

**FACTORS AFFECTING SUPPLY CHAIN PERFORMANCE IN
GOVERNMENT HEALTH INSTITUTIONS IN KISUMU
CENTRAL SUB-COUNTY, KENYA**

**ODENY MONICA AUMA
D61/61069/2011**

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DECLARATION

This Research Project is my original work and has not, wholly or in part, been submitted for an award of a diploma or degree in any other university or Institution.

Student's Name: **Odeny Monica Auma**

Registration Number: **D61/61069/2011**

Signature _____ Date _____

Supervisor

This research project has been submitted for examination with my approval as
University supervisor

Name of supervisor: **Mr. Gerald Ondiek**

Signature _____ Date _____

Lecturer

School of Business

University of Nairobi

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Lastly, I wish to thank all my children Glenn, Mark and Grannia for their moral support. Also I would like to thank my colleagues at JOOTRH for their continued encouragement and lastly I thank God Almighty for his grace that has seen me through.

DEDICATION

This study is dedicated to my family for their support, perseverance and encouragement through the entire period of my study. A special dedication goes to my loving mother for the role she played in making my life a success.

ABSTRACT

The concept of Supply Chain Management is inevitable for efficient resource utilization in the modern organization. Chopra et al. (2010) portend that supply chain management represent the confluence of at least three main streams of knowledge and practical experience of the business world spanning almost 60 years. Effective Supply chain management is key to efficient resource utilization and customer satisfaction in service sectors including government health institutions. Efficient Government health supply chain performance is essential for assuring access to health supplies, and thus for positive health outcomes. The Council of Logistics Management defines SCM as the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across business within the supply chain for the purpose of improving the long-term performance of the individual companies and the supply chain as a whole. Supply chain within Government health institutions must effectively link the supply chain trading partners to achieve breakthrough performance in satisfying the end users. To realize the benefits of supply chain management, the government health institutions must therefore address bottlenecks that might be inherent in their systems and which play to impede supply chain efficiency. The study sought to determine factors affecting supply chain performance in government health institutions in Kisumu Central Sub-County. To achieve the study objective, the study employed a descriptive census survey. The targeted population was all the 9 Government health institutions within Kisumu Central Sub-County, while the accessible populations were all stores managers, supply chain managers and administrators of these health institutions. The study collected qualitative likert scale and quantitative data primarily using questionnaires and interview guides from employees of various cadres in Government health institutions within Kisumu Central Sub- County. The study used self-administered semi-structured questionnaires which were delivered to the respondents in their offices by research assistants. Nine Key Informants interviews (KII) were also conducted by the researcher. Descriptive statistics and factor analysis were used to analyze the collected data with the help of SPSS 20.0 software. The findings are presented in frequency tables and percentages and discussed. The findings show that inadequate funding, lack of cooperation among supply chain users, poor management support and non-compliance to rules and market price fluctuations can impact negatively on effective functioning of SC system with a sample mean of 4.72, 4.38, 4.33 and 4.31 respectively. Inadequate information flow/ sharing can have moderate negative effects with a mean of 3.94, while well aligned value-added processes have a mean of 3.94. Timely information flow through ICT resources can improve the performance of supply chain system with a mean of 3.67, while environmental uncertainty variables can hamper the performance of supply chain system with a sample mean of 3.61. The study recommends that the management remains committed to offering satisfactory health care services to patients through a sense of positive commitment in ensuring adequate funding that supports investment in ICT resources. There is need to establish independent compliant units within the institutions to ensure that rules and regulations are adhered to in order to curb malpractices that reduces effectiveness of supply chain performance. The study recommends establishment of stronger networking and collaboration platform that facilitates sharing of real-time information between supply chain partners. The study further recommends flexible systems that allow for modern state of art technology like just-in-time supply of the required items to reduce storage-related cost.

Table of Contents

DECLARATION	i
ACKNOWLEDGEMENTS	ii
DEDICATION	iii
ABSTRACT.....	iv
LIST OF ACRONYMS AND ABBREVIATIONS	vii
LIST OF FIGURES	viii
LIST OF TABLES	ix
CHAPTER ONE: INTRODUCTION	1
1.1 Background of the Study	1
1.1.1 Supply Chain Management	2
1.1.2 Supply Chain Performance	3
1.1.3 Factors Affecting Supply Chain Performance	4
1.1.4 Government Health Institutions in Kisumu Central Sub-County	5
1.2 Research Problem	5
1.3 Objectives of the study.....	7
1.4 Value of the Study	7
CHAPTER TWO: LITERATURE REVIEW.....	8
2.1 Introduction.....	8
2.2 Theoretical perspective of Supply Chain Management	8
2.2.1 Resource-Based View	9
2.2.2 Value Chain Analysis: customer orientation	10
2.2.3 Operational Excellence: Strategic orientation of SCM.....	11
2.3 Factors Affecting Supply Chain Management.....	11
2.3.1 Information technology in supply chain management.....	12
2.3.2 Value added process and supply chain management	15
2.3.3 Environment Uncertainty in supply chain management.....	16
2.3.4 Management Support	18
2.4 Summary of Literature Review and Research Gap.....	19
2.5 Conceptual framework.....	20
CHAPTER THREE: RESEARCH METHODOLOGY	21
3.1 Introduction.....	21
3.2 Research Design.....	21
3.3 Research Population.....	21
3.4 Data Collection	21
3.5 Data Analysis	22

CHAPTER FOUR.....	24
DATA ANALYSIS, RESULTS AND DISCUSSION.....	24
4.1 Introduction.....	24
4.2. Response Rate.....	24
4.3 Respondents’ General Information.....	25
4.4 Factor Analysis.....	26
4.4.1 Factor Loadings.....	26
4.4.2 Mean Values Range of Factor Variable.....	28
4.5 Factors Affecting SC Performance.....	29
4.5.1 ICT Variables Affecting Supply Chain Performance.....	29
4.5.2 Environmental Uncertainty Variables Affecting SC.....	33
4.5.3 Value-Added Processes Variables Affecting SC Performance.....	35
4.5.4 Management Support Variables Affecting SC Performance.....	38
4.6 Discussion of the Study Findings.....	41
CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS	44
5.1 Introduction.....	44
5.2 Summary.....	44
5.3 Conclusion.....	45
5.4 Recommendations.....	45
5.5 Limitations of the Study.....	46
5.6 Suggestions for further Research.....	46
References.....	47
Appendix one: Transmittal Letter.....	51
Appendix two: Questionnaire to Supply Chain and Stores Managers.....	52
Appendix three: Interview Guide for Health Institutions’ Administrators.....	54

LIST OF ACRONYMS AND ABBREVIATIONS

SC:	Supply Chain
SCM:	Supply Chain Management
PPOA:	Public Procurement Oversight Authority
SPSS:	Statistical Packages for Social Sciences
KII:	Key Informant Interview
JOOTRH:	Jaramogi Oginga Odinga Teaching and Referral Hospital
UON:	University of Nairobi
ICT:	Information Communication and Technology
EDI:	Electronic Data Interchange

LIST OF FIGURES

Figure 1: A prototype value chain system in health institution	16
Figure 2: A Conceptual Framework	20

LIST OF TABLES

Table 4.1: Respondents' Designation	25
Table 4.2: Duration in the Position	25
Table 4.3: Factor Loadings of Variables Affecting Supply Chain Performance	26
Table 4.4: Total Variance Explained of Factor Variables	28
Table 4.5: ICT Variables affecting SC performance	29
Table 4.6: Scaled Responses in Percentages of Factors Affecting SC Performance	31
Table 4.7: Environmental uncertainty variables affecting SC Performance	33
Table 4.8: Value-Added Processes variables affecting SC Performance	36
Table 4.9: Management Support variables affecting SC Performance	39

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Supply chain management is a source of getting competitive advantage and sustainable growth for the firms on their rivals. The need for effective and efficient supply chain system has emerged in many today's organizations as a result of changing customer preferences and intense competition among organizations. According to Ballau (2005), improved Supply Chain Management can lower costs through greater operating efficiency, reduced waste generation, and reduced consumption of energy and water. SCM practices can also lead to increased revenue and shareholder value by generating more repeat business and attracting new business from customers who value good environmental and social performance.

Good performance and a high-quality, sustainable product can also help a company to reduce the risk of conflict or problems with suppliers, governments, staff and local communities, customers and improve its status as a respected partner in destinations (Veckery, 1999). In Kenya, to improve on transparency, accountability and resource utilization, the Government instituted supply chain departments in every public health institutions. Effective Supply chain management is key to efficient resource utilization and customer satisfaction in service sectors, health institutions inclusive. Efficient public health supply chain performance is essential for assuring access to health supplies, and thus for positive health outcomes. This is particularly important in most countries in sub-Saharan Africa where large proportion of the population is served by the public and mission health sectors.

