement, Analysis and Improvement Processes (MAIP) (X_3) had ($\beta_3 = .320$, $t = 3.866$, $p < .001$) providing a positive and significant effect on Performance (Y). From the simple linear regression analysis one unit increase in dimension of Measurement, Improvement and Analysis Processes (X_3) increases Performance (Y) by an index of .320 units when the others are held constant.

These findings support earlier studies on inventory management through measurement and analysis and operational performance, in which studies by Dimitrios (2008) on the effect of inventory management on firm performance. The aim of this research was to test the hypothesis that efficient (lean) inventory management leads to an improvement in a firm's financial performance revealed that the higher the level of inventories preserved by a firm, the lower its rate of returns. The operational performance had however been found to be improving.

Product Realization Processes (PRP), (X_4) had ($\beta_4 = .374$, $t = 5.294$, $p < .001$) showing a positive and significant effect on Performance, (Y). From the simple linear regression analysis, one unit increase in dimension of Product Realization Processes (X_4) increases Performance (Y) by an index of .374 units when the others are held constant. These findings support the studies of Prajogo, Huo and Han (2012) on the effects of different aspects of ISO 9000 implementation on key supply chain management practices and operational performance. They found out that advanced implementation of ISO 9000 is positively related to all three aspects of SC activities of internal processes, customer

processes, and supplier process management, and that supportive implementation is positively related to internal and customer process management. They concluded that supplier processes and internal process management both had a positive effect on operational performance, while customer process management has no significant impact on operational performance.

4.11 The Moderating effect of Government Procurement Regulations and Policies (GPRP) on Performance

This section focused on Objective Six (A1), which was to establish the moderating effect of Government regulations and policies on ISO 9001:2008 Management Responsibility Processes, Resource Management Processes, Measurement, Analysis and Improvement Processes and Product Realization Processes and the Performance of SCM Departments at GOK Ministry Headquarters. The researcher employed hierarchical multiple regression analysis. To test that Government Procurement Regulations and Policies had no significant moderating effect on the relationship between Management Responsibility Processes and Performance, hierarchical regression was employed. Cohen and Cohen (1983) state that, “depending on the researchers’ conceptual framework, the main effects can be entered into the equation in hierarchical, stepwise or simultaneous methods. Here hierarchical multiple regression was used where the dependent variable Performance (Y) was regressed on Management responsibility Processes, and then the Moderating variable Government Procurement Regulations and Policies was entered into the model as an independent variable and then the interaction term between Management responsibility Processes and Government Procurement Regulations and Policies was entered into the model. In order to test the interaction effects, multiplicative terms were created for the standardized independent variables (Cohen & Cohen, 1983; Kleinbaum, Kupper & Muller 1988).

The variables had to be centred by standardizing so as to address the issue of multicollinearity. Multicollinearity may be reduced by centring the continuous independent variables and the moderator variable.

This is accomplished by subtracting the sample mean from the respective variable, thereby obtaining a centred deviation score that has a mean of zero. The centring of these beta terms reduces the size of the correlations between the predictor variables and in turn reducing multicollinearity (Aldwin, 1994).

4.11.1 Inferential statistics of moderating effect of Government Regulations and Policies (GPRP) on ISO 9001:2008 Management Responsibility Processes and Performance

Hypothesis SIX (A1)

H_{06(A1)}: The Government Procurement Regulations and Policies do not significantly moderate between Management Responsibility Processes and the Performance of the Departments at GOK Ministry Headquarters.

To test the hypothesis the following models were fitted:

Model 1: $Y = \beta_0 + \beta_1 X_1 + \varepsilon$

Model 2: $Y = \beta_0 + \beta_1 X_1 + \beta_M X_M + \varepsilon$

Model 3: $Y = \beta_0 + \beta_1 X_1 + \beta_M X_M + \beta_{1M} X_1 X_M + \varepsilon$

From Table 4.28(A) the F change was statistically significant (F change = 50.463, $p < .001$) on entering Management responsibility Processes (X_1) into the model¹.

On adding Government Procurement Regulations and Policies (X_M) the model² improved as F change was statistically significant (F change = 80.259, $p < .001$). When the interaction term was added into the model³ the R square change was statistically insignificant (R square change = .009, $p = .067$) and also the F change was statistically insignificant (F change = 3.378, $p = .067$).

Table 4.28: (A) Model Summary of MRP (X_1), GPRP (X_M) and the Interaction of MRP and GPRP ($X_1.X_M$)

| Model | R | R Square | Adjusted R Square | Standard Error of the Estimate | Change Statistics | | | | |
|-------|-------------------|----------|-------------------|--------------------------------|-------------------|----------|-----|-----|---------------|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change |
| 1 | .430 ^a | .185 | .182 | .361 | .185 | 50.463 | 1 | 222 | .000 |
| 2 | .634 ^b | .402 | .397 | .310 | .217 | 80.259 | 1 | 221 | .000 |
| 3 | .641 ^c | .411 | .403 | .309 | .009 | 3.378 | 1 | 220 | .067 |

Note. a=Predictors: (Constant), (X_1). b=Predictors: (Constant), (X_1), (X_M). c=Predictors: nstant), (X_1), (X_M), ($X_1.X_M$).

From Table 4.28(B) all the three models were statistically significant, for the first model¹ ($F(1,222) = 50.463, p < .01$) for the second model² ($F(2,221) = 74.369, p < .001$) and for the third model³ ($F(3,220) = 51.239, p < .001$).

From Model 3 this indicates that for each unit increase in Management responsibility Processes (X_1) the Performance (Y) will increase by an index of .275 when X_M and the interaction of X_1 and X_M remain constant. For each unit increase in X_M , Performance (Y) will increase by an index of .420 when X_1 and the interaction of X_1 and X_M remain constant. For each unit increase in the interaction term, Performance (Y) will decrease by an index of .036 when X_1 and X_M remain constant. This indicates that Government Procurement Regulations and Policies (X_M) had some predictive power since the model² improved as F change was statistically significant (F change = 80.259, $p < .001$), but it did not moderate between Management responsibility Processes (X_1) and Performance (Y) due to the findings that depicted that when the interaction term was added into the model³ the R square change was statistically insignificant (R square change = .009, $p = .067$) and also the F change was statistically insignificant (F change = 3.378, $p = .067$).

Table 4.28: (B) A NOVA^a for MRP, GPRP and the Interaction of MRP and GPRP (N = 224)

| Model | | Sum of Squares | Df | Mean Square | F | Sig. (p-value) |
|--------------|------------|-----------------------|-----------|--------------------|----------|-----------------------|
| 1 | Regression | 6.594 | 1 | 6.594 | 50.463 | .000 ^b |
| | Residual | 29.008 | 222 | .131 | | |
| | Total | 35.602 | 223 | | | |
| 2 | Regression | 14.322 | 2 | 7.161 | 74.369 | .000 ^c |
| | Residual | 21.280 | 221 | .096 | | |
| | Total | 35.602 | 223 | | | |
| 3 | Regression | 14.644 | 3 | 4.881 | 51.239 | .000 ^d |
| | Residual | 20.958 | 220 | .095 | | |
| | Total | 35.602 | 223 | | | |

Note. a= Dependent Variable (Y). b= Predictors: (Constant), X₁. c= Predictors: (Constant), X₁, X_M, d= Predictors: (Constant), X₁, X_M, (X₁.X_M).

From Table 4.28(C) the final equations for the three models are:

Model 1: $Y = 2.672 + .369X_1$

Model 2: $Y = 1.411 + .258X_1 + .412X_M$

Model 3: $Y = 1.318 + .275X_1 + .420X_M - .036(X_1.X_M)$

Table 4.28: (C) Coefficients^a of MRP (X_1), GPRP (X_M) and the Interaction of MRP and GPRP ($X_1.X_M$) (N = 224)

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. (p-value) | Collinearity Statistics | |
|---------------|-----------------------------|----------------|---------------------------|--------|-------------------|-------------------------|-------|
| | B | Standard Error | Beta | | | Tolerance | VIF |
| 1 (Constant) | 2.672 | .211 | | 12.671 | .000 | | |
| X_1 | .369 | .052 | .430 | 7.104 | .000 | 1.000 | 1.000 |
| 2 (Constant) | 1.411 | .229 | | 6.155 | .000 | | |
| X_1 | .258 | .046 | .301 | 5.581 | .000 | .929 | 1.077 |
| X_M | .412 | .046 | .483 | 8.959 | .000 | .929 | 1.077 |
| 3 (Constant) | 1.318 | .234 | | 5.642 | .000 | | |
| X_1 | .275 | .047 | .321 | 5.863 | .000 | .893 | 1.120 |
| X_M | .420 | .046 | .493 | 9.144 | .000 | .920 | 1.087 |
| ($X_1.X_M$) | -.036 | .019 | -.098 | -1.838 | .067 | .939 | 1.065 |

a. Dependent Variable: Performance (Y)

4.11.2 Profile Plot of Y, X_1 and X_M 4.

From Figure 4.5 shows that the main effect due to Management responsibility Processes (X_1) while ignoring Government procurement regulations and policies (X_M) was not significant as the averages at the two levels were the same. Similarly, the main effect due to Government Procurement Regulations and Policies (GPRP), (X_5) whilst ignoring Management responsibility (MRP), (X_1) was not significant as the averages were the same. The slopes of the two lines are the same and they are parallel hence no interaction effect with respect to the two levels of Government Procurement Regulations and Policies.

Profile Plot of Y, X₁ and X_M

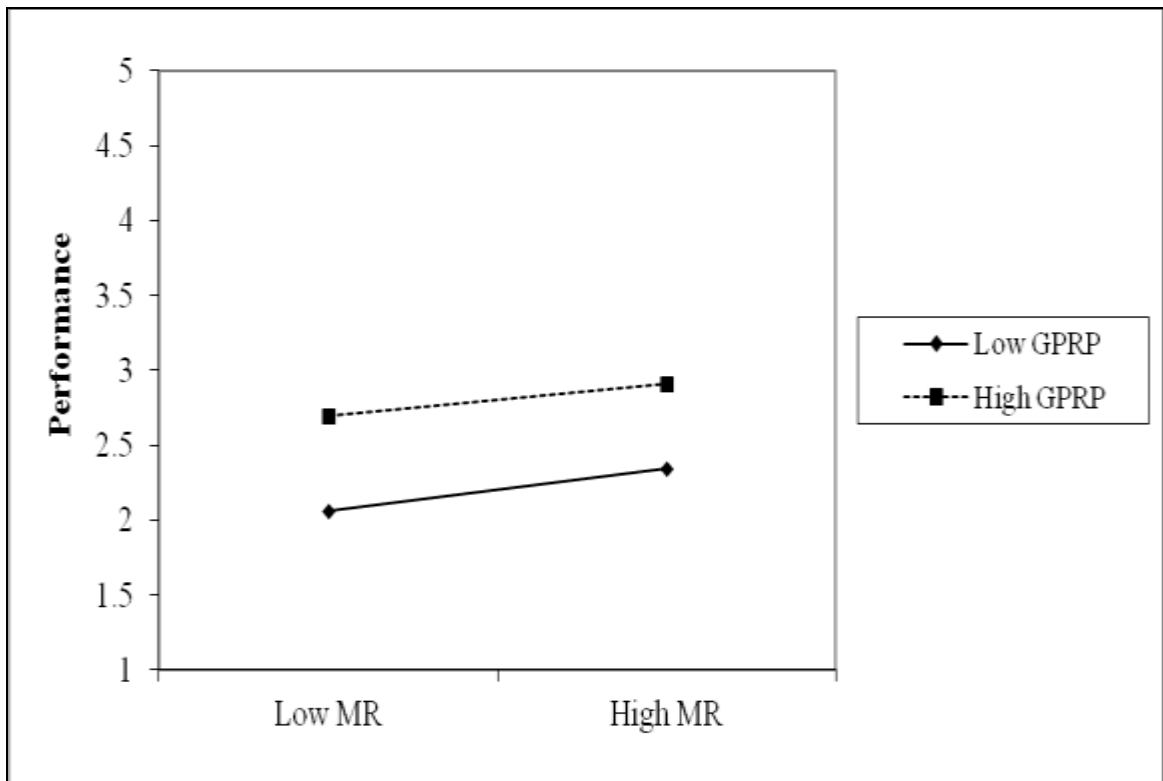


Figure 4.5: Interaction/Moderation of MRP (X₁) and GPRP (X_M) on Performance

Source: Survey data, Interaction 7.0 output

4.11.3 Discussions on the Moderating Effect of GPRP on the Relationship between MRP and Performance

In Model 1 Performance (Y) was regressed on Management responsibility Processes (X₁) the regression coefficient for Management responsibility Processes (X₁) was statistically significant ($\beta_1=.369, t = 7.104, p < .001$). This indicates that for each unit increase in Management responsibility Processes (X₁) the Performance (Y) will increase by an index of .369 units. In Model 2 Performance (Y) was regressed on Management responsibility Processes (X₁) and Government Procurement Regulations and Policies (X_M) the regression coefficient of Management responsibility Processes (X₁) was

statistically significant ($\beta_1=.258, t = 5.581, p < .001$) despite the fact that it had reduced from .369 units to .258 units. The regression coefficient of Government Procurement Regulations and Policies (X_M) was statistically significant ($\beta_M=.412, t = 8.959, p < .001$) hence X_M as a predictor was significant in Model 2.

In Model 3 Performance (Y) was regressed on Management responsibility Processes (X_1), Government Procurement Regulations and Policies (X_M) and the interaction of Management responsibility Processes and Government Procurement Regulations and Policies ($X_1.X_M$).

The regression coefficient for Management responsibility Processes (X_1) had reduced in magnitude to .275 but was statistically significant ($\beta_1=.275, t = 5.863, p < .001$). The regression coefficient of Government Procurement Regulations and Policies (X_M) improved marginally and was statistically significant ($\beta_M=.420, t = 9.144, p < .001$). The regression coefficient of the interaction term ($X_1.X_M$) was statistically insignificant ($\beta_{1M}= -.036, t = -1.838, p = .067$).

Hence we fail to reject the hypothesis ($H_{06(A1)}: \beta_{1M} = 0$) that “*The Government Procurement Regulations and Policies do not significantly moderate between Management Responsibility Processes and the Performance of the Departments at GOK Ministry Headquarters*”.

4.12 Inferential statistics of Moderating effect of GPRP on ISO 9001:2008 RMP and the Performance of SCM Departments at GOK Ministry Headquarters

Hypothesis SIX (A2)

$H_{06(A2)}$: *The Government Procurement Regulations and Policies do not significantly moderate between Resource Management Processes and the Performance of the Departments at GOK Ministry Headquarters.*

To test the hypothesis the following models were fitted:

Model 1: $Y = \beta_0 + \beta_2 X_2 + \varepsilon$

Model 2: $Y = \beta_0 + \beta_2 X_2 + \beta_M X_M + \varepsilon$

Model 3: $Y = \beta_0 + \beta_2 X_2 + \beta_M X_M + \beta_2 X_M X_2 + \beta_{2M} X_2 X_M + \varepsilon$

From Table 4.29(A) the F change was statistically significant (F change = 46.683, $p < .001$) on entering Resource Management Processes into the model¹. On adding Government Procurement Regulations and Policies the model² improved as F change was statistically significant (F change = 63.387, $p < .001$). When the interaction term was added into the model³ the R square change was dismal and statistically insignificant (R square change = .001, $p = .590$) and also the F change was statistically insignificant (F change = .291, $p = .590$).

Table 4.29(A): The Model Summary of RMP, GPRP and the Interaction of RMP and GPRP (N = 224)

| Model | R | R Square | Adjusted R Square | Standard Error of the Estimate | Change Statistics | | | | |
|-------|-------------------|----------|-------------------|--------------------------------|-------------------|----------|-----|-----|---------------|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change |
| 1 | .417 ^a | .174 | .170 | .364 | .174 | 46.683 | 1 | 222 | .000 |
| 2 | .598 ^b | .358 | .352 | .322 | .184 | 63.387 | 1 | 221 | .000 |
| 3 | .599 ^c | .359 | .350 | .322 | .001 | .291 | 1 | 220 | .590 |

Note. a=Predictors: (Constant), X₂. b=Predictors: (Constant), X₂, X_M. c=Predictors: (Constant), X₂, X_M, (X₂.X_M).

From Table 4.29(B) all the three models were statistically significant, for the first model (F(1,222)= 46.683, $p < .001$) for the second model (F(2,221)= 61.595, $p < .01$) and for the third model (F(3,220) = 41.028, $p < .001$).