Inspite of these, various challenges continued to be experienced by the users of supply chain systems in Government Health institutions. Rapidly increasing health assistance from multilateral and bilateral donors has significantly benefited health programs, but

has also resulted in huge increases in the quantity and value of commodities flowing through public health supply chains.

This study seeks to investigate the factors affecting supply chain management in government health institutions within Kisumu Central Sub-County.

1.1.1 Supply Chain Management

Supply chain management concept is closely related with the concept of best practices (Tummala, 2006). It is the combination of all parties (external suppliers, partner organizations, internal corporate services units) both inside and outside the organization, involved in delivering the inputs, outputs or outcomes that will meet a specified public sector requirement. A study by the UK Institute of logistics and Transport as cited by Lysons & Farrington (2006) defines Supply Chain Management as the flow of materials through procurement, manufacture, distribution, sales and disposal, together with the associated transport and storage. Different bodies have also given various definition of SCM. According to The Institute of Supply Management, SCM is the design and management of seamless, value-added processes across organizational boundaries to meet the real needs of the end customer. The Institute of Supply Management further states that the development and integration of people and technological resources are critical to successful supply chain management.

The Supply-Chain Council defines SCM as managing supply and demand, sourcing raw materials and parts, manufacturing and assembly, warehousing and inventory tracking, order entry and order management, distribution across all channels, and delivery to the customer. The Council of Logistics Management also defines SCM as the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across business within the supply chain for the purpose of improving the long-

term performance of the individual companies and the supply chain as a whole. Finally, a study by Dr. Hau Lee et al. defines SCM as “the integration activities taking place among a network of facilities that procure raw materials, transform them into intermediate goods and then final products, and deliver products to customers through a distribution system. This implies that for the health institutions mandated with primary role of service provision; supply chain management relates to acquisition of goods and services to meet patients’ needs.

The public procurement and disposal Act [2005] was enacted by parliament to help address challenges faced by supply chain management in public institutions. Public Procurement Oversight Authority (PPOA) was formed to oversee the implementation of the Act and its regulations. The authority develops the procurement guidelines and manuals that when adhered to ensure that efficiency is achieved in the supply chain. Because of the unique and critical nature of the services offered by the public hospitals, the PPOA further came up with the standard operating manual for the procurement of goods and services to the hospitals. This was geared towards addressing challenges facing supply chain management in the hospitals.

This study seeks to investigate the factors affecting supply chain management in government health institutions within Kisumu Central Sub-County.

1.1.2 Supply Chain Performance

Supply chain performance can be looked at as the extent by which supply chain’s activities effectively and efficiently ensure realization of organization goals and objectives. Simchi-Levi, Simchi-Levi & Kaminsky (2003) define Supply chain performance as the operational excellence to deliver leading customer experience. The performance of a supply chain is influenced by both internal and external factors of the organization. SCM measures can be classified broadly into two categories qualitative

measures such as customer satisfaction and product quality; and quantitative measures such as order-to-order lead time, response time, flexibility, resource utilization and delivery performance.

According to Leong, Tan & Wisner (2005, p.441), performance measurement systems for supply chain must effectively link the supply chain trading partners to achieve breakthrough performance in satisfying the end users. This implies, for instance, in health care institutions SCM should be very responsive to the ever changing needs, expectations and aspirations of the patients as the end users for it to realize effective performance measures. Leong et al (2005) asserts that the focus of the system should be on value creation for end customers. The authors argue that the traditional measures of performance (cost, revenue and profitability) are no longer sufficient in gauging effective performance. They identified four critical areas that determine supply chain performance in an organizations, health care institutions not exceptional. These included: quality of care, operational efficiency, financial performance and adaptation to the environment

1.1.3 Factors Affecting Supply Chain Performance

Supply chain performance and practices have been found to be different among companies with different supply chain characteristics. Chan (2003) compared supply chain performance in three different industries and found that in the electronic industry, achievement of quality, on-time delivery and cost were found to have the highest priority, whereas the logistics service industry concentrated on service accuracy and flexibility.

Marien (2000) identified four key enablers that must be fully leveraged if Supply Chain Management is to be successful. These included: organizational infrastructure, technology, strategic alliances and human resource management.

Natural disasters, such as extreme weather conditions, can have a devastating impact on supply chain. While the probability of these occurrences is low, these types of environmental disasters can cause widespread supply chain disruptions such as facility downtime and production interference. Volatility of price is yet another factor that causes uncertainty in supply chain management as prices fluctuation interferes with clear forecasting and budget estimates. Unreliable delivery, longer lead times, and poor quality are just a few of the challenges companies encounter with globalization.

1.1.4 Government Health Institutions in Kisumu Central Sub-County

There are 9 government administered health institutions in Kisumu Central Sub-County comprise of Teaching and Referral Hospital, County Referral Hospital, Health Centers and Dispensaries Categories. These are Jaramogi Oginga Odinga Teaching and Referral Hospital, Kisumu County Hospital, Migosi, Lumumba and Nyalenda Health centers, Mosqo, Police, Railways and Kowino dispensaries. Kisumu Central Sub-County is geographically situated in western part of Kenya. It covers approximate 32.7 square kilometres with a population of 168,892 according to Kisumu County health records data (2014).

1.2 Research Problem

Many studies recognize that an effective Supply Chain Management (SCM) is a powerful tool to achieve cost advantage and a more profitable outcome for all parties within and beyond any organization (Davis, 2008). Effective Supply Chain Management practices can also lead to increased revenue and shareholder value by generating more repeat business and attracting new business from customers who value good environmental and social performance (Hofstede 2006). It leads to a competitive edge as noted by Veckery (1999), that good performance and a high-

quality, sustainable product can help a company to reduce the risk of conflict or problems with suppliers, governments, staff and local communities, and improve its status as a respected partner. In particular, Supply chain management is a tool for improving budgeting, promoting a better reporting system and modernizing public procurement while enhancing efficiency in resource use and effectiveness in organizational performance.

In health sector, effective SCM can lead to efficient resource utilization and patients' satisfaction of the services offered. However many patients' complaints both documented and observed within the public health institutions in Kisumu Central Sub-County, according to Kisumu County Health Information Resource System (2015) mirror a close link to dysfunctional SCM within these institutions. For example, long patients' queues for services, stock out for essential drugs, slow response to emergency cases, lack of equipment and apparatus for theatre services, high burn-out rate for staff and delays in food stores supplies for patients are all indications of ineffective SCM. For effective resource utilization, health institutions need to address enablers of SCM such as organizational infrastructure, technology, strategic alliances and human resource management.

Many studies have been conducted on SCM and its contribution to service delivery in Health Institutions. A study by Mungu (2013) assessed the effect of supply chain management practices on the stock levels of essential drugs in public Health Institutions in Bungoma East sub-county. The findings from the study showed that public procurement as currently practiced is not effective in reducing the cost of drugs. It thus recommended evolution from manual procurement to e-procurement practices to eliminate unnecessary cost. Moenga (2011) focused his study on SCM practices and challenges for small scale tea sector in Kenya. The study findings

revealed that lengthy supply chain processes being a major challenge in tea sector contributing towards high operating costs. Otile (2011) focuses on SCM practices used in the cosmetic industry in Kenya, and Gitau (2011) on SCM malpractices in the Kenya public sector. The findings were that there was non compliance SCM policies and guidelines, lack of professional skills among the SCM staff, lack of ethics, competitive tendering, accountability and inadequate use of technology. While their contributions are valuable, they have not addressed the bottlenecks that impact on supply chain performance in public health sectors. It is against this background that this study aims to fill the gap. The study therefore seeks to investigate the factors that affect supply chain management in government health institutions within Kisumu Central Sub-County. It aims to answer the research question on what factors affect supply chain management in public healthcare institutions in Kisumu Central Sub-County?

1.3 Objectives of the study

The study sought to determine factors affecting supply chain performance in government health institutions in Kisumu Central Sub County.

1.4 Value of the Study

This study will provide information that could support evidence-based policy-making, particularly in the context of the national budget and County Government planning. These processes focus on government priorities among competing demands from citizens and groups in society. This should influence and lead to the formation of new policies at the Ministry of health. This study should also provide a basis for reference for other researchers and readers in general. As such, it is expected to provide hitherto unavailable information on this area of concern and act as useful source of reference

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The purpose of this chapter is to review the work that other scholars and researchers have done concerning supply chain management. Theoretical and empirical reviews are done leading to a conceptual framework which is proposed to guide the study. The chapter begins with a review of the theories that underpin the concept of supply chain and logistic management. The chapter then presents an empirical review of both the factors affecting supply chain generally and specifically in health institutions. The research gap is identified and conceptual framework adopted is discussed.

2.2 Theoretical perspective of Supply Chain Management

The concept of Supply Chain Management is inevitable for efficient resource utilization in the modern organization. Chopra et al. (2010) portend that supply chain management represent the confluence of at least three main streams of knowledge and practical experience of the business world spanning almost 60 years. The fusion of these streams into one powerful movement, supply chain management, that is sweeping across the present day individual world has brought about by intense competition characteristic of the contemporary markets. They identify three disciplines in supply chain management as: (a) sourcing, procurement and supply management; (b) materials management; and (c) logistics and distribution.