Table 4.29(B): ANOVA^a for RMP, GPRP and the Interaction of RMP and GPRP (N = 224)

| Model | | Sum of Squares | df | Mean Square | F | Sig. (p-value) |
|--------------|------------|-----------------------|-----------|--------------------|----------|-----------------------|
| 1 | Regression | 6.186 | 1 | 6.186 | 46.683 | .000 ^b |
| | Residual | 29.416 | 222 | .133 | | |
| | Total | 35.602 | 223 | | | |
| 2 | Regression | 12.742 | 2 | 6.371 | 61.595 | .000 ^c |
| | Residual | 22.860 | 221 | .103 | | |
| | Total | 35.602 | 223 | | | |
| 3 | Regression | 12.773 | 3 | 4.258 | 41.028 | .000 ^d |
| | Residual | 22.830 | 220 | .104 | | |
| | Total | 35.602 | 223 | | | |

Note. a=Dependent Variable: Y. b= Predictors: (Constant), X₂. c= Predictors: (Constant), X₂, X_M. d= Predictors: (Constant), X₂, X_M, (X₂.X_M)

From Table 4.29(C) the final equations for the three models are:

Model 1: $Y = 2.330 + .449X_2$

Model 2: $Y = 1.505 + .236X_2 + .402X_M$

Model 3: $Y = 1.505 + .248X_2 + .398X_M - .01(X_2.X_M)$

Table 4.29(C): Coefficientsa of RMP, GPRP and the Interaction of RMP and GPRP (N = 224

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. (p-value) | Collinearity Statistics | |
|-------|-----------------------------------|-----------------------------|----------------|---------------------------|-------|-------------------|-------------------------|-------|
| | | B | Standard Error | Beta | | | Tolerance | VIF |
| 1 | (Constan | 2.330 | .269 | | 8.657 | .000 | | |
| | X ₂ | .449 | .066 | .417 | 6.833 | .000 | 1.000 | 1.000 |
| 2 | (Constan | 1.527 | .258 | | 5.915 | .000 | | |
| | X ₂ | .236 | .064 | .220 | 3.705 | .000 | .826 | 1.211 |
| | X _M | .402 | .051 | .472 | 7.962 | .000 | .826 | 1.211 |
| 3 | (Constan | 1.505 | .262 | | 5.740 | .000 | | |
| | X ₂ | .248 | .067 | .230 | 3.684 | .000 | .746 | 1.340 |
| | X _M | .398 | .051 | .467 | 7.754 | .000 | .804 | 1.244 |
| | (X ₂ .X _M) | -.010 | .019 | -.031 | -.539 | .590 | .903 | 1.107 |

Note. a=Dependent Variable: Y

From Model 3, this indicates that for each unit increase in Resource Management Processes (X₂) the Performance will increase by an index of .248 when X_M and the interaction (X₂X_M) are held constant. For each unit increase in X_M, Performance will increase by an index of .398 when X₂ and the interaction of X₂ and X_M are held constant. For each unit increase in the interaction term, Performance will decrease by an index of .01 when X₂ and X_M are held constant. This indicates that Government Procurement Regulations and Policies (X_M) had some predictive power since the model² improved as F change was statistically significant (F change = 63.387, $p < .001$), but it did not moderate between Resource Management Processes (X₂) and Performance (Y) due to the findings that depicted that when the interaction term (X₂X_M) was added into the model³ the R square change was statistically insignificant (R square change = .001, $p = 0.59$) and also the F change was statistically insignificant (F change = .291, $p = 0.59$).

4.12.2 Profile Plot of Y, X₂ and X_M

From *Figure 4.6* shows that the main effect due to Resource Management Processes (X₂) while ignoring Government procurement regulations and policies (X_M) was not significant as the averages on both ends are the same. Similarly, the main effect due to Government Procurement Regulations and Policies (X_M) whilst ignoring Resource Management Processes (X₂) was also not found to be significant. The slopes of the two lines are the same and they are parallel hence no interaction effect with respect to the two levels of Government Procurement Regulations and Policies.

Profile Plot of Y, X₂ and X_M

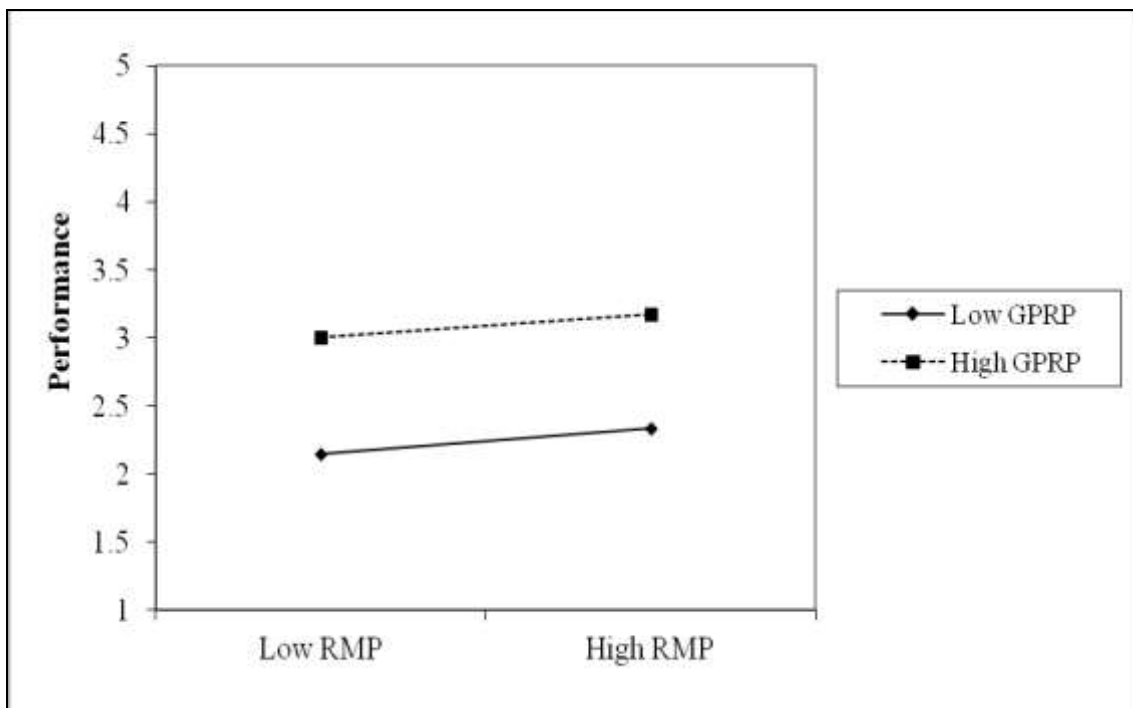


Figure 4.6: Interaction/Moderation of RMP and GPRP on Performance

4.12.3 Discussions on the Moderating Effect of GPRP on the Relationship between RMP and Performance

In Model 1 Performance (Y) was regressed on Resource Management Processes (X_2) the regression coefficient for Resource Management Processes (X_2) was statistically significant ($\beta_2=.449$, $t = 6.833$, $p < .001$). This indicates that for each unit increase in Resource Management Processes (X_2) the Performance (Y) will increase by an index of .449 units.

In Model 2 Performance (Y) was regressed on Resource Management Processes (X_2) and Government Procurement Regulations and Policies (X_M) the regression coefficient of Resource Management Processes (X_2) was statistically significant ($\beta_2=.236$, $t = 3.705$, $p < .001$) despite the fact that it had reduced from .449 units to .236 units. The regression coefficient of Government Procurement Regulations and Policies (X_M) was statistically significant ($\beta_M=.402$, $t = 7.962$, $p < .001$) hence X_M as a predictor was significant in Model 2.

In Model 3 Performance (Y) was regressed on Resource Management Processes (X_2), Government Procurement Regulations and Policies (X_M) and the interaction of Resource Management Processes and Government Procurement Regulations and Policies ($X_2.X_M$). The regression coefficient for Resource Management Processes (X_2) had reduced in magnitude to .248 but was statistically significant ($\beta_2=.248$, $t = 3.684$, $p < .001$). The regression coefficient of Government Procurement Regulations and Policies (X_M) reduced marginally and was statistically significant ($\beta_{2M}=.398$, $t = 7.754$, $p < .001$). The regression coefficient of the interaction term ($X_2.X_M$) was statistically insignificant ($\beta_{2M} = -.01$, $t = -.539$, $p = .59$).

Hence we fail to reject the hypothesis ($H_{06 (A2)}$: $\beta_{2M} = 0$) that “*The Government Procurement Regulations and Policies do not significantly moderate between Resource Management Processes and the Performance of the Departments at GOK Ministry Headquarters*”.

4.13 Inferential statistics of Moderating effect of GPRP on ISO 9001:2008 MAIP and the Performance of SCM Departments at GOK Ministry Headquarters

Hypothesis SIX (A3)

H_{06(A3)}: *The Government Procurement Regulations and Policies do not significantly moderate between Measurement, Analysis and Improvement Processes and the Performance of the Departments at GOK Ministry Headquarters.*

To test the hypothesis the following models were fitted:

Model 1: $Y = \beta_0 + \beta_3X_3 + \varepsilon$

Model 2: $Y = \beta_0 + \beta_3X_3 + \beta_MX_M + \varepsilon$

Model 3: $Y = \beta_0 + \beta_3X_3 + \beta_MX_M + \beta_{3X_M.X_3} + \beta_{3M}X_3X_M + \varepsilon$

From Table 4.30(A) the F change was statistically significant (F change = 103.015, $p < .001$) on entering Measurement, Analysis and Improvement Processes (X_3) into the model¹.

On adding Government Procurement Regulations and Policies (X_M) the model² improved as F change was statistically significant (F change = 64.821, $p < .001$). When the interaction term ($X_3.X_M$) was added into the model³ the R square change was statistically significant (R square change = .025, $p = .001$) and also the F change was statistically significant (F change = 11.029, $p = .001$).

Table 4.30(A): The Model Summary of MAIP, GPRP and the Interaction of MAIP and GPRP (N = 224)

| Model | R | R Square | Adjusted R Square | Standard Error of the Estimate | Change Statistics | | | | |
|-------|-------------------|----------|-------------------|--------------------------------|-------------------|----------|-----|-----|---------------|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change |
| 1 | .563 ^a | .317 | .314 | .331 | .317 | 103.015 | 1 | 222 | .000 |
| 2 | .687 ^b | .472 | .467 | .292 | .155 | 64.821 | 1 | 221 | .000 |
| 3 | .705 ^c | .497 | .490 | .285 | .025 | 11.029 | 1 | 220 | .001 |

Note. a= Predictors: (Constant), X₃ b= Predictors: (Constant), X₃, X_M, c= Predictors: (Constant), X₃, X_M, (X₃.X_M)

From Table 4.30(B) all the three models were statistically significant, for the first model (F (1,222) = 103.015, $p < .05$) for the second model (F (2,221) = 98.725, $p < .001$) and for the third model (F (3,220) = 72.480, $p < .001$).

Table 4.30(B): ANOVA^a for MAIP, GPRP and the Interaction of MAIP and GPRP. (N = 224)

| Model | | Sum of Squares | df | Mean Square | F | Sig. (p -value) |
|-------|------------|----------------|-----|-------------|---------|--------------------|
| 1 | Regression | 11.284 | 1 | 11.284 | 103.015 | .000 ^b |
| | Residual | 24.318 | 222 | .110 | | |
| | Total | 35.602 | 223 | | | |
| 2 | Regression | 16.799 | 2 | 8.400 | 98.725 | .000 ^c |
| | Residual | 18.803 | 221 | .085 | | |
| | Total | 35.602 | 223 | | | |
| 3 | Regression | 17.697 | 3 | 5.899 | 72.480 | .000 ^d |
| | Residual | 17.905 | 220 | .081 | | |
| | Total | 35.602 | 223 | | | |

Note. a= Dependent Variable: Y b= Predictors: (Constant), X₃ c= Predictors: (Constant), X₃, X_M. d= Predictors: (Constant), X₃, X_M, (X₃.X_M)

From Table 4.30(C) the final equations for the three models are:

Model 1: $Y = 1.501 + .646X_3$

Model 2: $Y = .705 + .480X_3 + .357X_M$

Model 3: $Y = .624 + .509X_3 + .352X_M - .045(X_3.X_M)$

Table 4.30(C): Coefficients^a of MAIP, GPRP and the Interaction of MAIP and GPRP (N = 224)

| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. (p-value) | Collinearity Statistics | |
|-------|-----------------------------------|-----------------------------|----------------|---------------------------|--------|-------------------|-------------------------|-------|
| | | B | Standard Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | 1.501 | .263 | | 5.709 | .000 | | |
| | X ₃ | .646 | .064 | .563 | 10.150 | .000 | 1.000 | 1.000 |
| 2 | (Constant) | .705 | .252 | | 2.796 | .006 | | |
| | X ₃ | .480 | .060 | .418 | 8.023 | .000 | .880 | 1.136 |
| | X _M | .357 | .044 | .419 | 8.051 | .000 | .880 | 1.136 |
| 3 | (Constant) | .624 | .248 | | 2.518 | .013 | | |
| | X ₃ | .509 | .059 | .444 | 8.607 | .000 | .861 | 1.162 |
| | X _M | .352 | .043 | .413 | 8.090 | .000 | .879 | 1.138 |
| | (X ₃ .X _M) | -.045 | .014 | -.161 | -3.321 | .001 | .978 | 1.023 |

Note. a= Dependent Variable: Y

From Model 3 this indicates that for each unit increase in Measurement, Analysis and Improvement Processes (X₃) the Performance (Y) will increase by an index of .509 when X_M and the interaction of X₃ and X_M are held constant. For each unit increase in X_M, Performance (Y) will increase by an index of .352 when X₃ and the interaction of X₃ and X_M are held constant. For each unit increase in the interaction term, Performance (Y) will decrease by an index of .045 when X₃ and X_M are held constant.

4.13.1 Profile Plot of Y, X₃ and X_M

Figure 4.7 shows that the main effect due to Measurement, Analysis and Improvement Processes (X₃) while ignoring Government procurement regulations and policies (X_M) slightly significant as the averages are slightly not the same. Likewise the main effect due to Government Procurement Regulations and Policies (X_M) whilst ignoring Measurement, Analysis and Improvement Processes (X₃) was not significant. The slopes of the two lines are almost the same and they partially parallel hence some interaction effect with respect to the two levels of Government Procurement Regulations and Policies.

Profile Plot of Y, X₃ and X_M

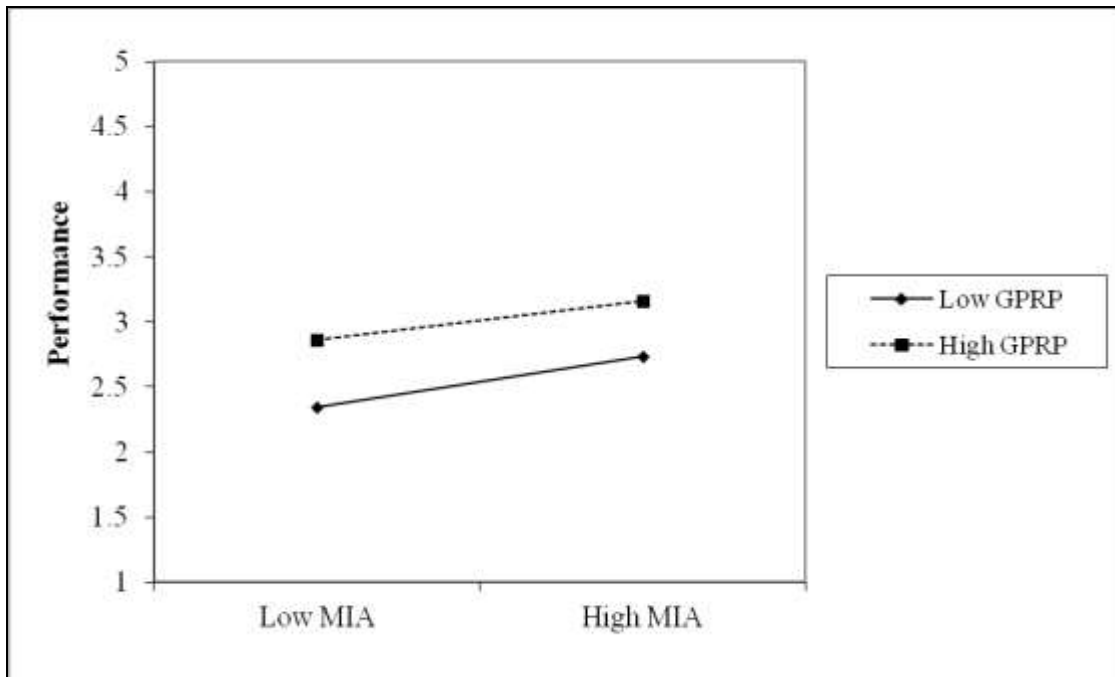


Figure 4.7: Interaction/Moderation of MAIP and GPRP on Performance

4.13.2 Discussions on the Moderating Effect of GPRP on the Relationship between MAIP and Performance

In Model 1 Performance (Y) was regressed on Measurement, Analysis and Improvement Processes (X_3) the regression coefficient for Measurement, Improvement and Analysis Processes (X_3) was statistically significant ($\beta_3 = .646$, $t = 10.150$, $p < .001$). This indicates that for each unit increase in Measurement, Improvement and Analysis Processes (X_3) the Performance (Y) will increase by an index of .646 units. In Model 2 Performance (Y) was regressed on Measurement, Improvement and Analysis Processes (X_3) and Government Procurement Regulations and Policies (X_M) the regression coefficient of Measurement, Improvement and Analysis Processes (X_3) was statistically significant ($\beta_3 = .480$, $t = 8.023$, $p < .001$) despite the fact that it had reduced from .646 units to .480 units.