It is apparent that much of the focus in the increasingly voluminous literature on supply strategy, operations strategy and supply chain management is directed at meaning making. Often this comprises assertions about what it essentially “is”. The precepts of SCM as currently portrayed are a mixture of three elements: description, prescription and the identification of alleged trends. Description Debates here relate to

scope and focus. Some academics openly declare that they use the terms supply chain management and purchasing “synonymously” (Lysons & Farrington, 2006). Giunipero, Handfield, Monczka, & Petterson (2009) hold that supply chain management endorses a supply chain orientation and involves proactively managing the two-way movement and coordination of goods, services, information, and funds (i.e, the various flows) from raw material through end user. The study looks at Supply Chain Management in three perspectives including: resource-based view, value chain analysis and operational excellence. The perspectives are discussed as follows:

2.2.1 Resource-Based View

Supply Chain Management (SCM) is an essential element to operational efficiency. SCM can be applied to customer satisfaction and organization’s success, health institution inclusive. SCM impacts on effective resource utilization and realization of organization goals and objectives. Supply chain management helps streamline everything from day-to-day product flows to unexpected natural disasters. With the tools and techniques that SCM offers, you’ll have the ability to properly diagnose problems, work around disruptions and determine how to efficiently move products to those in a crisis situation. Health Institutions require properly instituted SCM with minimal bottlenecks.

Supply chains underpin the entire health system and are essential for providing consistent availability of affordable, high - quality diagnostic and treatment products in locations that are geographically accessible to the target population. Proponents of Resource-based view see SCM as a basis for the competitive advantage of a firm, lying primarily in the application of a bundle of valuable tangible or intangible resources at the firm's disposal (Mwailu & Mercer, 1983 p142, Wernerfelt, 1984,

p172; Rumelt, 1984, p557-558; Penrose, 1959). According to Barney (1991) SCM effectively translates into valuable resources that are neither perfectly imitable nor substitutable without great effort. A broken supply chain can cripple the health system and undermine positive health outcomes. Most problems stem either from uncertainties or inability to coordinate several activities and partners.

2.2.2 Value Chain Analysis: customer orientation

The Value Chain concept was developed by Porter (1985). According to Porter, value is what buyers are willing to pay. Farrington & Lysons (2006, p.101) defines value chain as a linear map of the way in which value is added by means of a process from raw materials to finished delivered product including service after delivery. For service organizations like hospitals, this would imply mapping patients' needs correctly and offering satisfactory Medicare services. Farrington & Lysons argues that superior value stems from offering lower prices for equivalent benefits or providing unique benefits that more than offset a higher price. The implication is that organizations should strive to continuously create value addition to their customers by identifying what they can do best.

Creating value requires a deep understanding of unarticulated customer needs. It requires enormous creativity and radical thinking in terms of product and service configuration or value proposition. Chopra, meindl & Kalra (2010, p.25), argue that to achieve strategic fit, a company must ensure that its supply chain capabilities support its ability to satisfy the targeted customer segments. It thus follow that organization should continuously analyze activities along the value chain systems to identify what they can uniquely deliver to the customer segments and out-do their competitors.

Value creation for the customer is often challenging and entails deviating from practices that believe in making variances from standards of operations as a norm

(Gibson, 2013). It is essential that organizations take stock of their critical success factors and make use of them in order to outperform their rivals. As Farrington & Lyons notes, undertakings possessing strengths in their critical success factors outperform their rivals. These can be realized through seamless and effective supply chain management.

2.2.3 Operational Excellence: Strategic orientation of SCM

Organizations strive to improve performance resulting in eliminating waste by improving cost efficiency, quality and reliability and compliance safety. As Wright, Jones & Hoyle (2009) portend, there is need for organizations to identify process inefficiencies by such tools as value streaming maps or calculating process capability. Operational excellence is banked on organization's ability to deliver unique, differentiated and outstanding values to their customers.

Operational Excellence in Supply Chain Management implies excellence within each of the individual processes and in the way the supply chain operates as a whole. Customers expect high levels of quality, cost and service in all of their interactions that may be achieved through efficient supply chains. Supply chain processes should work together, with seamless information flow and smooth material handoffs ensuring that another group should not be the cause of a late delivery and lose credibility for the entire supply chain (ARC Advisory group, 2002). Many firms have reduced their supply base so that they more effectively manage relationships with strategic suppliers Tully (1995). Mason (2009) indicates that buying firms are developing a mutually beneficial relationship with suppliers and viewing suppliers as virtual extensions of their firm.

2.3 Factors Affecting Supply Chain Management

According to Davis (2008), good supplier management is not enough; there is an additional requirement for a wider, more integrated, all-encompassing perspective embracing all processes from sourcing through make and transportation and on to

merchandising to final customers. Turban et al. (2004), assert that there are several important problems in SCM that need to be resolved for efficient operation. Most of these problems stem either from uncertainties or inability to coordinate several activities and partner.

A study by Marien (2000) identified four key enablers that must be fully leveraged if SCM is to be successful and may also be barriers to effective supply chain management if they are not in place. These included: organizational infrastructure, technology, strategic alliances and human resource management. Based on Marien's findings, the study presents four selected factors that affect supply chain management as follows:

2.3.1 Information technology in supply chain management

According to Macleod (1994), supply chain managers increasingly want to automate all of the supply chain, from forecasting to distribution, and to link every element of the chain. More and more companies want an integrated solution to enable them to see the entire supply chain at once. Unfortunately for many midsize companies in these times of economic recession, such clarity in global distribution remains largely restricted to major multinationals with deep pockets and volumes large enough to justify the hefty initial investment in IT that can run into millions of dollars. Towill (1997) sums up "To survive, let alone win, a company must be part of one or more supply chains producing world class performance". Hence companies need to work together and optimize the complete pipeline by establishing a seamless supply chain to maximize their market share. Only with this support of the holistic chain concept can further significant and radical improvements in individual business performance be realized. Process manufacturers and IT system vendors are working to

develop a filter to sift through the barrage of data from process control systems to move important information to higher level IT systems (Das 2008).

According to Cooper (2003) Electronic Data Interchange (EDI) technology has been widely used by firms in supply chains to facilitate transactions and information exchanges. EDI is defined as computer to computer exchange of structured data for automatic processing. EDI is used by supply chain partners to exchange essential information necessary for the effective running of their businesses. These structural links are usually set up between organizations that have a long term trading relationship. EDI has many benefits as it provides timely information about its customers' sales as well as highly accurate and very efficient.

Bowersox (2004) EDI are Quick process to information, better customer service, reduced paper work, increased productivity, improved tracing and expediting, cost efficiency and improved billing. Through the use of EDI supply chain partners can overcome the distortions and exaggeration in supply and demand information by improving technologies to facilitate real time sharing of actual demand and supply information. Although companies gain a lot of benefits from EDI, it is often the mismatch between EDI's expectations and the company's activities undertaken to achieve the desired performance (Lang, 2005). Bar codes are widely used throughout the supply chain to identify and track goods at all stages in the process. Bar codes are a series of different width lines that may be presented in a horizontal order, called ladder orientation, or a vertical order, called picket fence orientation. Crown (2004) says when put away, the bar code is used to associate the storage location with the bar-coded stock, and on dispatch the stock record is amended. The use of bar codes can speed up operations significantly.

Enterprise Resource Planning (ERP) Systems are Enterprise-wide Information Systems used for automating all activities and functions of a business. These are transaction-based information systems that are integrated across the whole business. Basically, they allow for data capture for the whole business into a single computer package which gives a single source for all the key business information activities, such as customer orders, inventory and financials. Many companies now view ERP systems from vendors like Baan, SAP and People soft as the core of their IT infrastructure (Darling 2007). ERP systems have become enterprise-wide transaction processing tools which capture the data and reduce the manual activities and task associated with processing financial, inventory and customer order information. Cao (2003) indicate that ERP system achieve a high level of integration by utilizing a single data model, developing a common understanding of what the shared data represents and establishing a set of rules for accessing data.

A number of computer models have now been developed to assist in the planning of warehouse design and configuration. Transportation Management Systems provide more visibility into shipments and orders. Scheduling issues are also addressed on time. Multiple transportation options can be explored as a result of earlier visibility into the supply chain. Timely communication and status reports can also be obtained. By having control on its supply chain, businesses can make efficient routing decisions (Mason 2009). Benard (2012) states that this may include automated storage and retrieval systems (AS/RS), automated guided vehicles (AGVs), and the many other devices that are relatively common in today's modern warehouse such as, conveyors, carousels sortation and systems. Decision Support Systems (DSS) are a specific class of computerized information systems that supports business and organizational decision-making activities. A properly designed DSS is an interactive

software-based system intended to help decision makers compile useful information from raw data, documents, personal knowledge, and/or business models to identify and solve problems and make decisions (Green 2002).

2.3.2 Value added process and supply chain management

Porter (1985) defined value as the amount buyers are willing to pay for what a firm provides, and he conceived the “value chain” as the combination of nine generic value added activities operating within a firm – activities that work together to provide value to customers. Porter linked up the value chains between firms to form what he called a Value System; however, in the present era of greater outsourcing and collaboration the linkage between multiple firms’ value creating processes has more commonly become the “value chain”. As this name implies, the primary focus in value chains is on the benefits that accrue to customers, the interdependent processes that generate value, and the resulting demand and funds flows that are created.

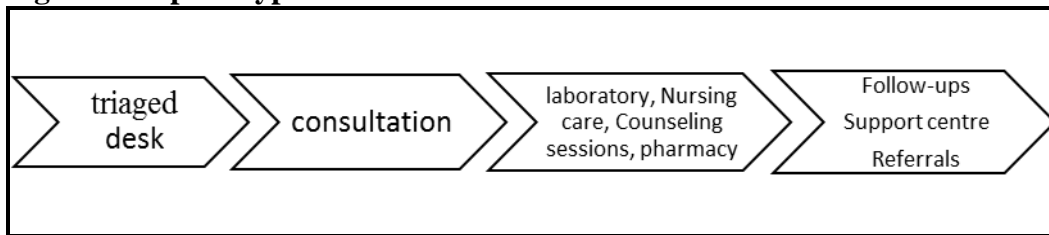
Festus (2000), states that effective value chains generate profits. Many views of Value Chains can be created. Value Chains are one that takes an order from a customer, one that fulfills a customer requirement and one that defines a product or service. Value has meaning in a number of contexts, including trading relationships, consumer purchases, and the interests of company shareholders.

All processes and functions that are part of a company’s value chain contribute to its success or failure (Chopra *et al.*, 2010). Value chain ensures uninterrupted flow of information specifying customers’ needs, transmits the demanded services to the right customers, in right quantity and quality, at the right time and place.

Responsive value-added processes to patients’ needs in health institutions translates to better supply chain performance.

Porter's value chain can be mirrored in hospital scenario as follows:

Figure 1: A prototype Value Chain in a Health Institution



Source: Author (2015)

In health facilities, triaged desk is a mirror to new product development stage through which patient's vital signs are generated that facilitates tailoring of service channels to direct the patients to. This is followed by consultation stage, where clinicians and doctors dispense prescriptions and that is almost equivalent to marketing & sales and operation stages in manufacturing organizations. At this stage, proper clinical diagnosis take place that it tailored to specified patients' vitals. Patients are then channeled to specific service delivery points as either laboratory, nursing care, counselling sessions or to the pharmacy. Community diagnosis are carried out in form of patients' follow up and referrals given to support centres and other service providers which mirror after sales service in manufacturing organizations.

Thus, supply chain performance in health institutions is measured on its (SC system) responsiveness to support efficient and effective service delivery to the patients along this service supply chain. Health institutions need to concentrate in the provision of its core processes and outsource non-core processes from partner organizations and supplier members.

2.3.3 Environment Uncertainty in supply chain management

Environmental uncertainty cannot be avoided. Today, more than ever before, enterprises are faced with complex task and uncertain competitive environments. If organizations want to sustain better performance, firms must understand ideal

alignment types such as business SCM strategy, information system strategy and organizational structure. These factors are playing important roles for organizational performance (Bergeron, 2004). Generally environment uncertainty involves three dimensions of supply chain such as supplier uncertainty, demand uncertainty and manufacturing uncertainty (Davis, 1993). Supplier uncertainty concern with supplier could not supply product to the customer. Another supplier uncertainty is that product cannot be delivered on time or the qualities problems. Demand uncertainty is uncertainty of customer demand for a product. Implied demand uncertainty is also referred to customer needs and product variability. Thus, customers' expect demand different than the implied demand uncertainty will be influenced (Melinda, 2003).

Chopra and Meindl (2010) pointed out that if firms' order is emergency and rapidly then firms will face the high level of implied demand uncertainty. In opposite, if firms' order lead time is long orientation then the company face the implied demand uncertainty is lower than emergency. Furthermore, company integrates with demand uncertainty below those two kinds of uncertainty then it could help company productivity and competitiveness ampleness. According to Croxton (2002) Customer integrate with demand uncertainty is like a bridge, it links with each other to assist customer requirement response faster by organizational reaction. More detail, predictability of product demand could integrate through communication with major customers and level of inventory accumulation can integrate with computerization for major customer's ordering. Johnson (2001) Product variety also is an important factor that organization could integrate with customer's feedback or requirement to avoid uncertainty. Furthermore, organizational integrate successfully at this dimension also could help organization to build the customer relationship as well. Supplier integrate with supplier uncertainty, if supplier's complexity of procurement, technology for

critical material that we could integrate with our major supplier, shares their production schedule for use or let supplier on-time delivery could integrate with information exchange suppliers through information networks.

2.3.4 Management Support

Effective Supply Chain Management requires close collaboration with suppliers as well as internal coordination with engineering, procurement, logistics, customers and marketing to coordinate activities and material flows across the supply chain (Giunipero *et al*, 2009, p.19). This calls for unqualified support and commitment from management.

A uniform SCM system is essential to optimize the efficiency of service delivery. Management support is part of internal environment that impacts on the SCM performance. A fair, equitable, transparent, competitive and cost-effective SCM system needs competent, objective and impartial people to run it.

Ethics, integrity and transparency among Supply Chain managers are critical success factor for optimal SCM performance. Compliance with SCM rules, legislations, guidelines, norms and standards is critical to ensure that organizations' objectives are attained. Compliance failures result in fraudulent activities including: fronting, bribery, nepotism, collusions, cover quoting, conflict of interest, forgery and tender splitting. All these work to derail proper functioning of supply chain management. Very rigid SCM framework and guidelines may also be a bottleneck to efficient operation of the system.

2.4 Summary of Literature Review and Research Gap

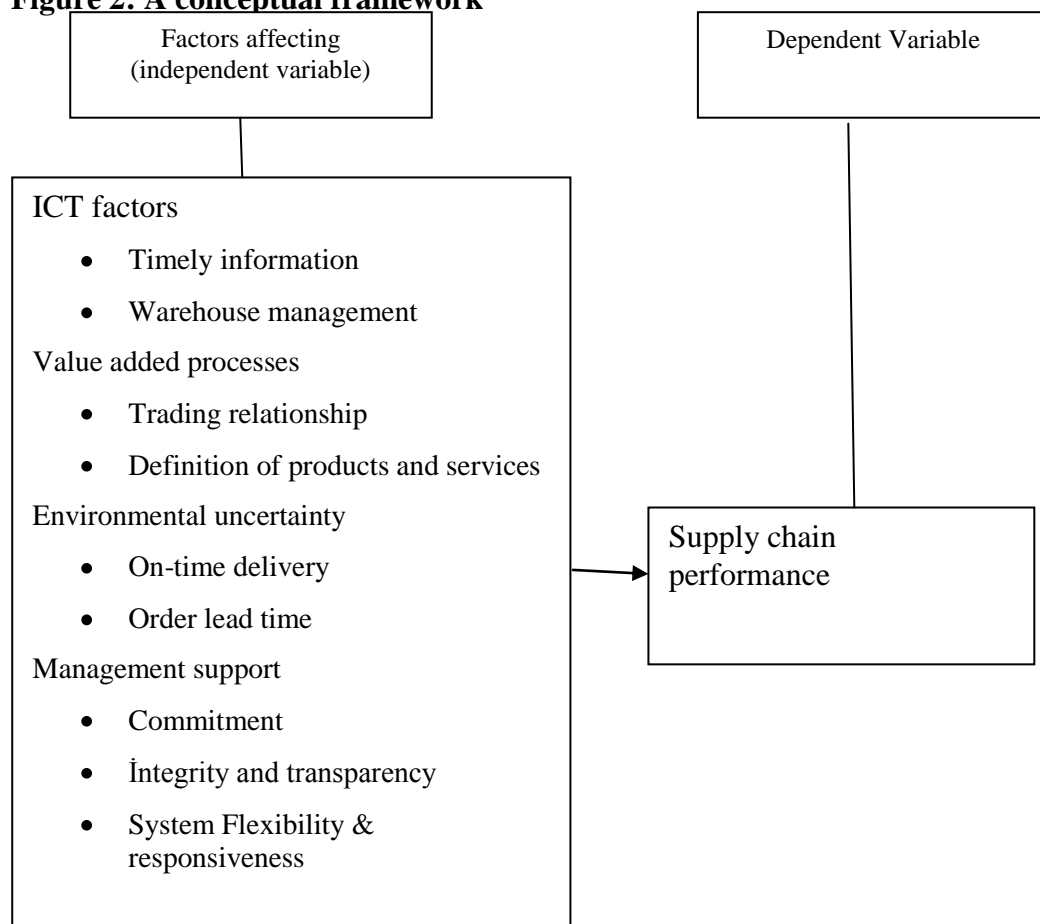
The ensuing research is based on a summary of the literature. The review started by looking at the theoretical perspective of SCM. It looked at SCM in three different orientations: resource-based view, value chain analysis and operational excellence.