The regression coefficient of Government Procurement Regulations and Policies (X_M) was statistically significant ($\beta_M = .357$, $t = 8.051$, $p < .001$) hence X_M as a predictor was significant in Model 2. In Model 3 Performance (Y) was regressed on Measurement, Improvement and Analysis Processes (X_3), Government Procurement Regulations and Policies (X_M) and the interaction of Measurement, Improvement and Analysis Processes and Government Procurement Regulations and Policies ($X_3.X_M$). The regression coefficient for Measurement, Improvement and Analysis Processes (X_3) had increased in magnitude to .509 but was statistically significant ($\beta_3 = .509$, $t = 8.607$, $p < .001$). The regression coefficient of Government Procurement Regulations and Policies (X_M) reduced marginally and was statistically significant ($\beta_{3M} = .352$, $t = 8.090$, $p < .001$). The regression coefficient of the interaction term ($X_3.X_M$) was statistically significant ($\beta_{3M} = -.045$, $t = -3.321$, $p < .001$).

Hence we reject the Null Hypothesis ($H_{06(A3)}: \beta_{3M} = 0$) that “The Government Procurement Regulations and Policies do not significantly moderate between Measurement, Analysis and Improvement Processes and the Performance of the Departments at GOK Ministry Headquarters”.

4.14 Inferential statistics of the Moderating effect of GPRP on ISO 9001:2008 PRP and the Performance of SCM Departments at GOK Ministry Headquarters.

Hypothesis SIX (A4)

H_{06(A4)} : *The Government Procurement Regulations and Policies (GPRP) do not significantly moderate between Product Realization Processes (PRP) and the Performance of the Departments at GOK Ministry Headquarters.*

To test the hypothesis the following models were fitted:

Model 1: $Y = \beta_0 + \beta_4X_4 + \varepsilon$

Model 2: $Y = \beta_0 + \beta_4X_4 + \beta_MX_M + \varepsilon$

Model 3: $Y = \beta_0 + \beta_4X_4 + \beta_MX_M + \beta_4X_M.X_4 + \beta_{4M}X_4X_M + \varepsilon$

From Table 4.31(A) the F change was statistically significant (F change = 102.764, $p < .001$) on entering Product Realization Processes (X_4) into the model¹. On adding Government Procurement Regulations and Policies (X_M) the model² improved as F change was statistically significant (F change = 43.186, $p < .001$). When the interaction term was added into the model³ the R square change was statistically significant (R square change = .011, $p = .039$) and also the F change was statistically significant (F change = 4,327, $p = .039$).

Table 4.31(A): Model Summary of PRP, GPRP and the Interaction of PRP and GPRP (N = 224)

| Model | R | R Square | Adjusted R Square | Standard Error of the Estimate | Change Statistics | | | | |
|-------|-------------------|----------|-------------------|--------------------------------|-------------------|---------|-----|-----|---------------|
| | | | | | R Square Change | F | df1 | df2 | Sig. F Change |
| 1 | .563 ^a | .316 | .313 | .331 | .316 | 102.764 | 1 | 222 | .000 |
| 2 | .654 ^b | .428 | .423 | .304 | .112 | 43.186 | 1 | 221 | .000 |
| 3 | .663 ^c | .439 | .432 | .301 | .011 | 4.327 | 1 | 220 | .039 |

Note. a= Predictors: (Constant), X₄. b= Predictors: (Constant), X₄, X_M. c= Predictors: (Constant), X₄, X_M, (X₄.X_M)

From Table 4.31(B) all the three models were statistically significant, for the first model (F(1,222)= 102.764, $p < .001$) for the second model (F(2,221)= 82.739, $p < .001$) and for the third model (F(3,220) = 57.432, $p < .001$).

Table 4.31(B): ANOVA^a for PRP, GPRP and the Interaction of PRP and GPRP (N = 224)

| Model | | Sum of Squares | Df | Mean Square | F | Sig. (<i>p-value</i>) |
|-------|------------|----------------|-----|-------------|---------|-------------------------|
| 1 | Regression | 11.265 | 1 | 11.265 | 102.764 | .000 ^b |
| | Residual | 24.337 | 222 | .110 | | |
| | Total | 35.602 | 223 | | | |
| 2 | Regression | 15.244 | 2 | 7.622 | 82.739 | .000 ^c |
| | Residual | 20.358 | 221 | .092 | | |
| | Total | 35.602 | 223 | | | |
| 3 | Regression | 15.636 | 3 | 5.212 | 57.432 | .000 ^d |
| | Residual | 19.966 | 220 | .091 | | |
| | Total | 35.602 | 223 | | | |

Note. a= Dependent Variable: Y. b= Predictors: (Constant), X₄. c= Predictors: (Constant), X₄, X_M. d= Predictors: (Constant), X₄, X_M, (X₄.X_M)

From Table 4.31(C) the final equations for the three models are:

Model 1: $Y = 1.598 + .615X_4$

Model 2: $Y = 1.088 + .414X_4 + .325X_M$

Model 3: $Y = 1.188 + .402X_4 + .315X_M - .019(X_4X_M)$

Table 4.31(C): Coefficients^a of PRP, GPRP and the Interaction of PRP and GPRP (N = 224)

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Collinearity Statistics | |
|-------|----------------------------------|-----------------------------|----------------|---------------------------|--------|------|-------------------------|-------|
| | | B | Standard Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | 1.598 | .254 | | 6.300 | .000 | | |
| | X ₄ | .615 | .061 | .563 | 10.137 | .000 | 1.000 | 1.000 |
| 2 | (Constant) | 1.088 | .245 | | 4.438 | .000 | | |
| | X ₄ | .414 | .063 | .379 | 6.524 | .000 | .768 | 1.302 |
| | X _M | .325 | .049 | .381 | 6.572 | .000 | .768 | 1.302 |
| 3 | (Constant) | 1.188 | .248 | | 4.790 | .000 | | |
| | X ₄ | .402 | .063 | .368 | 6.353 | .000 | .761 | 1.314 |
| | X _M | .315 | .049 | .370 | 6.394 | .000 | .761 | 1.314 |
| | (X ₄ X _M) | -.019 | .009 | -.107 | -2.080 | .039 | .967 | 1.034 |

Note. a= Dependent Variable: Y

From Model 3 this indicates that for each unit increase in Product Realization Processes (X₄) the Performance (Y) will increase by an index of .402 when X_M and the interaction of X₄ and X_M are held constant. For each unit increase in X_M, Performance (Y) will increase by an index of .315 when X₄ and the interaction of X₄ and X_M are held constant. For each unit increase in the interaction term, Performance (Y) will decrease by an index of .019 when X₄ and X_M are held constant.

4.14.1 Profile Plot of Y, X₄ and X_M

Figure 4.8 shows that the main effect on Performance (Y) due to Product Realization Processes (X₄) while ignoring Government procurement regulations and policies (X_M) was slightly significant as the average distance between the two extreme points are not the same. Likewise, the main effect due to Government Procurement Regulations and Policies (X_M) whilst ignoring Product Realization Processes (X₄) was slightly significant. The slopes of the two lines are not the same and they are not parallel hence an interaction effect with respect to the two levels of Government Procurement Regulations and Policies.

Profile Plot of Y, X₄ and X_M

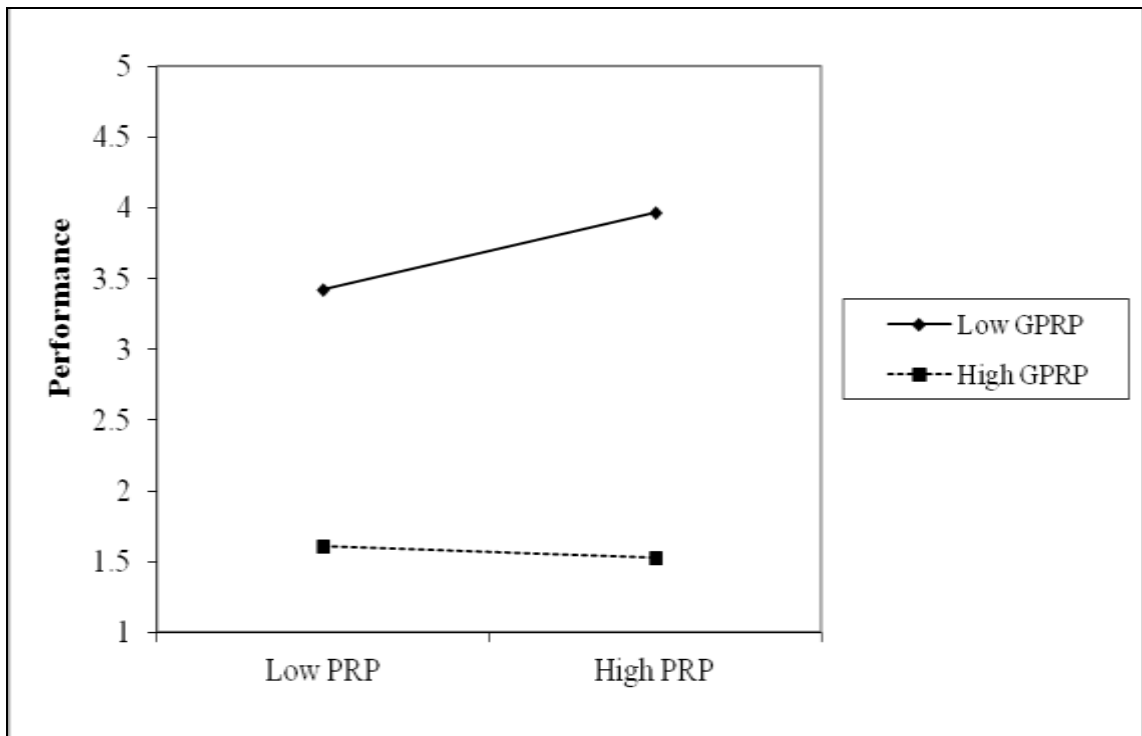


Figure 4.8: Interaction/Moderation of PRP and GPRP on Performance.

4.14.2 Discussions on the Moderating Effect of GPRP on the PRP and Performance

In Model 1 Performance (Y) was regressed on Product Realization Processes (X_4) the regression coefficient for Product Realization Processes (X_4) was statistically significant ($\beta_4 = .615, t = 10.137, p < .001$). This indicates that for each unit increase in Product Realization Processes (X_4) the Performance (Y) will increase by an index of .615 units. In Model 2 Performance (Y) was regressed on Product Realization Processes (X_4) and Government Procurement Regulations and Policies (X_M) the regression coefficient of Product Realization Processes (X_4) was statistically significant ($\beta_4 = .414, t = 6.524, p < .001$) despite the fact that it had reduced from .615 units to .414 units. The regression coefficient of Government Procurement Regulations and Policies (X_M) was statistically significant ($\beta_M = .325, t = 6.572, p < .001$) hence X_M as a predictor was significant in Model 2.

In Model 3 Performance (Y) was regressed on Product Realization Processes (X_4), Government Procurement Regulations and Policies (X_M) and the interaction of Product Realization Processes and Government Procurement Regulations and Policies ($X_4.X_M$). The regression coefficient for Product Realization Processes (X_4) had increased in magnitude to .509 but was statistically significant ($\beta_4 = .402, t = 6.353, p < .001$). The regression coefficient of Government Procurement Regulations and Policies (X_M) reduced marginally and was statistically significant ($\beta_{4M} = .315, t = 6.394, p < .001$). The regression coefficient of the interaction term ($X_4.X_M$) was statistically significant ($\beta_{4M} = -.019, t = -2.080, p = .039$). Hence we reject the Null Hypothesis ($H_{06(A4)}: \beta_{4M} = 0$) that “The Government Procurement Regulations and Policies do not significantly moderate between Product Realization Processes and the Performance of the Departments at GOK Ministry Headquarters”.

4.15 The Joint Moderation Effect

To test that Government Procurement Regulations and Policies does not significantly moderate the relationship between Performance and the four(4) independent variables,

hierarchical regression was applied, in which Performance was regressed on the four (4) independent variables; Management Responsibility Processes (X_1), Resource Management Processes (X_2), Measurement, Analysis and Improvement Processes (X_3), Product Realization Processes (X_4) and then the moderating variable, Government Procurement Regulations and Policies (X_M) was entered into the model as a predictor and finally the interaction terms (Management responsibility Processes*Government Procurement Regulations and Policies), (Resource Management Processes*Government Procurement Regulations and Policies), (Measurement, analysis and Improvement Processes*Government Procurement Regulations and Policies) and (Product Realization Processes*Government Procurement Regulations and Policies).

4.15.1 Inferential statistics of the Joint Moderation effect of GPRP on ISO 9001:2008 Dimensions and the Performance of SCM Departments

Hypothesis SIX (B)

H_{06(B)}: *The Government Procurement Regulations and Policies do not significantly moderate between Management Responsibility Processes (MRP), Resource Management Processes (RMP), Measurement, Analysis and Improvement Processes (MAIP), and Product Realization Processes (PRP) on the Performance of the Departments*

From Table 4.32 the F change was statistically significant (F change = 40.264, $p < .001$) on entering Management responsibility Processes (X_1), Resource Management Processes (X_2), Measurement, Improvement and Analysis Processes (X_3), Product Realization Processes (X_4) into the model¹. On adding Government Procurement Regulations and Policies (X_4) the model² improved as the F change was statistically significant (F change = 41.302, $p < .001$). When the interaction terms were added into the model³ the R square change was statistically insignificant (R square change = .018, $p = .086$) and also the F change was statistically insignificant (F change = 2.068, $p = .086$). From Table 4.32 all the three models were statistically significant, for the first model (F(4,219)= 40.264, p

< .001) for the second model ($F(5,218)= 46.400, p < .001$) and for the third model ($F(9,214) = 27.2702, p < .001$).

Table 4.32: The Model Summary of all the Study Variables (N = 224)

| Model | R | R Square | Adjusted R Square | Standard Error of the Estimate | Change Statistics | | | | |
|-------|-------------------|----------|-------------------|--------------------------------|-------------------|----------|-----|-----|---------------|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change |
| 1 | .651 ^a | .424 | .413 | .306 | .424 | 40.264 | 4 | 219 | .000 |
| 2 | .718 ^b | .516 | .504 | .281 | .092 | 41.302 | 1 | 218 | .000 |
| 3 | .730 ^c | .534 | .514 | .279 | .018 | 2.068 | 4 | 214 | .086 |

Note. a= Predictors: (Constant), X₁, X₂, X₃, X₄, b= Predictors: (Constant), X₁, X₂, X₃, X₄, X_M

c= Predictors: (Constant), X₁, X₂, X₃, X₄, X_M, (X₁.X_M) (X₂. X_M), (X₃.X_M) (X₄X_M)

The Analysis of Variance is summarized in Table 4.33 as follows.

Table 4.33: ANOVA^a of all the Study Variables. (N = 224)

| Model | | Sum of Squares | Df | Mean Square | F | Sig.(p-value) |
|-------|------------|----------------|-----|-------------|--------|-------------------|
| 1 | Regression | 15.087 | 4 | 3.772 | 40.264 | .000 ^b |
| | Residual | 20.515 | 219 | .094 | | |
| | Total | 35.602 | 223 | | | |
| 2 | Regression | 18.355 | 5 | 3.671 | 46.400 | .000 ^c |
| | Residual | 17.247 | 218 | .079 | | |
| | Total | 35.602 | 223 | | | |
| 3 | Regression | 18.997 | 9 | 2.111 | 27.202 | .000 ^d |
| | Residual | 16.606 | 214 | .078 | | |
| | Total | 35.602 | 223 | | | |

4.15.2 Discussion on Joint Overall Model

The study sought to evaluate how Management responsibility Processes (MRP), Resource Management Processes (RMP), Measurement, Analysis and Improvement Processes (MAIP), and Product Realization Processes (PRP) and the moderating effect of Government Procurement Regulations and Policies (GPRP) affects the Performance

of SCM departments. From the inferential statistics it was observed that when the four independent variables; Management Responsibility, Resource Management Process, Measurement, Analysis and Improvement and Product Realization Processes were regressed on Performance and then the moderator Government Procurement Regulations and Policies was introduced, it emerged that three ISO 9001:2008 dimensions were found to be statistically significant and hence significant predictors of the performance of the Supply Chain Management departments.

For the first model ($F(4,219) = 40.264, p < .001$) and for the second model ($F(5,218) = 46.400, p < .001$) and for the third model ($F(9,214) = 27.2702, p < .001$) as shown in Table 4.33. From Table 4.33 indicates that when the interaction terms were added into the model³ the R square change was statistically insignificant (R square change = .018, $p = .086$) and also the F change was statistically insignificant (F change = 2.068, $p = .086$). From this result, the study fails to reject the null hypothesis ($H_{06(B)}: \beta_{iM} = 0$) that: *“The Government Procurement Regulations and Policies (GPRP) do not significantly moderate between Management Responsibility Processes (MRP), Resource Management Processes (RMP), Measurement, Analysis and Improvement Processes (MAIP), and Product Realization Processes (PRP) on the Performance of the Departments”*.

Eken, and Selimler (2015) on the effects of regulations on the performance of banks in the Turkish Banking Industry established that tighter government regulations, close monitoring, tighter restrictions, strengthened supervision, and more capital and reforms had a positive impact on efficiency of the banks studied. They indicated that although deregulation and loose supervision at times seemed to result in increased efficiency, it was found not sustainable due to an ever changing economic environment and also through poor management practices that could have resulted from supervisory conditions not mentioned. The findings also implied that, compared to external factors such as government regulations, internal factors tended to have a greater effect on productivity. Therefore, the significance of regulations for the better performance of banks and for monitoring them could be less crucial than the management quality in

contrast to what is believed by many. This agrees with our findings on regulations and policies on performance of SCM departments in GOK Ministries.

Similarly, a report on the impact of government regulation on Microfinance performance Hubka and Zaidi (2005) for the World Development Report, opening of a new regulatory window enabled MFIs to achieve profitability or afford commercial costs of capital if they are not able to do so prior to application or licensing. It notes that although economies of scale could be important for microfinance, most of the benefits are captured between the 5,000-10,000 client ranges. The report states that minimum capital requirements for a bank charter are less than \$10 million in many countries and often as low as \$1-3 million (CGAP, 2000).

A similar study of Latin American NGOs that had transformed into financial institutions, found that the minimum capital did not impose a challenge as the amount required by these institutions was either the same or less than the amount required to create and maintain profitable operations according to Rhyne (2001). However, this report concluded that tiered regulatory structures in Latin America had generally been well-regarded and a number of other countries were pursuing this approach to deepen the microfinance sector. From these, the report observed that important lessons could be drawn from it that supervisory capacity of an organization and statutory regulations go hand in hand. It further indicates that if countries ease regulatory requirements for institutions, they needed to supplement this expansion by strengthening supervisory capacity of the respective organizations to deal with the ever changing markets. Countries that ease their regulations, need to strengthen supervisory capacity to deal with subsequent entry due to accommodation regulations and implementing tougher regulation in operational areas such as higher capital adequate requirements and stricter loan loss provisioning, may help to offset the risks associated with lower minimal capital requirements.

Studies on the moderating effects of institutional pressures on emergent green supply chain practices and performance by Zhu and Sarkis (2007) revealed that Chinese

manufacturers had experienced increasing environmental pressure to implement Green Supply Chain Management (GSCM) practices. Similarly, these studies demonstrated that the existence of market (normative) and regulatory (coercive) pressures influences organizations to have improved environmental performance, more so when these pressures cause adoption of eco-design and green purchasing practices. Their study findings also reflected that manufacturers facing higher regulatory pressures tended to implement green purchasing and investment recovery. They also established that competitive (mimetic) pressure existence significantly improved the economic benefits from adoption of a number of GSCM practices with no negative influences on environmental performance. The findings concluded that none of the institutional pressures (government regulations) contributed to or in effect lessened possible full achievement situations for organizations.

A study by Mellahi (2007) on the effect of regulations on HRM in the private sector firms in Saudi Arabia established that the emerging legal framework for HRM in the private sector, tended to have a positive effect of harmonizing employment statutes that helped regulate the industry in the country. The changing HRM practices through laws and regulations were found appropriate and had a significance change in HRM practices in Saudi Arabia and this had significant implications for private sector managers and policy makers.

4.15.3 The Final Model

From Table 4.38 in Appendix IV, the final moderated multiple regression model consisting of the interaction of the independent variables with the moderating variable is:

$$Y = 0.379 + .149X_1 - .59X_2 + .346X_3 + .188X_4 + .296X_M - .001(X_1.X_M) - .001(X_2.X_M) - .028(X_3.X_M) - .008(X_4.X_M)$$

Where Y = Performance of Supply chain departments

X_1 = Management responsibility Processes;

X_2 = Resource Management Processes;

X_3 = Measurement, Analysis and Improvement Processes;

X_4 = Product Realization Processes;

X_M = Government Procurement Regulations and Policies;

$(X_1.X_M)$ = Interaction of Management Responsibility Processes and Government Procurement Regulations and Policies;

$(X_2.X_M)$ = Interaction of Resource Management Processes and Government Procurement Regulations and Policies;

$(X_3.X_M)$ = Interaction of Measurement, Analysis and Improvement Processes and Government Procurement Regulations and Policies;

$(X_4.X_M)$ = Interaction of Product Realization Processes and Government Procurement Regulations and Policies;

4.16. Summary of Hypotheses Tested

Table 4.34: Results of the Hypothesis Tests

| Hypothesis Number | Hypothesis Statement | Decision |
|---------------------------|--|---|
| H₀₁ | The Supply Chain Management Responsibility Processes has no significant effect on the Performance of the Departments | Reject H₀₁:β₁ = 0 |
| H₀₂ | The Supply Chain Resource Management Processes has no significant effect on the Performance of the Departments | Reject H₀₂:β₂ = 0 |
| H₀₃ | The Supply Chain Measurement, Improvement and Analysis Processes has no significant effect on the Performance of the Departments | Reject H₀₃:β₃ = 0 |
| H₀₄ | The Supply Chain Product Realization Processes has no significant effect on the Performance of the Departments | Reject H₀₄:β₄ = 0 |
| H₀₅ | The ISO 9001:2008 Dimensions have no significant effect on the Performance of the Departments | Fail to Reject H₀₅ : β₂=0 |
| H_{06(A1)} | The Government Procurement Regulations and Policies do not significantly moderate between Management Responsibility Processes and the Performance of the Departments at GOK Ministry Headquarters | Fail to Reject H_{06(A1)}: β_{1Z}=0 |
| H_{06(A2)} | The Government Procurement Regulations and Policies do not significantly moderate between Resource Management Processes and the Performance of the Departments at GOK Ministry Headquarters | Fail to Reject H_{06(A2)}: β_{2Z}=0 |
| H_{06(A3)} | The Government Procurement Regulations and Policies do not significantly moderate between Measurement, Improvement and Analysis Processes and the Performance of the Departments at GOK Ministry Headquarters | Reject H_{06(A3)}: β_{3Z}=0 |
| H_{06(A4)} | The Government Procurement Regulations and Policies do not significantly moderate between Product Realization Processes and the Performance of the Departments at GOK Ministry Headquarters | Reject H_{06(A4)}: β_{4Z}=0 |
| H_{06(B)} | The Government Procurement Regulations and Policies do not significantly moderate between Management Responsibility Processes, Resource Management Processes, Measurement, Improvement and Analysis Processes, and Product Realization Processes on the Performance of the Departments | Fail to Reject H_{06(B)}: β_{IM}=0 |

Table 4.35: Summary of Moderating Effects Results

| Hypothesis | Variables | F-Change | p-value | Decision |
|---------------------------|--|-----------------|----------------|-------------------------------|
| H_{06(A1)} | (X ₁ .X _M), Y | 3.378 | .067 | Fail to Reject H ₀ |
| H_{06(A2)} | (X ₂ .X _M), Y | .291 | .590 | Fail to Reject H ₀ |
| H_{06(A3)} | (X ₃ .X _M), Y | 11.029 | .001 | Reject H ₀ |
| H_{06(A4)} | (X ₄ .X _M), Y | 4.327 | .039 | Reject H ₀ |
| H_{06(B)} | (X ₁ .X _M), (X ₂ .X _M), (X ₃ .X _M) (X ₄ .X _M) Y | 2.068 | .585 | Fail to Reject H ₀ |

4.17 Qualitative Analysis

The study also employed qualitative methods for data generation. For purposes of triangulation of responses in the tool, data was obtained from the respondents using open ended questions. According to Patton, (1999), triangulation is the use of multiple methods or data sources in qualitative research to develop a comprehensive understanding of phenomena. Respondents were probed for their suggestions

4.17.1 Suggestions on other aspects of Management Responsibility processes affect Performance of SCM Departments

When asked to comment on any other aspects of Management Responsibility Processes in the ISO QMS affected performance of the Departments majority of the respondents (37%) identified the provision of office space as the greatest factor influencing performance. Others identified were provision of adequate manpower (9%), proper coordination (9%), adherence to customer needs (9%), performance contracting and reviews (9%), proper records management (9%), appropriate resource allocation (9%) and management familiarization with procurement (9%). This is summarized in Table 4.36 and it indicates that most respondents believe provision of a better working

environment in for of office space as a management responsibility had a greater effect on performance.

These findings agree with the studies of Kamarulzaman et al. (2011) in which they noted that indoor environments in an office has a great influence on employees' attitudes, behaviour, satisfaction levels and work performance. Raziq and Maulabakash (2015), in their research showed that there was a positive relationship between working environment and job satisfaction. On studies on employees working in the banking sector, university and telecommunication all agreed that that the working environment plays a vital role in attaining job satisfaction and hence performance.

Table 4.36: Suggestions on other areas of Management Responsibility processes affecting Performance

| Response | Percentage |
|--|-------------------|
| Provision of sufficient Manpower | 9.0 |
| Proper Coordination | 9.0 |
| Provision of adequate Office Space | 37.0 |
| Adherence to customer needs | 9.0 |
| Adherence to Performance Contracting and Reviews | 9.0 |
| Proper Records Management | 9.0 |
| Appropriate Resource allocation | 9.0 |
| Management familiarization with procurement | 9.0 |
| N | 100.0 |

n = 224

4.17.2 Suggestions on other Aspects of the Resource Management Processes affecting Performance

With respect to any other aspects of resource management processes that the respondents thought have an effect on the performance of the departments, 13% indicated that staff motivation does, while 47% felt that provision of adequate equipment had effect on the performance. Another 13% also indicated that updating the inventory

systems had a significant effect while 20% of the respondents felt that training of staff had effect on the performance.

Only 7% of the respondents indicated that adequate financial resources were adequate to have effect on the performance of these departments.

Therefore majority of the respondents 47% felt that inadequate equipment had a major effect on the performance of the Supply Chain Management departments as shown in Table 4.37.

This agrees with studies by Orjan (1998) on measurement of overall equipment effectiveness as a basis of productivity. He observed that lack of equipment or failure to maintain equipment significantly reduced productivity levels by values as high as 55% of the overall expected output.

Table 4.37: Suggestions on other Aspects of the Resource Management Processes affecting Performance

| Aspect | Percentage |
|---------------------------------|-------------------|
| Staff Motivation | 13.0 |
| Provision of adequate equipment | 47.0 |
| Updating of inventory systems | 13.0 |
| Training of staff | 20.0 |
| Adequate Financial Resource | 7.0 |
| N | 100.0 |

n = 224

4.17.3 Suggestions on any other Aspects of Measurement, Improvement and Analysis that affect Performance

When asked to suggest other aspects of measurement, improvement and analysis that have an effect on the performance of the SCM departments in the Ministries, most of the respondents, 32% indicated that the measurement of budget absorption had the greatest effect, while the use of S11 and volume of documents, work-life balance, proper job

descriptions and other improvement processes all gave a 17% level of effect to performance as shown in Table 4.38.

Table 4.38: Suggestions on any other Aspects of Measurement, Improvement and Analysis affecting Performance

| Aspect | Percentage |
|------------------------------------|-------------------|
| Use of S11 and volume of documents | 17.0 |
| Work life Balance | 17.0 |
| Proper Job Descriptions | 17.0 |
| Improvement of processes | 17.0 |
| Measurement of Budget Absorption | 32.0 |
| N | 100.0 |

n=224

4.17.4 Suggestions on other Aspects of the Product Realization Processes affecting Performance

Respondents were able to highlight that the timely acquisition and disposal of assets, lack of storage space, resource allocation and failure by users to provide comprehensive specifications were the main aspects within the ISO product realization processes that have an effect on the performance of these SCM departments. This is summarized in Table 4.39.

Table 4.39: Suggestions on other Aspects of the Product Realization Processes affecting Performance

| Aspect | Percentage |
|--|-------------------|
| Timely acquisition and disposal of assets | 25.0 |
| Lack of storage space | 25.0 |
| Resource allocation | 25.0 |
| Failure by users to provide comprehensive specifications | 25.0 |
| N | 100.0 |

n=224

4.17.5 Suggestions on other aspects of the Government Procurement Regulations and Policies have effect on the Performance of the SCM (N=224)

When asked if there were any other aspects of the Government Procurement regulations and policies have an effect on the performance of the SCM departments, 71% of the respondents identified the publication of new regulations as having a significant effect while 29% identified the accounting and procurement circulars. Therefore most of the respondents 71% indicated that government regulations have enhanced performance as shown in Table 4.40.

Table 4.40: Suggestions on other aspects of the Government Procurement Regulations and Policies having effect on the Performance

| Aspect | Percentage |
|--------------------------------------|-------------------|
| Publication of New Regulations | 71.0 |
| Accounting and Procurement Circulars | 29.0 |
| N | 100.0 |

n=224

These results corroborates the findings of Kale et al (2015) in their research on the effects of regulations in the Turkish Banking industry which indicated that tighter regulations, close monitoring, tighter restrictions, strengthened supervision, and more capital and reforms were seen to have a positive impact on efficiency. They observed that although deregulation and loose supervision sometimes seemed to result in efficiency increases, it is generally not sustainable due to unstable macroeconomic environment and/or bad management practices stemming from unspecified supervisory conditions.

SBRC (2008) investigated the impact of regulation on small business performance outcomes in England. In the findings, it was observed that although regulation clearly does impose costs on businesses and affect performance, the outcomes experienced in practice are not simply a function of the regulation involved. Rather, performance

outcomes depend on how business owners, and other stakeholders, adapt to specific regulations. It was also found that regulation generates multiple influences, simultaneously, which can be enabling and motivating for business owners as well as constraining. These influences were found to operate whether or not owner-managers and other actors were explicitly aware of them.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter highlights the summary of the study findings on the basis of the specific objectives of the study. It also draws conclusions from the findings and suggests policy recommendations on the basis of these findings as well as opening up new avenues for future research on the basis of the findings. The study focused on determining the effect of the ISO 9001:2008 supply chain processes on the performance of performance of selected departments at the Ministry headquarters. Specifically, the study sought to find out how Management responsibility processes, resource management processes, the measurement, improvement and analysis processes, product realization processes individually and collectively influence the performance of the SCM departments in the Ministries. It also sought to establish the moderating effect of government procurement regulations and policies on the variables and hence performance of the SCM departments in the Government of Kenya Ministry Headquarters.

5.2 Summary of Study Findings

The study collected data from 10 sampled Ministry headquarters out of which 234 provided feedback out of the initial estimated 284 targeted. This was after conducting a pilot study using at least 10% of similar institutions. On cleaning the data in the questionnaires, 224 remained which represented a response rate of 78%. The summary of the findings are as discussed:

5.2.1 Specific Objective One: To assess the effect of Management Responsibility Processes (MRP) on the performance of the departments

The study found that there was a moderate positive correlation between Management responsibility Processes and Performance among the departments. The inferential

statistics showed that Management responsibility Processes had an effect on the Performance of supply chain entities at GOK Ministries in Kenya, as the relationship was observed to be statistically significant ($p < 0.001$; $t = 7.104$). This was on the basis of the evidence that ISO management review meetings were being conducted, the management style was seen to be appropriate and a suitable organization structure was in place to facilitate the realization of standards. Hence the dimension of Management responsibility Processes has a positive effect on the Performance of Supply Chain entities at GOK Ministries in Kenya.

5.2.2 Specific Objective Two: To establish the effect of Resource Management Processes (RMP) on the Performance of the Departments

The inferential statistics showed that when Resource Management Processes was regressed on Performance the model was found to be statistically significant. Hence the dimension of Resource Management Processes has a positive effect on the Performance of Supply Chain entities at GOK Ministries in Kenya. The descriptive analysis suggests that the Resource Management processes support ISO implementation. This was attested by resource availability which was confirmed by the departments maintaining a human skills inventory, an assets register, regular asset audits and quality infrastructure. The technology in use was also found to be supportive of the ISO quality management system and this was confirmed through regular servicing of machines in the department, regular updating of the software in use, modern technology being embraced and protection of the assets from physical and/electronic attacks. There is also evidence of the human resource development which was established through a human skills inventory being in place, an updated employee training register and strategies to develop and retain talent. These human resource development aspects were seen to be supporting the ISO implementation in the SCM departments.