Empirical outcomes of past studies support the idea that organizations can enhance their supply chain performance by fully leveraging on enablers including: organizational infrastructure, embracing technology, adopting strategic alliances and good HR management practices. This is however a general view for all organizations. A study by Mungu on the effect of supply chain management practices on the stock levels of essential drugs in public Health Institutions in Bungoma East sub-county. The findings from the study showed that public procurement as currently practiced is not effective in reducing the cost of drugs. It thus recommended evolution from manual procurement to e-procurement practices to eliminate unnecessary cost. It focussed on SCM and service delivery in public health institutions.

To the researcher's knowledge, these studies have not addressed the challenges affecting supply chain performance in public health sectors. The current study thus aims at filling this literature gap by investigating the impact of selected factors on Supply Chain performance in Government Health institutions in Kisumu Central Sub-County.

2.5 Conceptual framework

Figure 2: A conceptual framework



Source: Author (2015)

One way arrow indicates the influence of the factors on Supply Chain Management. Thus if there is a proper mix of ICT factors, value addition processes, proper forecast of environmental uncertainty and flexible, support and creativity in management there would be high performance in SCM.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, the researcher describe the research design, target population, sample size and sampling techniques , data collection ,validity and reliability of instruments, data analysis techniques used to realized study objective.

3.2 Research Design

This study employed a descriptive census survey. Sekaran (2003) notes that descriptive studies are undertaken to understand the characteristics of organization that follow certain common practices. The design enabled gathering of sufficient data that answered the research questions. According to Oso & Onen (2009), survey is suitable for studies that just describe events or opinions without manipulating variables. It was therefore necessary to describe them as they were. It is this intention to describe “issues as they are” that made descriptive survey the ideal design for this study.

3.3 Research Population

The targeted population was all the 9 Government health institutions within Kisumu Central Sub-County, while the accessible populations were all stores managers, supply chain managers and administrators of these health institutions. According to Kisumu County Office Human Resource Data (2013), there are 9 supply chain managers, 9 store managers and 9 Hospital Administrators. This gave a total of 27 respondents who were be censured for the study.

3.4 Data Collection

The study collected qualitative likert scale and quantitative data primarily using questionnaires and interview guides from employees of various cadres in Government health institutions within Kisumu Central Sub- County. The study used

self-administered semi-structured questionnaires. These enabled the researcher to collect both quantitative data from the closed-ended sections, and qualitative data from the open-ended sections. Self-administered questionnaires were delivered to the Supply chain Managers and the stores managers in the 9 facilities by research assistants, completed by the respondents and collected the same day by the research assistants for preparation and analysis.

The study employed Key Informants interviews to collect qualitative data from the 9 hospital administrators in the 9 Government health institutions within Kisumu Central Sub-County. This was conducted by the researcher in the respective respondent's offices. Their views were crucial to this study since they are accounting officers. It views complemented the data collected using questionnaires.

For reliability and validity of the research instruments, a pilot study was conducted in 2 Government health institutions in Bondo Sub-County Hospital. Validity refers the extent to which research results can be correctly interpreted and generalized to other populations, or a measure of the accuracy of the study (Mugenda & Mugenda, 1990). While reliability is the extent to which research results are consistent over time, over place and over methods (Oso & One, 2009). The pilot study involved administering of the questionnaires to two supply chain managers, four stores managers and holding interview session with hospital's superintendent and his/her assistant at the institution. The eight (8) respondents for the pilot study will be purposively and conveniently selected.

3.5 Data Analysis

Data collected was analyzed using descriptive statistics and factor analysis. The descriptive statistics of mean and standard deviation was used, data summarized and presented visually by frequency tables and percentages (proportions). The data

was checked for incomplete questionnaires as a preliminary analysis. Completed questionnaires were coded and keyed into SPSS 20.0 software pagged version to aid the analysis. It was then cleanse for missing values, sorted and analyzed. The generated descriptive statistics were complemented by narratives as per emerging thematic.

Factor analysis was also used to reduce the data and present how the various identified factors influence or relate to each other.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

The purpose of this chapter is to analyze and discuss the study findings in line with the objective. The objective of the study was to determine factors affecting supply chain performance in Government Health Institutions within Kisumu Central Sub-County. The chapter has five sections including responses rate, respondents' general information, factor analysis, discussion on factors affecting supply chain performance and summary of the findings. The findings are presented in charts and tabular form.

4.2. Response Rate

This was a census study that targeted 9 Government Health Institutions within Kisumu Central Sub-County. The institutions are: JOOTRH, Kisumu County Hospital, Obunga Health Centre, Nyalenda Health Centre, Simba Upepo Health Centre, Joel Omino Health Centre, Migosi Health Centre, Lumumba Hospital and Mosque/ Railways Health Centre. The study administered 18 questionnaires to supply chain managers and stores managers in 9 government Health Institutions within Kisumu Central Sub-County. Nine (9) Key Informant (KI) interviews were also conducted to 9 Hospital administrators to gather qualitative data that complements the quantitative data from the questionnaire. The response rate for the study was 100% as all sampled respondents were reached. The response rate was very good and it conforms to the assertion by Garg & Kothari (2014) that a response rate greater than 70% is very good.

4.3 Respondents' General Information

The study sought two general information about the respondents, the designation and number of years they have been holding such responsibilities within the institutions. Table 4.1 and 4.2 present the respondents' general information.

Table 4.1: Respondent's Designation

What position do you hold within this institution?	Frequency	Percent
Stores Manager	11	40.7
SC Manager	7	25.9
Administrator	9	33.3
Total	27	100.0

Source: Researcher (2015)

The results in table 4.1 shows that 40.7% of the respondents are stores managers, 25.9% are supply chain managers, whereas 33.3% are administrators. This implies that there is an institution with two stores managers and no supply chain manager.

Length of period interacting with a system helps one learn it, understand the challenges it faces and institutionalize solutions to the challenges. It provide a window period enough to design measures that support efficient and effective supply chain operations.

In order to establish the length of time the respondents in table 4.1 have held their respective designations, the researcher asked the question "how many years have you held the position?" and the answers presented in table 4.2.

Table 4.2: Duration in the Position

How many years have you held the position?	Frequency	Percent
1 to 5 Years	12	44.4
5 to 10 Years	6	22.2
Over 10 Years	9	33.3
Total	27	100.0

Source: Researcher (2015)

From the findings in table 4.2, 44.4% of the respondents being institutional agents have held their respective roles as users of supply chain system for between 1 to 5 years, 33.3% have held the positions for over 10 years, whereas there are 22.2% of the respondents who have held the positions for 5 to 10 years. The fact that 55.5% of the respondents have over 5 years' experience interacting with supply chain systems in these health institutions is a strong indicator that they are relevant respondents to express their views and give responses for the study questions. It will ensure collection of relevant data for the study that leads to relevant conclusion and recommendations.

4.4 Factor Analysis

The purpose for factor analysis was to reduce data into acceptable factor components. Factor analysis was used for questions 4 to 13 of the questionnaire as variables and coded as Q4 to Q13.

4.4.1 Factor Loadings

Factor analysis generated factor loadings accepting all the variables of the questionnaire and reducing the variables into 3 factor components as shown in table 4.3, all the factor loadings exceed 0.5. This shows that the variables are suitable and acceptable for further analysis.

Table 4.3: Factor Loadings of Variables Affecting Supply Chain Performance

Variables of the questionnaire	No.	Factor Component		
		1	2	3
Timely dissemination of information through use of effective ICT resources is vital in proper functioning of SC performance in public health institutions	Q4	0.884		
The institution has well developed ICT infrastructure that supports Supply Chain activities	Q5			0.911
Uncertainty in environmental factors has very serious negative impact on proper functioning of Supply Chain	Q6	0.813		
Inadequate information flows to and from supplies affect supply chain performance	Q7	0.767		
Lack of cooperation from supply chain members has negative impact on supply chain efficiency	Q8			0.613
Poor management support and lack of compliance to supply chain guidelines impact negatively on supply chain performance	Q9		0.583	
Inadequate funding to the facility leads to ineffective supply chain operations	Q10		0.871	
Market price fluctuation affect proper forecasting of supply chain operations	Q11	0.854		
Properly aligned/ synchronized value-added processes help in improving functioning of Supply Chain activities	Q12		0.764	

There is flexible bureaucratic system that facilitates efficient functioning of the Supply Chain operations in public health institutions within Kisumu Central Sub-County	Q13	0.694		
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Source: Researcher (2015)

With eigenvalues requested ≥ 1 , the first three factors components are accepted for the study as presented in table 4.4. The three factors explain nearly 75.249% of the variability in the original 10 variables as indicated in column 10, table 4.4. the underlying factors components are related to ICT usage, environmental uncertainty and management systems in the institutions.