5.2.3 Specific Objective Three: To assess the effect of Measurement, Analysis and Improvement Processes (MAIP) on the performance of the Departments

The study found that there was a moderate positive correlation of Measurement, Improvement and Analysis Processes on Performance among the departments. The inferential statistics showed that when performance was regressed on Measurement, Improvement and Analysis Processes the model was found to be statistically significant. Hence the dimension of Measurement, Improvement and Analysis Processes has a positive effect on the Performance of Supply Chain entities at GOK Ministries in Kenya. The findings suggest that the departments were keen to undertake measurement, improvement and analysis in a bid to improve performance through this ISO processes. Efforts to adhere to the service charter and the establishment of customer feedback mechanisms were efforts to improve on the processing time of customer requests and hence quality service provision. This aspect of measurement leads to improved performance of these departments. A reduction of wastes through provision of quality materials, keeping a corrective action record, and the keeping of customer order records as an ISO process was also found to significantly affect the performance of these departments. There was also evidence of analysis of customer requirements and complaints to ensure that customer satisfaction levels are monitored hence maintaining performance.

5.2.4 Specific Objective Four: To evaluate the effect of Product Realization Processes (PRP) on the Performance of the Departments

The study found that there was a moderate positive correlation between Product Realization Processes and Performance among the departments. The inferential statistics showed that when Performance was regressed on Product Realization Processes the model was found to be statistically significant. Hence the dimension of Product Realization Processes has a positive effect on the Performance of Supply Chain entities at GOK Ministries in Kenya. The product realization process was measured against the parameters of procurement processes, distribution processes and customer processes.

The findings suggest that procurement processes were adhered to in the departments through the keeping of the product information records, the purchasing records, product verification records and inspection records to fulfil the ISO 9001:2008 requirements. The maintenance of product inspection plans is also an indicator that the departments adhere to customer related issues and hence affecting the performance of these departments significantly. On distribution, the supplier premises details and channels of distribution records were also found to be in place

5.2.5 Specific Objective Five: To establish the effect of the joint relationship between the Supply Chain ISO 9001:2008 dimensions and performance of the Departments

The objective was to evaluate the joint effect of ISO 9001:2008 Dimensions that were aggregated as Management responsibility Processes, Resource Management Processes, Measurement, Improvement and Analysis Processes and Product Realization Processes on Performance. The findings indicated that Management responsibility Processes provides a positive and significant effect on Performance. This was on the basis that one unit increase in dimension of Management responsibility Processes increases Performance by an index of .153 units when the others are held constant. There was evidence of management review meetings, an appropriate organizational structure and an appropriate leadership style which all led to the findings. On Resource Management Processes, the findings indicate that the processes provided a negative and insignificant effect on Performance since one unit increase in dimension of Resource Management Processes decreased Performance by an index of .006 units when the others are held constant. There was no evidence to link the various resource management parameters such as human resource and financial resource management to the joint performance of the variables. However when isolated as a single variable, these factors significantly influenced the performance of the departments.

The dimension on Measurement, Improvement and Analysis Processes had a positive and significant effect on Performance according to the research findings. From the simple linear regression analysis one unit increase in dimension of Measurement, Improvement and Analysis Processes (X_3) increases Performance (Y) by an index of .320 units when the others are held constant. This was on the basis of the evidence provided on improvement strategies, the PAS records provided and analysis of suppliers' records provided. On Product Realization Processes the results showed that it has a positive and significant effect on Performance, (Y). From the simple linear regression analysis one unit increase in dimension of Product Realization Processes (X_4) increases Performance (Y) by an index of .374 units when the others are held constant. The evidence on product realization initiatives such as process flow and records' keeping supported these findings.

5.2.6 Specific Objective Six: To assess the moderating influence of Government Procurement Regulations on the relationship between Supply Chain ISO 9001:2008 dimensions and performance of the Departments.

On the Moderating Effect of Government Procurement Regulations and Policies (GPRP) on the Relationship between Management responsibility Processes (MRP) and Performance the study found that The Government Procurement Regulations and Policies (GPRP) do not significantly moderate between Management Responsibility Processes (MRP) and the Performance of the Departments.

Looking at the Moderating Effect of Government Procurement Regulations and Policies (GPRP) on the Relationship between Resource Management Processes (RMP) and Performance the Government Procurement Regulations and Policies (GPRP) it was found that it does not significantly moderate between Resource Management Processes (RMP) and the Performance of the Departments.

On the Moderating Effect of Government Procurement Regulations and Policies (GPRP) on the Relationship between Measurement, Analysis and Improvement Processes

(MAIP) and Performance the study found that the Government Procurement Regulations and Policies (GPRP) do not significantly moderate between Measurement, Analysis and Improvement Processes (MAIP) and the Performance of the Departments.

Finally, on the Moderating Effect of Government Procurement Regulations and Policies (GPRP) on the Product Realization Processes (PRP) and Performance the findings indicate that the Government Procurement Regulations and Policies (GPRP) do not significantly moderate between Product Realization Processes (PRP) and the Performance of the Departments.

5.3 The Overall Effect of the Variables

A combined summary of Findings for the moderating effect of Government Procurement Regulations and Policies (GPRP) on Management responsibility Processes (MRP), Resource Management Processes (RMP), Measurement, Analysis and Improvement Processes (MAIP), Product Realization Processes (PRP) and their effect on the Performance of Supply Chain Management Departments at GOK Ministry Headquarters established that the Government Procurement Regulations and Policies do not significantly moderate between Management Responsibility Processes (MRP), Resource Management Processes (RMP), Measurement, Analysis and Improvement Processes (MAIP), and Product Realization Processes (PRP) on the Performance of the Departments.

5.4 Conclusion

From these findings, the researcher was able to draw the following conclusions:

Specific Objective One: To assess the effect of Management Responsibility Processes (MRP) on the performance of the departments

The study findings indicate that Management responsibility processes have a significant influence on the performance of the Supply Chain departments in the Ministries.

Therefore the parameters of management responsibility such as managerial attitude, an appropriate organization structure, regular review meetings, a good physical and emotional work environment, and management support of ISO could be positively used to influence the level of performance of these departments. The findings emphasize the importance of top management in the ISO 9001:2008 processes. Management is perceived as a significant enabler to the general work processes of these departments. Support from top management through the provision of necessary resources, a good work environment, provision of the necessary supply chain infrastructure and strict compliance with the ISO 9001:2008 Standard requirements will have a significant bearing on the performance of these SCM departments.

Specific Objective Two: To establish the effect of Resource Management Processes (RMP) on the Performance of the departments

The resource management processes were also found to be significant in influencing the performance of the Supply chain departments in the Ministries. Therefore provision of quality material resources, provision of quality infrastructure, the use of quality and appropriate technology, provision of quality secure environment and sound human resource practices that enhance human resource planning, development and retention could be used by these Ministries to enhance their performance in the Supply Chain departments. Therefore the adherence to Clause 6.2 of the ISO 9001:2008 Standard and which expresses Principle 3 which states that personnel performing work affecting conformity to product requirements shall be competent on the basis of education, training, skills and experience is of immense significance to these SCM departments. The focus on principle 2 in Clause 5 of the ISO 9001:2008 Standard which states that leadership should establish unity of purpose and direction and create a conducive internal environment is important in supporting the performance of the SCM departments in these Ministries.

Specific Objective Three: To assess the effect of Measurement, Analysis and Improvement Processes (MAIP) on the performance of the departments

The Measurement, Analysis and Improvement processes were also confirmed to be significant in influencing the performance of the Supply Chain entities. Therefore the various supply chain processes such as processing time, waste and cost reduction, quality measures and reaction time to customer related issues could be used by the departments to enhance their performance in the Ministries. The importance of reaction or processing time to customer requirements, inspection and testing of materials received and products to be supplied and validation of the level of conformity of the materials and products is of great importance in the realization of performance of the SCM departments. Similarly, efforts to minimize waste and cost reduction initiatives in these departments result in significant improvement on their performance. Management should hence endeavour to reinforce measurement of all work processes to enable provide factual data that will inform improvement initiatives within the SCM departments.

Specific Objective Four: To establish the effect of Product Realization Processes (PRP) on the performance of the departments

The product realization processes through the procurement processes, distribution processes and the handling of customer issues were found to have a significant effect on the performance of the departments. Basing on Principle No. 8 of mutually beneficial supplier relationships, Clause 7.4 of the ISO 9001:2008 of the Standard, it can be concluded that proper planning, enhancing customer related processes in procurement, processing and distribution all have a great bearing on the performance of the SCM departments. Therefore emphasis on acquisition of materials in the right condition guarantees products with the right customer specifications through quality supply chain processes. Management of these departments therefore needs to strengthen the procurement processes to reflect customer requirements, process the requests and products as per customer needs, distribute and avail them in expected timelines and

resolve customer related issues in real time to enhance performance of these departments.

Specific Objective Five: To establish the effect of the joint relationship between the Supply Chain ISO 9001:2008 dimensions and performance of the departments

From the findings which indicated that Management Responsibility while interacting with the other independent variables, it provided a positive and significant effect on performance, it can be concluded that Management responsibility is crucial in enhancing performance of Supply Chain Management departments of an ISO 8001:2008 certified organization as it contributes positively in supporting the performance of the other variables in the department. Having a sound organization structure, regular meetings, correct leadership styles and appropriate work environment would therefore significantly improve work performance in SCM departments.

The findings on Resource Management Processes which reflected a negative and insignificant effect on performance while interacting with other independent variables, it may be concluded that there is need to conduct further studies to seek an understanding of this research output. It could also be an indicator that resource management processes are subsumed in other variables such as management responsibility and therefore its independent contribution to overall performance becomes diminished and hence insignificant.

The findings on Measurement, Analysis and Improvement which when interacting with other independent variables had a positive and significant effect on performance reflect that in SCM departments, the use of accurate records, analysis of all supply chain data from customers and suppliers, the measurement of performance gaps on the basis of standards and overall use of the measurement results greatly enhance the performance of these departments as it facilitates other parameters that contribute to performance.

The findings on product realization processes which displayed a positive and significant effect on performance when interacted with other independent variables suggest that how the SCM department delivers its services through the processes of procurement, processing, distribution and how it handles customer issues has a great bearing in influencing the performance of such a department. It enhances the contribution of the other variables towards realization of improved performance.

Specific Objective Six: To assess the moderating influence of Government Procurement Regulations on the relationship between Supply Chain ISO 9001:2008 dimensions and performance of the departments

It may now be concluded that the Government Procurement Regulations and Policies do not significantly moderate between Management Responsibility Processes, Resource Management Processes, Measurement, Improvement and Analysis Processes, and Product Realization Processes on the Performance of the Departments. The adherence to these regulations as a regulatory obligation may be for purposes of fulfilling public interest but may not have a bearing on the performance of the SCM departments in the Ministries. Regulations in the Public Procurement and Disposal Act of 2015, Access to Government Procurement Opportunities and Public Procurement and Disposal Regulations only serve to defend public interests in supply chain processes and fail to contribute to performance of the departments. It may also be argued that adhering to the ISO 9001:2008 processes fully is in itself conforming to the existing government regulations and policies, hence the introduction of GPRP into the equation fails to add much significance on the overall performance of the SMC departments.

5.5 Recommendations for policy and practice

The study was mainly based on the Contingency theory, the Institutional theory and the Resource-based View theory. Financial and non-financial parameters were used to measure performance. Therefore, based on the study findings, the researcher makes the following recommendations:

Specific Objective One: To assess the effect of Management Responsibility Processes (MRP) on the performance of the departments

Arising from the significant role top managers in the Ministries play in the quality management system process, there is need for their full participation in the institutionalization of ISO in their Ministries and hence peg their Performance Contracts on the level of participation and compliance with ISO 9001:2008 quality system. This will enhance their continued conformity and support to these processes to help realize improved performance in the SCM departments. Currently, the PC focuses on the institutional adoption of the ISO QMS but not individual managers;

Specific Objective Two: To establish the effect of Resource Management Processes (RMP) on the Performance of the departments

There is need for Principal Secretaries in the Ministries to enhance the resource management processes since these were found to have a significant influence on performance. This could be through the provision of an enabling internal and external environment via a relevant policy framework, enhancing resource allocation through budgets, HR policies that promote appropriate recruitment, development and retention of quality human resource based on the ISO 9001: 2008 Standard, all of which have a significant bearing on the performance of the departments and hence Ministries;

Specific Objective Three: To assess the effect of Measurement, Analysis and Improvement Processes (MAIP) on the performance of the departments

Since it was found that measurement, improvement and analysis processes affect performance of SCM departments, the Principal Secretary at the National Treasury under whose purview all supply chain entities in all Ministries fall needs to provide guidelines on uniform measurement and analysis for improvement in the Supply chain in all the Ministries. These will streamline the process to ensure uniform process gain across all Ministries and hence improved performance.

Specific Objective Four: To establish the effect of Product Realization Processes (PRP) on the performance of the departments

The Heads of Supply Chain departments in the Ministries have an obligation to ensure quality and the researcher recommends that the ISO 9001:2008 products' realization processes through the procurement processes planning, purchasing, acquisition and distribution to user departments and sections should be appropriately identified as performance targets in their work so that their work output is weighted against these processes. This will ensure conformity to the ISO 9001:2008 Standard and performance in the departments.

Specific Objective Five: To establish the effect of the joint relationship between the Supply Chain ISO 9001:2008 dimensions and performance of the departments

The study findings suggest that all except the resource management processes have a positive and significant effect when interacting with other variables hence contributing to performance. There is therefore need to carry out an independent study on why resource management processes fails to contribute significantly to performance when interacted with the other independent variables. It is also recommended that based on the significance of each of the processes in contributing to performance, management of ISO 9001:2008 certified SCM departments should endeavour to reinforce their entire contribution through appropriate interventions.

Specific Objective Six: To assess the moderating influence of Government Procurement Regulations on the relationship between Supply Chain ISO 9001:2008 dimensions and performance of the departments

The study findings indicate that Government regulations do not significantly affect the performance of ISO 9001:2008 certified SCM departments in Ministries. The study therefore recommends that the Principal Secretary, National Treasury should develop new policy guidelines and regulations which not only enhance the public good but which

also favour the realization of the performance targets of the SCM departments in line with ISO 9001:2008 Quality Standard.

5.6 Recommendations for Further Research

The researcher focused on Supply Chain entities at the ISO 9001:2008 certified Ministry headquarters in Nairobi. It may be important for other researchers to focus on other National government agencies that are outside Nairobi such as State Corporations to establish if the findings in this study obtain in such agencies. This is considering the geographical spread of such agencies across Kenya plus their varied nature in terms of mandate and organization. Varied responses from field officers in Ministries may also provide a different dimension of the effect of ISO certification on their performance based on varied geographical and functional spreads.

This study examined generally how the combined Government Regulations in the procurement sector in Kenya affect the performance of SCM departments in the context of the ISO 9001:2008 processes. These interactions were fairly generalized and respondents perceived the effect in the said general frame, which may not reflect actual policies and regulations and how significantly they affect performance of these ISO certified departments. There is therefore need for further research to establish how specific government regulations such as Public Procurement and Disposal Act 2015, Access to Government Procurement Opportunities and Procurement regulations may individually influence performance of SCM departments.

This study focused on Supply Chain entities at Ministry Headquarters in Nairobi. Using the same variables, other researchers could attempt to establish how adoption of ISO 9001:2008 at County departments has affected performance of these departments at the County headquarters. The County governments in Kenya is a fairly new phenomena with its own administrative, functional and quality perspectives which require attention to establish whether these study findings still hold within the context. The geographical

spread of these Counties and their unique characteristics could form an interesting study of the variables and their relationships thence.

The study focused on how ISO 9001:2008 processes within a Supply Chain framework influence the performance of these departments. It may be interesting to focus on focal departments such as the Human Resource Management departments, Finance and Administrative services in these Ministries and assess to what extent these variables would remain true to these findings.

There is also need for further research to establish how the specific aspects in the supply chain processes such as procurement planning, ordering, and distribution and how they affect the performance of these departments. The study generalized the effect of these supply chain processes within an ISO 9001:2008 certified context. It would be interesting for researches to isolate each of these processes and study them within the context of these variables and asses their relative contribution to performance of the processes.

REFERENCES

- Ader, H., Mellenbergh, G., & Hand, D. (2008). *Advising on research methods: A consultant's companion*, Brussels, Belgium: Johannes van Kessel Publishing.
- Adil, B., & Lale, Ö. (2008). Analysing the effect of flexibility on manufacturing systems performance, *Journal of Manufacturing Technology Management*, 19(2), 172-193.
- Alcina, D., & Inaki, H. (2013). Efficiency of ISO 9001 in Portugal: A qualitative study from a holistic theoretical perspective. *International Journal for Quality Research*, 7(1), 31-36.
- Aldwin, C. M. (1994). *Stress, coping, and development*. New York: The Guilford Press.
- Amin, E. M. (2005). *Social Science Research, Conception Methodology and Analysis*. Younde: Wilsmith.
- Anastasia A. K. (2015). The mediating effects of psychological contracts on the relationship between human resource management systems and organizational performance, *International Journal of Manpower*, 36(1), 1012-1033.
- Anderson, S. W., Daly, J. D., & Johnson, M. F. (1999). Why firms seek ISO 9000 certification regulatory compliance or competitive advantage? *Production and Operations Management Journal*, 8(1), 28-43.
- Andrey P., & Bourne, M. (2011). Explaining the effects of performance measurement on performance: An organizational routines perspective", *International Journal of Operations & Production Management*, 31(1), 101-122.