Table 4.4: Total Variance Explained of Factor Variables

Factor Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Var.	Cum. %	Total	% of Var.	Cum. %	Total	% of Var.	Cum. %
1	3.641	36.410	36.410	3.641	36.410	36.410	3.570	35.705	35.705
2	2.436	24.364	60.774	2.436	24.364	60.774	2.182	21.818	57.523
3	1.448	14.475	75.249	1.448	14.475	75.249	1.773	17.727	75.249
4	.897	8.969	84.219						
5	.491	4.914	89.133						
6	.435	4.347	93.480						
7	.321	3.211	96.691						
8	.225	2.252	98.943						
9	.074	.742	99.685						
10	.031	.315	100.000						

Source: Researcher (2015)

4.4.2 Mean Values Range of Factor Variable

The effects of factor variables on supply chain performance can be identified by calculating the values of the sample mean for the questionnaire variables. On a 5-point scale, the sample mean range from 1 to 5 indicating low to high effects. Some

sample mean that falls in 3 will indicate moderate effects of the factor on supply chain performance. Therefore, variables with sample means lower than 2 may not be used for further analysis as they indicate low effects on supply chain performance.

4.5 Factors Affecting SC Performance

This section discusses factors affecting supply chain performance as identified from factor analysis. The section is divided into four. It begins with ICT variables affecting SC performance in Government Health Institutions within Kisumu Central Sub-County, Kenya. This is followed by environmental uncertainty, value-added processes and management support variables affecting SC performance.

4.5.1 ICT Variables Affecting Supply Chain Performance

Organizations are currently embracing use of ICT as a tool for competitive edge and therefore trying to automate their operations including those of supply chain department, given the prominent accorded to SCM in realizing strategic goals. This is in line with Macleod (1994) assertion that supply chain managers are increasingly trying to automate all of the supply chain activities from forecasting to distribution and to link every element of the chain. Well synchronized ICT infrastructure resources would enable timely availability of information that make it possible for effective forecasting in supply chain operations. If properly installed, ICT system will make it possible for efficient patients' data capture and transmission and warehouse management that reduces redundancy in resource utilization. Table 4.5 shows the ICT variables from the questionnaire accepted as having moderate effect on supply chain performance.

Table 4.5: ICT variables affecting SC performance

Factor	No.	Variable	Min	Max	Mean	Std. Dev.
ICT	Q4	Timely dissemination of information through use of effective ICT resources is vital in proper functioning of Supply Chain performance in public health institutions	1	5	3.67	1.029
ICT	Q5	The institution has well developed ICT infrastructure that supports Supply Chain activities	1	5	3.28	1.274

Source: Researcher (2015)

From the results in table 4.5, it can be seen that the sample mean of ICT infrastructure development in Government Health Institution is rather low (3.28) on a 5-point scale, as compared to the sample mean of (3.67) for the role of ICT in timely dissemination of information within Supply Chain system. It can be implied that users of Supply Chain systems in these institutions do appreciate the role that ICT resources play in ensuring effective functioning of Supply Chain system. To establish this, the study sought the respondents' opinions on the statement "timely dissemination of information through use of effective ICT resources is vital in proper functioning of Supply Chain performance in Government health institutions" and responses presented in table 4.6 row Q4. Results in table 4.6 row Q4 shows that 16.7% of the respondents strongly agreed that timely dissemination of information through robust ICT resources is essential in improving supply chain performance, 50.0% agreed, 22.2% disagreed, 5.6% strongly disagreed. There were 5.6 % of the respondents who

indicated “not at all” option. Overall, 66.7% of the respondents indicated “agree” option attesting to the important role of ICT resources improving supply chain performance.

The findings conforms to Cooper (2003) assertion on Electronic Data Interchange (EDI), as an element of ICT platform providing timely information about its customers’ sales as well as highly accurate and very efficient. It also conform to Ruston (2000) assertion that ICT via EDI facilitates sending invoices, bills of lading, confirmation of dispatch, shipping details and any information that the linked organizations choose to exchange. KI interview session at Kisumu County Hospital on the question “how important would an ICT infrastructure resources be to your supply chain system?”, revealed that the institutions is embracing ICT resources to reduce turn-around time and paper work in prescription of patients’ treatments.

Table 4.6: Scaled Responses in Percentages of Factors Affecting SC Performance

No.	Factor Variables of the questionnaire	Responses in percentages (%)				
		1	2	3	4	5
Q4	Timely dissemination of information through use of effective ICT resources is vital in proper functioning of SC performance in public health institutions	5.6	5.6	22.2	50.0	16.7
Q5	The institution has well developed ICT infrastructure that supports Supply Chain activities	11.1	11.1	38.9	16.7	22.2
Q6	Uncertainty in environmental factors has very serious negative impact on proper functioning of Supply Chain	11.1	11.1	5.6	50.0	22.2
Q7	Inadequate information flows to and from supplies affect supply chain performance	11.1	5.6	11.1	22.2	50.0
Q11	Market price fluctuation affect proper forecasting of supply chain operations	16.7	5.6	-	22.2	55.6
Q8	Lack of cooperation from supply chain members has negative impact on supply chain efficiency	-	5.6	22.2	16.7	55.6

Q12	Properly aligned/ synchronized value-added processes help in improving functioning of Supply Chain activities	5.6	5.6	16.7	33.3	38.9
Q9	Poor management support and lack of compliance to supply chain guidelines impact negatively on supply chain performance	-	-	11.1	44.4	44.4
Q10	Inadequate funding to the facility leads to ineffective supply chain operations	-	-	-	27.8	72.2
Q13	There is flexible bureaucratic system that facilitates efficient functioning of the Supply Chain operations in Government health institutions within Kisumu Central Sub-County	5.6	27.8	33.3	27.8	5.6

Source: Researcher (2015)

The patients' vital signs are captured at the triaged desk and transmitted online throughout the service pipeline up to pharmacy. Through this process, supply chain get real-time information that make it more responsive. Similar sentiment was held by JOOTRH administrator during KI interview session at the institution. However, there were many health institutions censured that have not embraced use of ICT resources due to level of investment required but acknowledge its importance in improving supply chain performance.

The benefits of ICT resources in improving supply chain performance can only be realized if the institutions have digitalize the departments and especially user centres that are directly linked to supply chain events. For this, the respondents were asked of their opinion on the statement “the institution has well developed ICT infrastructure that supports Supply Chain activities” and the answers presented in table 4.6 row Q5. The responses show that 38.9% disagreed with the statement that the institution has well developed ICT infrastructure that supports supply chain activities, 22.2% strongly agreed, 16.7% agreed and 11.1% strongly disagreed whereas 11.1% of the respondents indicated “not at all” option. The fact that only 38.9% of the respondents agreed with the statements imply that many Government

health institutions censured have not embraced investing in ICT to tap on the benefits in improving supply chain performance.

When asked the question during KI interview session “how would you describe level of ICT development in your institution?” administrator at Obunga health centre simply said we have not invested in installation of ICT resources in this facility. Similar sentiment was echoed by Nyalenda Health centre administrator. They said “we are still handling most of the patient-related core processes manually and this impact negatively on turn-around time”.

This confirms the findings that many of these institutions have not invested in ICT infrastructure that supports supply chain performance.

4.5.2 Environmental Uncertainty Variables Affecting SC Performance

As noted by Bergeron (2004), enterprises are today faced with complex task and uncertain competitive environments. Health institutions too are faced with uncertain environmental events including casualty cases that surges in almost on daily basis, price fluctuations of drugs and other essential commodities required to meet patients’ needs, unforeseen patients’ surges and industrial strikes by health workers. These uncertainties if not well predicted and forecasted can pose negative impacts on time delivery and order lead time for services which are elements of agile supply chain system. For this, the researcher sought to establish the effects of environmental variables on supply chain performance in Government Health Institutions within Kisumu Central Sub-County. Table 4.7 presents the accepted environmental variables from the factor analysis.

Table 4.7: Environmental uncertainty variables affecting SC performance

Factor	No.	Variable	Min	Max	Mean	Std. Dev.
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Environmental uncertainty	Q6	Uncertainty in environmental factors has very serious negative impact on proper functioning of Supply Chain	1	5	3.61	1.290
Environmental uncertainty	Q7	Inadequate information flows to and from supplies affect supply chain performance	1	5	3.94	1.392
Environmental uncertainty	Q11	Market price fluctuation affect proper forecasting of supply chain operations	1	5	4.31	1.195

Source: Researcher (2015)

Results in table 4.7 shows that market price fluctuation has very high impact on supply chain performance with a sample mean of 4.31. This is followed by inadequate information sharing (3.94) and finally other environmental uncertainty (3.61). Overall, factor analysis accepted environmental uncertainty as having moderate to high effects on supply chain performance. Table 4.6 rows Q6, Q7 and Q11 present specific findings on the environmental uncertainty variables as expressed by 18 stores and supply chain managers in the censured institutions.

The respondents' answers on the statement "Uncertainty in environmental factors has very serious negative impact on proper functioning of Supply Chain" are presented in table 4.6 row Q6. From the results, 22.2% strongly agreed, 50.0% agreed, 5.6% disagreed, and 11.1% strongly disagreed while 11.1% indicated not at all. The same group of respondents were asked to express their opinion on the statement "Inadequate information flows to and from supplies affect supply chain performance" and the responses presented in table 4.6 row Q7. The results show that 50.0% of the

respondents strongly agreed, 22.2% agreed, 11.1% disagreed and 5.6% strongly disagreed whereas 11.1% indicated not at all. Overall, there was 72.2% agreement that inadequate information flow impacts on supply chain performance. The finding concurs with Towill (1997) sentiment that to survive, let alone win, a company must be part of one or more supply chains producing world class performance. Hence health institutions need to collaborate with other partners and optimize the complete pipeline by establishing a seamless supply chain system to ensure patients' service satisfaction.

To determine the effect of market price fluctuation on supply chain operations, respondents were asked of their opinions on the statement "Market price fluctuation affect proper forecasting of supply chain operations" and answers presented in table 4.6 row Q11. The results show that 55.6% strongly agreed, 22.2% agreed, 5.6% strongly disagreed and 16.7% indicated not at all. In aggregate, there is 78.8% agreement to the fact that market price fluctuation affect proper functioning of supply chain. The findings shows that environmental uncertainty poses negative effects on supply chain performance. Considering Davis (1993) argument that environment uncertainty involves three dimensions of supply chain such as supplier uncertainty, demand uncertainty and manufacturing uncertainty, and with proper forecasting of these factors then institutions can improve on supply chain performance.

4.5.3 Value-Added Processes Variables Affecting SC Performance

Like other organizations, health institutions today focus more on core processes that must be performed for a successful service delivery to patients and outsourcing certain non-core services and processes. Defining clearly the relationship between supply chain partners helps improve on the value chain activities that act to improve supply chain performance. Health Institutions should strive to develop very

strong and lasting supplier relationship in order to improve outbound and inbound services to the patients. Effective supply chain system in health institutions should be such a way that it draws real-time information from the core service processes that begins at the triaged desk through to community diagnosis as depicted in *figure 1*, p. 16 so that it remains very agile and responsive.

Factor analysis on value-added factors accepted two variables of the questionnaire as having impact on supply chain performance as shown in table 4.8. The results show that poor relationship, either inter and intra supply chain members relationship has high negative impact on supply chain performance with a sample mean of 4.38 as compared to alignment of value-added processes with a mean of 3.94. The responses on the statement “lack of cooperation from supply chain members has negative impact on supply chain efficiency” aimed at determining the impact of this variable on supply chain performance is presented in table 4.6 row Q8. Results in table 4.6 row Q8 shows that 55.6% strongly agreed with the statement “lack of cooperation from supply chain members has negative impact on supply chain efficiency”, 16.7% agreed, 22.2% disagreed and 5.6% strongly disagreed. From table 4.6 row Q8, it can be seen that with 72.3% of the respondents agreeing to the statements, implies that stronger relationship, collaboration and networking is essential for health institutions in improving their supply chain performance.

Table 4.8: Value-Added Processes variables affecting SC performance

Factor	No.	Variable	Min	Max	Mean	Std. Dev.
Value-Added Processes	Q8	Lack of cooperation from supply chain members has negative impact on supply chain efficiency	2	5	4.38	.957

Value-Added Processes	Q12	Properly aligned/ synchronized value-added processes help in improving functioning of Supply Chain activities	1	5	3.94	1.162
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Source: Researcher (2015)

The finding agrees with Giunipero et al (2009) argument that effective supply chain management requires collaboration with suppliers as well as internal coordination with engineering, procurement, logistics, customers and marketing to coordinate activities and material flows across the supply chain. This might not entirely apply to health institutions, but it could be implied that effective supply chain would require closer collaboration with suppliers as well as internal coordination with doctors, nurses, laboratory specialist, pharmacist, procurement, logistics and patients to coordinate efficient flow of service delivery.

Further, this finding is complemented by responses from key informant interview sessions. There seems to exist closer linkages between the facilities and even with private facilities that ensures easier and effective referral of patients for specific examinations in facilities that have the required medical equipment. Again, outsourcing non-core services and developing closer and stronger relationship with partners is increasingly being embraced by Health Institutions within Kisumu Central Sub-County. KI interview session with administrator at JOOTRH confirmed this. According to the administrator, the hospital is currently outsourcing security and cleaning services from other vendors. The hospital is leveraging of strong relationship with other partner organizations locally and international. For instance, there are equipment that are installed and maintained by partners and the hospital only provide laboratory technicians and re-agents to facilitate running of specified tests. This is an indication of lasting relationship and collaboration with partners. There is also a

cancer screen unit within JOOTRH that is run by partner organizations and the hospital can easily refer patients for those services to that unit, at the patient's cost. Hence, there is an important role of supply chain partners' cooperation in achieving very vibrant supply chain systems in the Government health institutions.

On value-added processes and supply chain performance, the answers on the statement "properly aligned/ synchronized value-added processes help in improving performance of Supply Chain activities" are presented in table 4.6 row Q12. The results show that 38.9% of the respondents strongly agreed that well aligned value chain system can improve supply chain performance, 33.3% agreed, 16.7% disagreed and 5.6% strongly disagreed whereas 5.6% indicated not at all. Overall, 72.2% agreed that well aligned value chain system can improve supply chain performance.

Thus, there is a link between these findings and the assertion by Chopra *et al.* (2010) that all processes and functions that are part of a company's value chain contribute to its success or failure. Metric measures of supply chain performance including right quantity, quality, right time and place can be achieved through well aligned value added processes that defines clearly the core activities of the organization.

4.5.4 Management Support Variables Affecting SC Performance

Health Institutions need well designed supply chain system with guidelines which draw information from its core-processes that if properly adhered to translate to efficient and effective resource utilization and patients' satisfaction with offered services. Thus, effective supply chain performance in health institutions calls for unqualified support from management in terms of commitment, adequate funding to supply chain activities and ensuring compliance from supply chain users.

The study sought to find out the effect of management support on supply chain performance. From factor analysis, three questionnaire variables on management

support were accepted to have impact of supply chain performance as indicated in table 4.9. Result in table 4.9 shows that inadequate funding and lack of compliance to supply chain guidelines have high impact on supply chain performance with a mean of 4.72 and 4.33, while bureaucracy has moderate impact with a mean of 3.00. The responses to the statement “poor management support and lack of compliance to supply chain guidelines impact negatively on supply chain performance” aimed at determining the effect of management support on supply chain performance are presented in table 4.6 row Q9. From the result, 88.8% agreed that poor management support and lack of compliance to supply chain guidelines impact negatively on supply chain performance, while 11.1% disagreed. It can therefore be implied that there are guidelines that prescribe procedures to be followed in supply chain operation that if well adhered to would increase its efficiency and effectiveness in resource utilization.

Table 4.9: Management Support variables affecting SC performance

Factor	No.	Variable	Min	Max	Mean	Std. Dev.
Management Support	Q9	Poor management support and lack of compliance to supply chain guidelines impact negatively on supply chain performance	3	5	4.33	.686
Management Support	Q10	Inadequate funding to the facility leads to ineffective supply chain operations	4	5	4.72	.461

Management Support	Q13	There is flexible bureaucratic system that facilitates efficient functioning of the Supply Chain operations in public health institutions within Kisumu Central Sub-County	1	5	3.00	1.029
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Source: Researcher (2015)

This finding concurs with the results from KI interview session on the question “do you have supply chain manual that guides operations in supply chain department and how elaborate is the manual?”. In all the sessions, there was an indication of the existence of the supply chain manual. KI at Kisumu County hospital said that “there are very elaborate guidelines in form of manuals that detail the procedures for compliance. Some of these manuals are also provided by PPOA”. When ask to comment on the level of compliance to these guidelines, the administrator said “compliance may not be 100% but the users do follow the guidelines very well. There are also certain malpractices that can manifest among supply chain users like conflict of interest. However, the management has always shown support towards ensuring compliance to the guidelines”. Similar sentiment is expressed at Migosi Health Centre. The finding conforms with Gitau (2011) assertion on SCM malpractices in the Kenya public sector that there are non-compliance to SCM policies and guidelines, lack of professional skills among the SCM staff, lack of ethics, competitive tendering, accountability and inadequate use of technology.