- Andrey, P., & Mike, B. (2011). Explaining the effects of performance measurement on performance: An organizational routines perspective, *International Journal of Operations & Production Management*, 31(1), 101 -122.
- Anyango, D. M., & Wanjau, K. (2011). *Assessment of the relationship between ISO 9001 certification and performance of manufacturing firms in Nairobi*. Unpublished PhD thesis. Juja: JKUAT.
- Arasa, K., & Obonyo, P.K (2012). The relationship between strategic planning and firm performance. *International Journal of Humanities and Social Science*, 2(22), 71-93.
- Arauz, R., & Suzuki, H. (2004). ISO 9000 Performance in Japanese industries. *Total Quality Management and Business Excellence*, 15(1), 3-33.
- Arvind, D., & Christmann, P. (2008). Institutional and resource- based determinants of substantive implementation of ISO 14001. *In academy of management proceedings*, 1, 1-6.
- Babbie, E. (1990). *Survey Research Methods*: (2nd ed). Belmont, CA, Wadsworth.
- Barnes, F. C. (1998). Myth and reality, a reasonable approach to ISO 9000. *SAM Advanced Management Journal*, 63(2), 23-30.
- Bhuiyan, N., & Alam, N. (2005). An investigation into issues related to the latest version of ISO 9000. *Total quality management Journal*, 16(2), 199-213.
- Bititci, U. S., Ackermann, F., Aylin, A., John, D., Patrizia, G., Stephen, G., Jillian, M., ... & Seniye U. F. (2011). Managerial processes: business process that sustain performance. *International Journal of Operations & Production Management*, 31(8), 851-891.

- Bititci, U., Garengo, P., Dörfler, V., & Nudurupati, S. (2012). Performance measurement: Challenges for tomorrow. *International Journal of Management Reviews*, 14(3), 305-327.
- Black, K. (2010). *Business Statistics: Contemporary decision making* (6th ed.), Hoboken, New Jersey: John Wiley & Sons.
- Boermans M.A., & Roelfsema H. (2012). A resource-based view of internationalization in emerging economies. in: Marinov M.A., & Marinova S.T. (eds) *Impacts of emerging economies and firms on international business*. London: Palgrave Macmillan.
- Bourne, M., Andrey, P., Franco-Santos, M., Lucianetti, L., & Matteo, M. (2013). Generating organisational performance: The contributing effects of performance measurement and human resource management practices, *International Journal of Operations & Production Management*, 33 (11/12), 1599-1622.
- Box. S. (1999). Running government like a business: Implications for public administration theory and practice. *The American review of Public Administration*, 29 (2), 91-43.
- Breja, S.K., Banwet, D.K. & Iyer, K.C. (2011). Quality strategy for transformation: a case study, *The TQM Journal*, 23(1), 5-20,
- Briscoe, J. A., Fawcett, S. E., & Todd, R. H. (2005). The implementation and impact of ISO 9000 among small manufacturing enterprises. *Journal of small Business Management*, 43(3), 309-330.
- Bryman, A. (2012). *Research Methods*, (4th Ed.). London: Oxford University Press.

- Bryman, A., & Bell, E. (2011). *Business Research Methods*. (3rd ed.). London: Oxford University Press.
- Bryman, A., & Cramer, D. (1997). *Quantitative Data Analysis with SPSS for Windows: a guide for Social Scientists*. London: Routledge.
- Bwisa H., Otieno S., Kihoro J. (2012). Influence of entrepreneurial orientation on Kenya's manufacturing firms operating under East African Regional Integration. *International Journal of Learning and Development*, 2(1), 299-319.
- Carmignani, G. (2008). Process-based management: a structured approach to provide the best answers to the ISO 9001:2008 requirements. *Business process journal*, 14(6), 580-596.
- Cartwright, G. (1992). Lessons learned about ISO 9000. *The journal for quality and participation*, 15(5), 44-49.
- Casadesus, M., & Karapetrovic, S. (2005). Has ISO 9000 lost some luster? A longitudinal impact study. *International Journal of operations and production Management*, 25(6), 580-596.
- Casadesus, M., & Rodolfo, V. (2005). How improving quality improves supply chain management: Empirical study. *The TQM Magazine*. 17, 345-357.
- Changiz, V., & Mohsen, K. (2015). The moderating effect of motivations on the relationship between obtaining ISO 9001 certification and organizational performance, *The TQM Journal*, 27(5), 503-518.
- Chapman, E., Sisk, F., Schatten, J., & Miles, E. (2018). Human resource development and human resource management levers for sustained competitive

advantage: Combining isomorphism and differentiation. *Journal of Management & Organization*, 24(4), 533-550.

Cheruiyot, T.K., & Maru, L.C. (2013) Service quality and relative performance of public universities in East Africa, *The TQM Journal*, 25(5), 533-546.

Chiung-Hui, T., & Chen, S. (2015). Do firms with more alliance experience outperform others with less? A three-level sigmoid model and the moderating effects of diversification. *Canadian Journal of Administrative Sciences*, 34(3), 229-243.

Chow-Chua, C., Goh, M., & Wan, T. B. (2003). Does ISO 9000 certification improve business performance? *International Journal of quality and reliability management*, 20(8), 936-953.

Chua, W., & Petty, R. (1999). Mimicry, director interlocks and the inter organizational diffusion of a quality: A note. *Journal of Management accounting research*, 11(2), 93-104.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers.

Collins, H. (2010). *Creative Research: The theory and practice of research for the creative industries*. Worthing, United Kingdom: AVA Publications.

Commission for Higher Education. (2012). *Accreditation and quality assurance report July 2006 to June 2012*, Nairobi: CHE.

Cooper, D., & Schindler, P. (2010). *Business Research Methods*. New York: McGraw-Hill Education.

- Crowther, D. & Lancaster, G. (2008) *Research Methods: A Concise Introduction to Research in Management and Business Consultancy*. Oxford: Butterworth-Heinemann.
- D'Netto, B., & Sohal, A. S. (1999). Human resource practices and workforce diversity: an empirical assessment. *International Journal of Manpower*, 20(8), 530-547.
- Daniel, I. P. (2011). The roles of firms' motives in affecting the outcomes of ISO 9000 adoption. *International Journal of Operations and Production Management*, 31(1), 78-100.
- Daniel, P., Baofeng, H., & Zhaojun, H. (2012). The effects of different aspects of ISO 9000 implementation on key supply chain management practices and operational performance, *Supply Chain Management: An International Journal*, 17(3), 306-322.
- Darlington, R. (1968). Multiple Regression in psychological research and practice. *Psychological Bulletin*, 69(3), 161-182.
- Davenport, T H. (1993). *Process innovation: re-engineering work through information technology*. Boston MA: Havard Business School Press.
- David U. (1998). Just-in-time and performance measurement systems. *International Journal of Operations & Production Management*, 18(11), 101-1110.
- Deming, W. E. (1982). *Quality productivity and competitive position*. Boston, MA: Havard Business School Press.
- De-Sena, P. D., & Heras-Saizarbitoria, I. (2013). Efficiency of ISO 9001 in Portugal: A qualitative study from a holistic theoretical perspective. *International Journal for quality research*, 7(1), 31-62.

- Dick, G. P. (2000). ISO 9000 certification benefits: reality or myths? *The TQM Magazine*, 12(6), 365-371.
- DiMaggio P. J., & Powell W.W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review* 48(2), 147-160.
- Donaldson L. (1985). Organisation design and the life cycle of products. *Journal of management studies*, 22(1), 378-392.
- Dorthe, D., Haakonsson, R., Richard, M. B., Børge, O., & Jørgen, L. (2008). How failure to align organizational climate and leadership style affects performance, *Management Decision*, 46(3), 406-432.
- Emmanuel, O., & Lyoyd, C.H. (2011). Leadership style, organizational culture and performance: empirical evidence from UK companies. *The International Journal of Human Resource Management*. 11(4), 209-221.
- Eskildsen, J., Kristensen, K., Juhl, H. J. & Ostergaard, P. (2004). The drivers of customer satisfaction and loyalty; the case of Denmark 2000-2002. *Total quality management*, 15(6), 859-868.
- Fabrizio, S., Cipriano, F., Manus, R., & Thomas, Y. C. (2001). Supply chain interactions and time-related performances: An operations management perspective, *International Journal of Operations & Production Management*, 21(4), 461-475.
- Feng, M., Terziovski, M., & Samson, D. (2007). Relationship of ISO 9001:2000 quality system certification with operational and business performance: A survey in Australia and New Zealand-based manufacturing and service companies. *Journal of Manufacturing Technology Management*, 19(1), 22-37.

- Fontana, A., & Frey, J. H. (2000). The interview: From structured questions to negotiated text. In N. K. Denzin, & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed.), Thousand Oaks, CA: Sage Publishers.
- Forker, L. B., Mendez, D., & Hershaner, J. C. (2010). Total quality Management in the Supply Chain. What is the impact on performance? *International journal for production research*, 35(6), 1681-1702.
- Forker, L., & Forker, L. B. (1997). Factors affecting supplier quality performance. *J Operations Management*, 1, 243-269.
- Frankfort-Nachmias, C., & Nachmias, D. (1996). *Research methods in the social sciences*. (5th ed.), London: Armond Publishers.
- Gamboa, J.A. & Melao, N. (2012). The impacts and success factors of ISO 9001 in education: Experiences from Portuguese vocational schools. *International Journal of Quality & Reliability Management*. 29(4), 384-401.
- Gay, L. R. (1987). *Educational Research: Competencies for analysis and application* (3rd ed.) London: Merrill Publishing.
- Green, S. B. (1991). How many subjects does it take to do a regression analysis, *Multivariate Behavioral Research Journal*, 26(3), 499-510.
- Grigg, N., & Mann, R. (2008). Review of the Australian business excellence framework: A comparison of national strategies for designing, administering and promoting Business Excellence Frameworks. *The Total Quality Management Journal*. 19. 1173-1188.
- Haakonsson, D., Burton, R., Børge, O., & Lauridsen, J. (2008). How failure to align organizational climate and leadership style affects performance, *Management Decision*, 46(3), 406-432.

- Hammer, M., & Champy, J. (1993). *Re-engineering the corporation: A manifesto for business revolution*. New York: Harper Business.
- Hanna, S., & Liisa-Maija, S. (2010). Customer knowledge processing and key account performance, *European Business Review*, 22(3), 339-352.
- Hayden, J. (2017). *Introduction to health behaviour theory*, (2nd ed.) New York: Amazon.
- Heidari, F., Loucopoulos, P., & Kedad, Z. (2011). *A quality-oriented business process meta-model*, In J.Barjis, T.Eldabi and A.Gupta(eds). *EOMAS*, 88, 85-99.
- Heinrich, R., & Paech, B. (2010). Defining the quality of business process: *In Proc. Modellierung*, 161(2), 133-148.
- Hofstede, G. (2011). Dimensionalizing cultures: The Hofstede Model in context. *Online Readings in Psychology and Culture*, 2(1), 459-470.
- Hu, H.-H., Kandampully, J., & Juwaheer, T. D. (2009). Relationships and impacts of service quality, perceived value, customer satisfaction and image: An empirical study. *The service industries journal*, 29(2), 111-125.
- International Organization for Standardization (ISO). (2008). *Introduction and support package implementation guidance for ISO 9001:2008*. ISO/TC/176/SC2/N/N836.
- Jason, O., & Elaine, W. (2002). Four assumptions of multiple regression that researchers should always test. *Practical Assessment, Research & Evaluation*, 8(4), 223-250.
- Jayanth, J., Shawnee, K., Vickery, D., & Cornelia, D. (2000). The effects of information system infrastructure and process improvements on supply-chain time

- performance. *International Journal of Physical Distribution & Logistics Management*, 30(3), 314-360.
- Jin, S., Vidyaranya, B., & Gargeya, B. (2016). Supplier selection in small- and medium-sized firms: The case of the US textile and apparel industry, *American Journal of Business*, 31(4), 166-186.
- John M., Marek S., & Colin N. (2000). Process variability and its effect on plant performance, *International Journal of Operations & Production Management*, 20 (7), 792-808.
- Joubert, B. (1998). International quality standards. *Production and inventory management journal*, 39(2), 60-65.
- Juan, L., & Juan, J. (2003). The importance of internal aspects in quality improvement. *International Journal of Quality & Reliability Management*, 20(3), 304-324.
- Kamarulzaman, Y., & Zolkepli, I. (2015). Social media adoption: The role of media needs and innovation characteristics. *Computers in Human Behavior*. 43(4), 189-209.
- Kamran, R., & Haris, A. M. (2012) Business excellence through total supply chain quality management, *Asian Journal on Quality*, 13(3), 309-324.
- Kanji, G. K. (1998). An innovative approach to make ISO 9000 standards more effective. *Total quality management*, 9(1), 67-68.
- Karapetrovic, S., & Willborn, W. (1999). Quality assurance in investment services. *Managing Service Quality: An International Journal*, 9(4), 222-230.
- Kariuki, M. M., & Kasomi, F. M. (2011). The perception of Kenyan Citizens on improvement of public service delivery since implementation of

performance contracts in Kenya. *DBA African Management Review*, 1(1), 349-370.

Kaziliūnas, A. (2010). Success factors for quality management systems: certification benefits. *Intellectual Economics Research Journal*, 2(8), 267-280.

Keith, T. (2006). *Multiple regression and beyond*. London: Pearson Alln & Bacon.

Keogh, G. (1994). Use and investment markets in British real estate. *Journal of Property Valuation and Investment*, 12(4), 58-72.

Kleinbaum, D.G.; Kupper, L.L., & Muller, K.E. (1988). *Applied regression analysis and other multivariable methods*, (2nd ed.). Boston: PWS-Kent.

Kombo, K. D., & Tromp, D. L. (2009). *Proposal and thesis writing. An introduction*. Nairobi: Paulines Publication Africa.

Kothari, C. R. (2008). *Quantitative Techniques* (3rd ed.). New Delhi: New Age International Publishers.

Kujala, S. (2002). User involvement: *A review of the benefits and challenges*. In Soininen, T. (Ed.), *Preprints, Software Business and Engineering Institute*,. HUT-SoberIT-B1: Espoo, Finland: Helsinki University of Technology.

Kuloba, E. (2015). *Effect of procurement procedures on organizational performance: A case of Moi Teaching and Referral Hospital, Eldoret*. Unpublished PhD dissertation, Kisii: Kisii University.

Laosirihongthong, T., Adebajo, D., & Choon, K. T. (2013). Green supply chain management practices and performance, *Industrial Management & Data Systems*, 113(8), 1088-1109.

- Lee, T. Y., Leung, H. K., & Chan, K. C. (1999). Improving quality management on the basis of ISO 9000. *The TQM Magazine*, 11(2), 88-94.
- Legcevic, J. (2008). Measuring customer satisfaction and service quality: the case of Croatia. *The Journal of American Academy of business*, 14(1), 123-130.
- Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology*: New York: We Chat Publishing.
- Lohrmann, M., & Reichert, M. (2013). *Understanding business process quality*. Heidelb: Springer Berlin.
- Lowrey, W. (2005). Commitment to newspaper-TV partnering: a text of impact of institutional isomorphism. *Journalism and mass communication quarterly*, 82(3), 495-515.
- Macharia, S. (2010, May 1). *Kibaki's ISO plan turns the heat on corporations*. Retrieved from Business Daily: <http://www.businessdailyafrica.com/corporate-News/Kibakis-ISO-plan-turns-the-heat-on-corporations>.
- Maiga, K. (2005). Antecedents and consequences of quality performance. *Behavioral Research in accounting*, 17(3), 111-131.
- Maina, M. (2012). *Qualitative and quantitative research methods simplified*. Nairobi: Frajopa Printers mall.
- Malam, S., Kabiru, J., Tang, S., Mohd, H. & Raihan, J. (2019). Relationship between human resource management practices, ethical climates and organizational performance, the missing link: An empirical analysis, *PSU Research Review*, 3(1), 50-69.

- Mapes, J., Szwejcowski, M., & New, C. (2000). Process variability and its effect on plant performance, *International Journal of Operations & Production Management*, 20(7), 792-808.
- Markus, K., & Hajo, A. R. (2013). The effects of process-oriented organizational design on firm performance, *Business Process Management Journal*, 19(2), 245-262.
- Martinez-Costa, M., Martinez-Lorente, A. R., & Choi, T. Y. (2008). Simultaneous consideration of TQM and ISO 9000 on performance and motivation: an empirical study of Spanish companies. *International Journal of Production Economics*, 113(1), 23-39.
- Maulabakhsh, R., & Raziq, A. (2015). Impact of working environment on job satisfaction, *Procedia Economics and Finance*, 23(2), 717-725.
- McAdam, R., & O'Neill, E. (1999). Taking a critical perspective to the European Business Excellence Model using a balanced scorecard approach: A case study in the service sector. *Managing Service Quality: An International Journal*, 9(3), 191-197.
- Mellahi, K., & Budhwar, P. (2007). *Introduction: human resource management in the Middle East*. New Delhi: Gurati Publishers.
- Menard, S. (1995). *Applied logistic regression analysis*. Thousand Oaks, CA: Sage.
- Messick, S. (1989). Validity. In R.L Linn (Ed). *Educational measurement* (3rd ed.) New York: Macmillan.
- Meyer, J. W., & Rowan, B. (1997). Institutional organizations: Formal structure as myth and ceremony. *American Journal of Sociology*, 83, 340-363.

- Michael, H. S. (1999). Assessing manufacturing performance: an advanced manufacturing technology portfolio perspective. *Industrial Management and Data Systems Journal*, 99(6), 266-278.
- Millen, R., & Maggard, M. (1997). *Total Quality Management*. Routledge: Taylor & Francis Group Publishers.
- Morris, P. W. (2006). ISO 9000 and Financial performance in the elections industry. *The journal of American Academy of business*, 8(2), 227-234.
- Mugenda, O. M., & Mugenda, A. G. (1999). *Research methods- quantitative & qualitative Approaches*. Nairobi: African Centre for technology studies.
- Mutai, K. (2015). *Relationship between procurement policies and procedures and supply chain performance*. Unpublished PhD dissertation, Nairobi: University of Nairobi.
- Muthaura, J. W. (2007). The role of Kenya public service in a changing global environment: opportunities and challenges-what is working and what is not? *Paper presented at the KAPAM annual dinner*, Nairobi.
- Muturi, W.M., Sakwa, M., & Kimuyu, P.K. (2013). Determinants of participation in rotating savings and credit associations in Kenyas urban informal settlements: A survey of Mathare Slums, Nairobi. *Journal of Human Resource and Entrepreneurship Development*, 4(5), 221-256.
- Mwituria, S.M. (2012). *Qualitative and quantitative research methods simplified*. Nairobi: Frajopa Printers Mall.
- Naceur, J., & Hassan, A. A. (2005). Leadership styles supporting ISO 9000:2000, *Quality Management Journal*, 12(1), 21-29.

- Nagasaku, C., & Oda, M. (1965). *Planning and execution of quality control*. Tokyo: Juse press.
- Namusonge, G. (2010). *Businesss statistics. Concepts and application*. New Delhi: Verlag publishers.
- Nations, U. (2001). *Application of ISO 9000 standards in local governments and other public sector organizations*. Retrieved from: <http://logotri.hypermart.net/download/iso9000.pdf>
- Neuman, L. J. (2009). *Understanding research*. Boston: Allyn and Bacon.
- Ntayi, J. M., Namugenyi, I., & Sarah, E. (2010). Supplier delivery performance in Ugandan public procurement contracts, *Journal of Public Procurement*, 10(4), 479-511.
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill, Inc.
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory*, (3rd ed.). New York, NY: McGraw-Hill, Inc.
- Ochieng, J., & Muturi, D., & Njihia, S. (2015). Impact of ISO 9001 on organization performance in Kenya. *The TQM Journal*, 7(5), 554-557.
- Odhiambo, W., & Kamau, P. (2008). Working paper No.208 (Formerly technical paper No. 208). *Public procurement : Lessons from Kenya , Tanzania and Uganda* .
- OECD (2013), Education at a Glance 2013: *OECD Indicators*, OECD Publishing. <http://dx.doi.org/10.1787/eag-2013-en>

- Ogbonna, E., & Lloyd, H. (2011). Antecedents and consequences of management-espoused organizational cultural control, *Journal of Business Research* 64(6), 437-445.
- Ogolla, G. (2015). *Factors affecting performance of public sector supply chain departments in Kenya*. Unpublished PhD Dissertation, Nairobi: University of Nairobi.
- Okibo, W. B. & Kimani, W. A. (2013). Effectiveness of ISO 9001:2008 on service delivery of public universities in Kenya, *European Journal of Business Management*, 5 (13), 2222-2839.
- Oliver, R. L. (1997). *Satisfaction: A behavioral perspective on the customer*. New York: Mc Graw Hill.
- Omachonun, V. K., Suthummanon, S., & Einspruch, N. G. (2004). The relationship between quality and quality cost for a manufacturing company. *International Journal of Quality and Reliability*, 21(3), 277-290.
- Őrjan, L. (1998). Measurement of overall equipment effectiveness as a basis for TPM activities, *International Journal of Operations & Management*, 18(5), 495-507.
- Orodho, A. J., & Kombo, D. K. (2002). *Research Methods*. Nairobi: Masola Publishers.
- Osborne, J., & Waters, E. (2002). Four assumptions of multiple regression that researchers should always test. *Practical assessment, research & evaluation*, 8(2). Retrieved from: <http://PAREonline.net/getvn.asp?v=2>
- Owino, A. O. (2010). *The relationship between ISO 9001 certification status and operational performance of government agencies in Kenya*. Unpublished PhD dissertation. Nairobi: University of Nairobi.

- Padgett, M., & Leite, R. (2008). The impact of research and development intensity on corporate reputation interactions of innovations and high social benefit. *Intangible Capital Journal*, 8(2), 216-238.
- Pal, P. & Ghosh, K.K. (2018). Estimating digitization efforts of complex product realization processes. *International Journal of Advanced Manufacturing Technology* 9(5), 65-78 3717.
- Pamela, J. Z., Kenneth, W. G., & Victor, E. S., (2010). Impact of RFID technology performance, *International Journal of Manpower*, 36 (1), 1012-1033.
- Phillips, R. (2003). *Stakeholder Theory and Organizational Ethics*. New Jersey: Berrett-Koehler Publishers.
- Pisano, G., & Teece, D. (1994). The dynamic capabilities of firms: *An Introduction Industrial and Corporate Change Journal*, 3(3), 537–556.
- Poole, M., & O'farrel, P. (1971). The assumptions of linear regression model. *Transactions of the Institute of British Geographers*, 52, 145-158. Retrieved from: <http://www.jstor.org/stable/621706>.
- Popper, K.R. (1973). *Of clouds and clocks in objective knowledge*. London: Oxford University Press.
- Power, D., & Terziovski, M. (2007). Quality audit roles and skills: Perceptions of non-financial auditors and their clients. *Journal of Operations Management*. 25, 126-147.
- Prajogo, D., Huo, B., & Zhaojun, H. (2014). The effect of ISO 9000 implementation on flow management. *International Journal of Production Research*. 52(9), 6467-6481.

- Qinghua, Z., & Sarkis, J. (2007). The moderating effects of institutional pressures on emergent green supply chain practices and performance, *International Journal of Production Research*, 45(18-19), 4333-4355.
- Quazi, H. A., & Jacobs, R. L. (2004). Impact of ISO 9000 certification on training and development activities: An exploratory study. *International Journal of Quality & Reliability Management*, 21(5), 497-517.
- Quazi, H. A., Hong, C. W., & Meng, C. T. (2002). Impact of ISO 9000 certification on quality management practices: a comparative study. *Total quality management*, 13(1), 53-67.
- Republic of Kenya (2007). Kenya Vision 2030, *Ministry of Planning and National Development*. Retrieved from: <http://www.opendata.go.ke>
- Republic of Kenya (2012). Kenya Bureau of Statistics. *Kenya facts 2012*. Retrieved from : <http://knbs.or.ke/downloads/pdf/kenyafacts2012.pdf>
- Republic of Kenya (2012). Public Procurement Oversight Authority Report, The National Treasury. Retrieved from: <http://www.opendata.go.ke>
- Rhyne, E. (2001). *Mainstreaming microfinance, how lending to the poor began, grew and came of age in Bolivia*, West Hartford: Kumarian Press.
- Rodrigo, M., Víctor, J. G., & Antonio, M., (2011). How can we increase Spanish technology firms' performance?, *Journal of Knowledge Management*, 15(5), 759-778.
- Roger, E. (2002). *Quantitative analysis of the expectations and realized benefits of ISO 9000 certification as reported by companies in Indonesia*. Unpublished Master's thesis California: California State University.

- Romano, P., & Vinelli, A. (2001). Quality management in supply chain perspective, strategic and operative choices in textile-apparel network. *International Journal of Operations and Production Management*, 21(4), 446-460.
- Ruxton, G. D., & Colgrave, N. (2006). *Experimental designs for the life sciences* (2nd ed). Oxford: Oxford university press.
- Sang, M. L., Sung, T., & Donghyun, C. (2012). Green supply chain management and organizational performance. *Industrial Management & Data Systems Journal*, 112(8), 1148-1180.
- Saunders, M., Lewis, P. & Thornbill, A. (2012). *Research methods for business students*, (6th ed.): New York: Pearson Education Limited.
- Scott, D., & John, K. (2018). ISO 9001 and supply chain quality in the USA. *International Journal of Productivity and Performance Management*, 67(2), 297-317.
- Sekaran, U., & Bougie, R. (2010). *Research methods for business: A skill-building approach* (5th ed.). Haddington: John Wiley & Sons.
- Serem, D. K., Boit, J. M., & Wanyama, M. N. (2013). *Understanding research, a simplified form*. Eldoret: Utafiti Foundation Press.
- Shaukat A. B., & Hua Y. L. (2006). The effects of technology and TQM on the performance of logistics companies, *International Journal of Physical Distribution & Logistics Management*, 16(3), 192-209.
- Simmons, B. L. (1999). The relationship between ISO 9000 and business performance: does registration really matter? *Journal of Managerial Issues*, 11(3), 330-343.

- Somsuk, N. (2010). Theoretical perspectives in quality management implementation: A literature review. *Industrial Engineering Management (IEEM)* 4(3), 916-920.
- Stamatis, D. H. (1995). *Understanding ISO 9000 and implementing the basics to quality*. New York: Marcel Dekker.
- Stefano, B., & Giovanni, B. (2003). Process management practices and quality system standards: risks and opportunities of the New ISO 9001 Certification. *Business Process Management Journal*, 9(2), 149-16.
- Steinar K. (2007). *Doing Interviews*, London: Sage Publishers
- Strackle, C. M. (2006). Process oriented quality management. In U.-D. J. Ehlers, *Handbook on Quality and Standardization in E-Learning*. Berlin: Springer.
- Süleyman, K., Mehmet, H. E., & Hüseyin, S. (2015). The effects of regulations on the performance of banks: Evidence from the Turkish banking industry. *Journal of Centrum Cathedra: The Business and Economics Research Journal*, 8(2), 109-145.
- Süleyman, K.M., Hasan, E., & Hüseyin, S. (2015). The Effects of regulations on the performance of banks: Evidence from the Turkish banking industry, *Journal of Centrum Cathedra: The Business and Economics Research Journal*, 8(2), 109 – 145.
- Tolbert, P. S., & Zucker, L. G. (1996). The institutionalization of institutional theory. In S. Clegg, C. Hardy and W. Nord (Eds.), *Handbook of organization studies*. London: SAGE.
- Tricker, R. (2016). *ISO 9001:2015 in Brief*, (4th ed.): New York: Routledge Publishers.

- Valmohammadi, C., & Kalantari, M. (2015). The moderating effect of motivations on the relationship between obtaining ISO 9001 certification and organizational performance, *The TQM Journal*, 27(5), 236-256.
- Vicente, R., Inmaculada, B., & Mercedes, S. C., (2011). Combined effect of human capital, temporary employment and organizational size on firm performance. *Personnel Review*, 41(1), 4-22.
- Vouzas, F. K., & Gotzamani, K. D. (2005). Best Practices of Greek companies on their road to business excellence: The Contribution of the New ISO 9000: 2000 series of standards. *The TQM Magazine*, 17(3), 259-266.
- Waiganjo, E. W., Mukulu, E., & Kahiri, J. (2012). Relationship between strategic HR and firm performance in Kenya's Corporate Organizations. *International Journal of Humanities and Social Science*, 2(10), 62-70.
- Walrus, M. T., Peter, P. C., & Billy, T. W. (2011). ISO 9001:2000 implementation in the public sector: A Survey in Macao SAR, the People's Republic of China. *The TQM Journal*, 23(1), 59-70.
- Wantao, Y., Roberto, C., Mengying, F., Frank, W., (2014). Integrated green supply chain management and operational performance, *Supply Chain Management: An International Journal*, 19(5/6), 683-696.
- Wiele, T., & Brown, A. (2002). Quality management over a decade: A longitudinal study. *International Journal of Quality & Reliability Management*, 19(5), 508-523.
- Williams, J. A. (2004). The Impact of Motivating Factors on Implementation of ISO 9001:2008 registration processes. *Management Research News*, 27(1), 74-84.

- World Bank, Trading economics report (2013). *ISO Certification in Kenya as a percentage of firms*. Retrieved from <https://data.worldbank.org/trading-economics/a/IT.NET.USER.ZS>
- XenophonKoufteros, A., Verghese, L. (2014). The effect of performance measurement systems on firm performance: A cross-sectional and a longitudinal study. *Journal for Operations Management*, 5(3), 313-336.
- Yogesh, M. (2005). Integrating knowledge management technologies in organizational business processes: getting real time enterprises to deliver real business performance, *Journal of Knowledge Management*, 9(1), 7-28.
- Yuzhuo, C., & Yohannes, M. (2015). The use of institutional theory in higher education research, in (ed.) *Theory and method in higher education research*: New York: Emerald Group Publishing Limited.
- Zaidi, R., & Hubka, A. (2005). *Impact of government regulation on microfinance*. Washington, DC: World Bank.
- Zairi, M., & Sinclair, D. (1995). Business process re-engineering and process management: A survey of current practice and future trends in integrated management. *Business Process Re-engineering & Management Journal*, 11(1), 8-30.
- Zikimund, W. G., Babin, B.J., Carr, J. C., & Griffin, M. (2013). *Business research methods*, (8th ed). Oklahoma: Cenage Learning.

APPENDICES

Appendix I: Questionnaire for the Staff of SCM Departments

Introduction

The researcher is seeking to study the effect of the adoption ISO 9000:2008 by your Ministry on the performance of your department for his PhD thesis. Kindly support him by indicating your response through writing into the provided space or ticking the appropriate response area in the various items of the questionnaire. The information is purely for academic purposes and will be treated with utmost confidentiality.

Background information

1. Ministry/Dept/Organization-----

2. Indicate current Designation-----

3. Age (Optional): (A) 20-29 (B) 30-39 (C) 40-49 (D) 50-59 (E) Over 6
4. Gender: Male Female
5. Qualifications (A) Certificate (B) Diploma (C) Degree (D) Postgraduate
6. Specialization-----

7. Years you have worked in this department (A) 0-5 (B) 6-10 (C) 11-20 (D) Over 20
8. **Management responsibility**

In a scale of **1-5** where **1** represents **Strongly Disagree**, **2** represents **Disagree**, **3** represents **Don't Know**, **4** represents **Agree** and **5** represents **Strongly Disagree**, indicate your level of agreement on the effect of the following parameters of management responsibility on performance of the SCM entity.

| No. | Parameter | Strongly Disagree | Disagree | Don't Know | Agree | Strongly Agree |
|-----|--|-------------------|----------|------------|-------|----------------|
| a. | ISO Management Review meetings have been held in the on-going financial | | | | | |
| b. | There is in place a management style that supports the implementation of the ISO QMS | | | | | |

| | | | | | | |
|-----------|---|--|--|--|--|--|
| c. | There is in place an organization structure that supports the ISO QMS | | | | | |
| d. | Management has provided modern technology such as e-procurement that enhances the activities of the SCM Department. | | | | | |
| e. | Management insists on the safe custody of all the mandatory QMS documents and records | | | | | |
| f. | The application of the identified aspects of Management responsibility a-f have improved the performance of the SCM department | | | | | |

g. Which other area of management responsibility in the QMS do you think affects performance of the department SCM and how

.....

9. Resource Management Process

In a scale of **1-5** where **1** represents **Strongly Disagree**, **2** represents **Disagree**, **3** represents **Don't Know**, **4** represents **Agree** and **5** represents **Strongly Disagree**, indicate your level of agreement on the effect of the following parameters of resource management processes on performance of the SCM entity.

| | Parameter | Strongly Disagree | Disagree | Don't Know | Agree | Strongly Agree |
|----------|---|--------------------------|-----------------|-------------------|--------------|-----------------------|
| a | There is a Human Skills Inventory in place within the SCM department | | | | | |
| b | An assets register is kept in place within the SCM Department | | | | | |
| c | There is an updated employee training register in place within the SCM Department | | | | | |

| | Parameter | Strongly Disagree | Disagree | Don't Know | Agree | Strongly Agree |
|-----------|--|--------------------------|-----------------|-------------------|--------------|-----------------------|
| d | Management has provided quality infrastructure for the SCM Department | | | | | |
| e | The department and management have put in place strategies to develop and retain talent. | | | | | |
| f | The machines in the department are regularly serviced and maintained | | | | | |
| g | Management has put in place adequate resources for the ISO QMS implementation in the department | | | | | |
| h | The software used in the computers used is regularly upgraded | | | | | |
| i | Modern technology in the SCM processes | | | | | |
| j | There is protection of assets from physical or and/or electronic attacks using passwords, firewalls and other security systems. | | | | | |
| k | There are regular asset audits in the SCM department | | | | | |
| l. | The adoption of the identified aspects of resource management processes a-j have improved the performance of the SCM department | | | | | |

m. Which other aspects of the resource management process do you think have an effect on the performance of the department of SCM and how
.....
.....
.....

10. Measurement, Improvement and Analysis

In a scale of 1-5 where 1 represents **Strongly Disagree**, 2 represents **Disagree**, 3 represents **Don't Know**, 4 represents **Agree** and 5 represents **Strongly Disagree**, indicate your level of agreement on the effect of the following parameters of measurement, analysis and improvement on performance of the SCM entity.

| | Parameter | Strongly Disagree | Disagree | Don't Know | Agree | Strongly Agree |
|-----------|--|--------------------------|-----------------|-------------------|--------------|-----------------------|
| a | The Department and management has put customer feedback mechanisms and records in place | | | | | |
| b | The department adheres to its service charter in provision of timely services | | | | | |
| c | The Department and every Department in the organization has put in place its product requirement specifications and records. | | | | | |
| d | Quality materials are used in all the SCM processes | | | | | |
| e | There is a corrective action record kept in the Department. | | | | | |
| f | The Department has carried out customer satisfaction surveys. | | | | | |
| g | The SCM Department has a formalized continuous improvement program. | | | | | |
| h | There is a systematic way of measuring improvement in the department. | | | | | |
| i | The Department keeps in place customer order records | | | | | |
| j | After certification, the department has realized a significant reduction in waste. | | | | | |
| k. | The adoption of the identified aspects of product measurement, analysis and improvement a-j have | | | | | |

| | Parameter | Strongly Disagree | Disagree | Don't Know | Agree | Strongly Agree |
|--|--|-------------------|----------|------------|-------|----------------|
| | improved the performance of the SCM department | | | | | |

l. Indicate the departmental/organizational customer satisfaction level scores (%) before and after certification

Before Certification: (A) 10-30 (B) 31-50 (C) 51-70 (D) 70-90 (E) Over 90

After Certification: (A) 10-30 (B) 31-50 (C) 51-70 (D) 70-90 (E) Over 90

m. In terms of savings, give an approximate figure before and after certification as a %.

Before Certification: (A) 10-30 (B) 31-50 (C) 51-70 (D) 70-90 (E) Over 90

After Certification: (A) 10-30 (B) 31-50 (C) 51-70 (D) 70-90 (E) Over 90

n. Are there any other aspects of measurement, evaluation and analysis that you feel have an effect on the performance of the department of SCM and how?

.....

11. Product Realization Processes

In a scale of **1-5** where **1** represents **Strongly Disagree**, **2** represents **Disagree**, **3** represents **Don't Know**, **4** represents **Agree** and **5** represents **Strongly Disagree**, indicate your level of agreement on the effect of the following parameters of product realization processes on performance of the SCM entity.

| | Parameter | Strongly Disagree | Disagree | Don't Know | Agree | Strongly Agree |
|----------|--|-------------------|----------|------------|-------|----------------|
| a | The Department keeps product information records | | | | | |

| | Parameter | Strongly Disagree | Disagree | Don't Know | Agree | Strongly Agree |
|----------|---|--------------------------|-----------------|-------------------|--------------|-----------------------|
| b | There are purchasing records of all Departments in the SCM Department. | | | | | |
| c | The Department keeps inspection plans and records for all goods received. | | | | | |
| d | The Department keeps supplier quality plans for all goods | | | | | |
| e | The Department keeps all details of supplier premises. | | | | | |
| f | The Department verifies all goods received and keeps records | | | | | |
| g | The application of the identified aspects of product realization a-g have improved the performance of the SCM department | | | | | |

h. Which other aspects of the product realization have an effect on the performance of the department of SCM and how?

.....

12. Government Procurement Regulations and Policies

In a scale of **1-5** where **1** represents **Strongly Disagree**, **2** represents **Disagree**, **3** represents **Don't Know**, **4** represents **Agree** and **5** represents **Strongly Disagree**, indicate your level of agreement on the effect of the following parameters of government procurement regulations and policies on performance of the SCM entity.

| | Parameter | Strongly Disagree | Disagree | Don't Know | Agree | Strongly Agree |
|----------|--|--------------------------|-----------------|-------------------|--------------|-----------------------|
| g | The SCM Department keeps all relevant government procurement | | | | | |

| | | | | | | |
|----------|--|--|--|--|--|--|
| | regulations and policies. | | | | | |
| h | The government procurement regulations and policies are complied with. | | | | | |
| i | The government procurement policies and regulations have enhanced the adoption of ISO within the Department. | | | | | |
| j | The adoption of the identified aspects of government policies and regulations a-j have improved the performance of the SCM department | | | | | |

k. Which other aspects of the government procurement regulations and policies have an effect on the performance of the department of SCM and how?

.....
.....
.....

13. Performance

In a scale of **1-5** where **1** represents **Strongly Disagree**, **2** represents **Disagree**, **3** represents **Don't Know**, **4** represents **Agree** and **5** represents **Strongly Disagree**, indicate your level of agreement on the effect of the following parameters of performance of the SCM entity.

| | Parameter | Strongly Disagree | Disagree | Don't Know | Agree | Strongly Agree |
|----------|--|--------------------------|-----------------|-------------------|--------------|-----------------------|
| a | There is generally increased employee satisfaction due to the adoption of ISO in the organization. | | | | | |
| b | The time used in various activities and processes within the Department has reduced. | | | | | |
| c | There has been a significant reduction in the organization's costs | | | | | |

| | Parameter | Strongly Disagree | Disagree | Don't Know | Agree | Strongly Agree |
|----------|--|--------------------------|-----------------|-------------------|--------------|-----------------------|
| | due to ISO adoption | | | | | |
| d | The revenue accrued in the SCM Department has significantly increased due to the ISO adoption. | | | | | |
| e | There has been a significant increase in business volumes after ISO certification | | | | | |
| f | The SCM department has realized significant savings after ISO certification. | | | | | |
| g | You have fulfilled your Performance Contract obligations in the last financial year better than before certification | | | | | |

- i. Indicate the two year average percentage of your Performance Appraisal System (%) score results in the Department before and after ISO adoption.

BEFORE CERTIFICATION : (A) 40-60 (B) 61-80 (C) 81-100 (D) Over 100

AFTER CERTIFICATION: (A) 40-60 (B) 61-80 (C) 81-100 (D) Over 100

- j. Are there any other aspects of performance that can be attributed to the adoption of the ISO QMS in the department?.

.....

Thanks for your time.

Appendix II: Observation Guide on ISO Certification Of SCM Departments

1. Are the quality statements, service charter and quality objectives openly displayed?
2. Are work procedures followed in the execution of tasks?
3. Are records well kept for ease of retrieval and reference?
4. Is there adequate supervision of the available staff?
5. Are customers handled in a manner that leads to satisfaction?
6. How fast are customer complaints addressed by the staff?
7. Do the staff appear motivated to work?
8. Are there any medals or awards displayed and when were they acquired and for what?
9. How is the physical condition of the workplace in terms of work space, light, aeration etc.?
10. Are the various policies and circulars displayed in the office?
11. Is there evidence of compliance with procurement regulations and policies?
12. Is there a customer feedback mechanism in the office?
13. Do we have any performance records displayed in the office? What do they reflect?

Appendix III: Government of Kenya Ministries, 2017

| | |
|-----|---|
| 1. | Ministry of Mining |
| 2. | Attorney General (State Law Office) |
| 3. | Ministry of Industrialization |
| 4. | Ministry of Agriculture |
| 5. | Ministry of Energy and Petroleum |
| 6. | Ministry of Labour |
| 7. | Ministry of Sports, Arts and Culture |
| 8. | Ministry of Lands |
| 9. | Ministry of Environment |
| 10. | Ministry of Information, Communication and Technology |
| 11. | Ministry of Transport and Infrastructure |
| 12. | Ministry of Health |
| 13. | Ministry of Education |
| 14. | Ministry of Foreign Affairs |
| 15. | Ministry of Defence |
| 16. | Ministry of Finance and National Treasury |
| 17. | Ministry of Devolution and Planning |
| 18. | Ministry of Interior |
| 19. | Ministry of Water and Irrigation |
| 20. | Public Service, Youth and Gender Affairs |
| 21. | Tourism |

Appendix IV: Table 4.41:- Coefficients^a of all the Study Variables (N = 224)

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Collinearity Statistics | |
|-----------------------------------|---|-----------------------------|----------------|---------------------------|-------------|-------------|-------------------------|-------|
| | | B | Standard Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | .694 | .282 | | 2.458 | .015 | | |
| | Management responsibility | .153 | .054 | .179 | 2.852 | .005 | .670 | 1.492 |
| | Resource Management Processes | -.006 | .074 | -.006 | -.083 | .934 | .558 | 1.792 |
| | Measurement, Analysis and Improvement | .320 | .083 | .279 | 3.866 | .000 | .506 | 1.977 |
| | Product Realization processes | .374 | .071 | .342 | 5.294 | .000 | .631 | 1.585 |
| 2 | (Constant) | .404 | .263 | | 1.535 | .126 | | |
| | Management responsibility | .145 | .049 | .169 | 2.938 | .004 | .670 | 1.493 |
| | Resource Management Processes | -.098 | .069 | -.091 | -1.407 | .161 | .535 | 1.870 |
| | Measurement, Analysis and Improvement | .330 | .076 | .287 | 4.336 | .000 | .506 | 1.978 |
| | Product Realization processes | .229 | .069 | .209 | 3.330 | .001 | .563 | 1.776 |
| 3 | Government Procurement Regulations and Policies | .304 | .047 | .356 | 6.427 | .000 | .723 | 1.384 |
| | (Constant) | .379 | .280 | | 1.350 | .178 | | |
| | Management responsibility | .149 | .049 | .174 | 3.017 | .003 | .653 | 1.530 |
| | Resource Management Processes | -.059 | .071 | -.055 | -.839 | .402 | .505 | 1.981 |
| | Measurement, Analysis and Improvement | .346 | .078 | .302 | 4.440 | .000 | .472 | 2.120 |
| | Product Realization processes | .188 | .072 | .172 | 2.607 | .010 | .502 | 1.993 |
| | Government Procurement Regulations and Policies | .296 | .051 | .348 | 5.829 | .000 | .613 | 1.631 |
| | (X ₁ .X _M) | -.001 | .025 | -.002 | -.026 | .979 | .462 | 2.164 |
| | (X ₂ .X _M) | -.001 | .023 | -.003 | -.038 | .970 | .475 | 2.104 |
| | (X ₃ .X _M) | -.028 | .027 | -.098 | -1.013 | .312 | .231 | 4.338 |
| (X ₄ .X _M) | -.008 | .015 | -.046 | -.547 | .585 | .310 | 3.222 | |

a. Dependent Variable: Performance (Y)

Appendix V: Letter of Authorization from NACOSTI



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: 020 400 7000,
0713 788787, 0733404245
Fax: +254-20-318245, 318249
Email: dg@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KEN

Ref. No. **NACOSTI/P/17/22638/19626**

Date: **12th October, 2017**

Fredrick Ephraim Mukabi
Jomo Kenyatta University of
Agriculture and Technology
P.O. Box 62000-00200
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on "*Effect of ISO 9001 Certification on performance of supply chain entities at Kenya Government Ministries 'Headquarters'*" I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for the period ending **12th October, 2018.**

You are advised to report to **the County Commissioner and the County Director of Education, Nairobi County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit a **copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.


GODFREY P. KALERWA MSc., MBA, MKIM
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Nairobi County.

**COUNTY COMMISSIONER
NAIROBI COUNTY
P. O. Box 30124-00100, NBI
TEL: 341666**

The County Director of Education
Nairobi County.

Appendix VII: NACOSTI Researcher Identification Card


THIS IS TO CERTIFY THAT:
MR. FREDRICK EPHRAIM MUKABI
of JOMO KENYATTA UNIVERSITY OF
AGRICULTURE AND TECHNOLOGY,
402-60100 Embu, has been permitted to
conduct research in Nairobi County

Permit No : NACOSTI/P/17/22638/19626
Date Of Issue : 12th October, 2017
Fee Received : Ksh 2000

on the topic: **EFFECT OF ISO 9001**
CERTIFICATION ON PERFORMANCE OF
SUPPLY CHAIN ENTITIES AT KENYA
GOVERNMENT MINISTRIES'
HEADQUARTERS



for the period ending:
12th October, 2018


.....
Applicant's
Signature


.....
Director General
National Commission for Science,
Technology & Innovation

CONDITIONS

1. The License is valid for the proposed research, research site specified period.
2. Both the Licence and any rights thereunder are non-transferable.
3. Upon request of the Commission, the Licensee shall submit a progress report.
4. The Licensee shall report to the County Director of Education and County Governor in the area of research before commencement of the research.
5. Excavation, filming and collection of specimens are subject to further permissions from relevant Government agencies.
6. This Licence does not give authority to transfer research materials.
7. The Licensee shall submit two (2) hard copies and upload a soft copy of their final report.
8. The Commission reserves the right to modify the conditions of this Licence including its cancellation without prior notice.



REPUBLIC OF KENYA



National Commission for Science,
Technology and Innovation
RESEARCH CLEARANCE
PERMIT

Serial No.A.16114

CONDITIONS: see back page

Appendix VIII: Introduction Letters for Research Assistants

Kenya School of Government-Embu

P.O. Box 402-60100

Embu

19/10/2017

TO WHOM IT MAY CONCERN

Dear Sir/Madam

RE: DATA COLLECTION FOR RESEARCH ON 'EFFECT OF ISO 9001:2008 CERTIFICATION ON PERFORMANCE OF SUPPLY CHAIN ENTITIES IN GOVERNMENT MINISRIES' HEADQUARTERS'.

This is to confirm that **HENRY TERENCE WERE, ID NO. 28480145** is a Research Assistant for the data collection in Supply Chain Departments/Sections in Government Ministries on behalf as the Researcher **Fredrick Ephraim Mukabi P/No. 1995087542** of Kenya School of Government.

The purpose of this letter is to introduce him to you and seek your support in enabling him collect the data in your Ministry/Department. The information collected by the officer is purely for academic purposes and will be treated with utmost confidentiality in line with the ethical standards of research.

In case the Ministry Headquarters is not ISO 9001:2008 certified, the researcher should be guided to collect the said data in any Department or State Agency in the Ministry which is certified for purposes of the study.

In his possession for verification is the research permit **NACOSTI/P/17/22638/19626** from the National Commission on Science, Technology and Innovation (NACOSTI) and other relevant documents for the said exercise.

Kindly support him.

Thank you.



MUKABI EPHRAIM FREDERICK

Researcher

Kenya School of Government-Embu

P.O. Box 402-60100

Embu

19/10/2017

TO WHOM IT MAY CONCERN

Dear Sir/Madam

RE: DATA COLLECTION FOR RESEARCH ON 'EFFECT OF ISO 9001:2008 CERTIFICATION ON PERFORMANCE OF SUPPLY CHAIN ENTITIES IN GOVERNMENT MINISRIES' HEADQUARTERS'.

This is to confirm that **ISAIAH KAMURA IRUNGU, ID NO. 27962330** is a Research Assistant for the data collection in Supply Chain Departments/Sections in Government Ministries on behalf as the Researcher **Fredrick Ephraim Mukabi P/No. 1995087542** of Kenya School of Government.

The purpose of this letter is to introduce him to you and seek your support in enabling him collect the data in your Ministry/Department. The information collected by the officer is purely for academic purposes and will be treated with utmost confidentiality in line with the ethical standards of research.

In case the Ministry Headquarters is not ISO 9001:2008 certified, the researcher should be guided to collect the said data in any Department or State Agency in the Ministry which is certified for purposes of the study.

In his possession for verification is the research permit **NACOSTI/P/17/22638/19626** from the National Commission on Science, Technology and Innovation (NACOSTI) and other relevant documents for the said exercise.

Kindly support him.

Thank you.



MUKABI EPHRAIM FREDERICK

Researcher