In order to determine the effect of funding to supply chain performance, the respondents were asked to express their view on the statement “inadequate funding to the facility leads to ineffective supply chain operations” and the responses presented

in table 4.6 row Q10. From the result, there is 100% agreement that inadequate funding leads to poor supply chain performance. This can impact on the trust and relationship between supply chain partners that can affect quality of service, delivery time and order lead time.

On the general system structure within the institutions, the respondents were asked of their opinion on the statement “there is flexible bureaucratic system that facilitates efficient functioning of the Supply Chain operations in public health institutions within Kisumu Central Sub-County” and the answers are presented in table 4.6 row Q13. From the result, 33.3% agreed that flexible bureaucratic system can improve supply chain performance, 61.1% disagreed and 5.6% indicated not at all. The fact that only 33.3% are in agreement imply that bureaucratic system in its entirety whether flexible or otherwise can hamper the performance of supply chain. Unfortunately, this is the system in the Government health Institutions

When ask to comment on nature of system in the facility, KI at Lumumba Hospital had this to say “systems here are very rigid and cannot allow many of the supply chain operation s to be very responsive to patients’ needs. It calls for prior planning of events and activities. Again this is affected by many environmental uncertainty. So even forecasting effectively becomes a problem, but we try just to be compliant to the system’s requirements. We need robust systems that allow for modern state of art technology in supply chain like just-in-time procurement of required drugs and other apparatus”

4.6 Discussion of the Study Findings

The questionnaire was successfully administered to 18 stores managers and supply chain managers, while key informant interviews (KII) conducted for 9 administrators in the 9 Government Health Institutions in Kisumu Central Sub-County

to determine factors that affect supply chain performance in these institutions. The study recorded 100% response rate.

The findings shows that stores managers constituted 40.7% of the respondents, 25.9% were supply chain managers, whereas 33.3% were administrators. In relation to duration of responsibility, 44.4% of the respondents being institutional agents have held their respective roles as users of supply chain system for between 1 to 5 years, 33.3% have held the positions for over 10 years, whereas there are 22.2% of the respondents who have held the positions for 5 to 10 years. Overall, 55.5% of the respondents have used supply chain systems in the censured institutions for over 5 years.

In terms of factors affecting supply chain performance in Government Health Institutions within Kisumu Central Sub-County, the findings shows that inadequate funding, lack of cooperation among supply chain users, poor management support and non-compliance to rules and market price fluctuations can impact negatively on effective functioning of SC system with a sample mean of 4.72, 4.38, 4.33 and 4.31 respectively. Inadequate information flow/ sharing can have moderate negative effects with a mean of 3.94, while well aligned value-added processes have a mean of 3.94.

Timely information flow through ICT resources can improve the performance of supply chain system with a mean of 3.67, while environmental uncertainty variables can hamper the performance of supply chain system with a sample mean of 3.61. However, the findings revealed that most of the censured institutions have not invested in ICT infrastructure that supports information sharing of critical patients' needs which can help the system to be more agile and responsive. There is high degree of agreement that bureaucratic system make supply chain less responsive to patients' needs.

The study findings are in agreement with Marien (2000) study which identified four key enablers that must be fully leveraged if Supply Chain Management is to be successful. These included: organizational infrastructure, technology, strategic alliances and human resource management. Natural disasters, such as extreme weather conditions, can have a devastating impact on supply chain

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary, conclusions and recommendations from the study. It is divided into five sections including summary of the study, conclusion based on the findings and discussions in chapter four, recommendations, limitations of the study and suggestions for further research.

5.2 Summary

Chapter one opened with a discussion on the background of the study, followed by the research problem, objectives and value of the study. The objective of the study was to determine factors affecting supply chain performance in Government Health Institutions within Kisumu Central Sub-County, Kenya. To achieve the study objectives, a descriptive census survey design was used. It censured 9 Government Health Institutions with a target of 27 supply chain users (administrators, stores managers and supply chain managers) in these institutions as the respondents. The study recorded 100% response rate.

Data was collected using a 5-point likert scale questionnaire and an interview guide for KI sessions. The respondents were targeted purposively as there are definite individuals holding such positions in those institutions. Descriptive statistics of mean, standard deviation and frequency tables and factor analysis were used to analyze the collected data. Factor analysis was used to reduce the data/ variables into acceptable factors for further analysis. The study used Statistical Packages for Social Sciences (SPSS) to aid the analysis. The findings were presented in tabular forms.

The findings showed that supply chain performance in Government Health Institutions is affected by four broad factors categorized as: embracing use of ICT infrastructure, proper scanning of environmental factors, and good alignment of

value-added processes that ensures focusing on core businesses and management commitment and support.

5.3 Conclusion

There is poor investment priority in ICT infrastructure in the censured health institutions. This negatively impacts on sharing of information that facilitates or dictates the level of responsiveness in supply chain systems. However, the institutions do understand the vital role of ICT resources in improving supply chain functionality. It is also evident from the study findings that uncertainty in environmental factors do affect supply chain performance.

There seems to be lack of proper funding to these institutions and non-compliance to rules and regulations on supply chain operations among system users. These negatively impact on supply chain performance. Mechanical bureaucratic systems within these institutions also derails the performance of supply chain system.

5.4 Recommendations

The study recommends that the management remains committed to offering satisfactory health care services to patients through a sense of positive commitment in ensuring adequate funding that supports investment in ICT resources.

There is need to establish independent compliant units within the institutions to ensure that rules and regulations are adhered to in order to curb malpractices that reduces effectiveness of supply chain performance.

The study recommends establishment of stronger networking and collaboration platform that facilitates sharing of real-time information between supply chain partners.

The study further recommends flexible systems that allow for modern state of art technology like just-in-time supply of the required items to reduce storage-related cost.

5.5 Limitations of the Study

Some of the limitations of the study include:

The research targeted only 9 Government Health Institutions in Kisumu Central Sub-County as a representative of many health facilities in Kenya. This was limited due to financial constraints. More objective findings would be possible given an extension of the research to include either entire County of Kisumu or Kenya as a whole.

The study was also constrained by time as the researcher had to balance between the research undertakings and other work related commitments.

The researcher relied entirely on primary quantitative and qualitative data collected by questionnaire and KI. This means that the benefits associated to using secondary had to be forgone.

5.6 Suggestions for further Research

Further studies can improve on this research in the following areas:

A study on the relationship between the identified factors and supply chain performance in Government Health Institutions Kisumu Central Sub-County is highly suggested for further studies.

A more detailed and comprehensive study that considers all health institutions and which is not constrained by time can be undertaken so as to improve the quality of the report.

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Appendix one: Transmittal Letter



UNIVERSITY OF NAIROBI
SCHOOL OF BUSINESS
KISUMU CAMPUS

Telegrams: "Varsity" Nairobi
Fax: 4181650
Kisumu, Kenya
Telex: 22095 Varsity
Mobile: 0720348080
Email: ajaleha@uonbi.ac.ke

P.O Box 19134-40123
Kisumu, Kenya

Date: 9th September, 2015.

TO WHOM IT MAY CONCERN

The bearer of this letter Odeny Monica Auma

REGISTRATION NO: D61/61069/2011

The above named student is in the Master of Business Administration degree program. As part of requirements for the course, she is expected to carry out a study on **"Factors affecting Supply Chain Management in Health care Institutions within Kisumu Central Sub County."**

She has identified your organization for that purpose. This is to kindly request your assistance to enable her complete the study.

The exercise is strictly for academic purposes and a copy of the final paper will be availed to your organization on request.

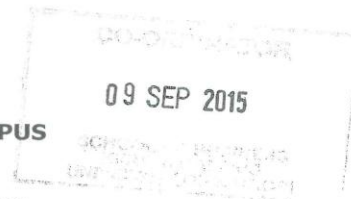
Your assistance will be greatly appreciated.

Thanking you in advance.

Sincerely,

MR. CHARLES DEYA
ADMINISTRATOR, SOB, KISUMU CAMPUS

Cc File Copy



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Appendix two: Questionnaire to Supply Chain and Stores Managers
Dear Respondent,

My name is Monica Auma Odeny and I am an MBA student at the University of Nairobi. I am carrying out study on factors affecting Supply Chain performance in Government Health Institutions within Kisumu Central Sub-County. The information you provide will be confidential and used strictly for the purposes of this study.

Do not write your name on this questionnaire.

PART A: General Information

1. Name of the Institution where you are working.....
2. What position do you hold within this institution? (a) Medical Superintendent
 (b) Store Manager (c) SC Manager
3. How many years have you held this position? (a) 1-5 years (b) 5-10 years
 (c) Over 10 years

The following are some of the factors affecting supply chain performance in government health institutions. Kindly indicate to what extent the following factors affect the Supply Chain performance

In a scale of 1-5, where 1= Not at all 2= I strongly disagree
 3= I disagree 4= I agree 5= I strongly agree

No	Factor	1	2	3	4	5
4	Timely dissemination of information through use of effective ICT resources is vital in proper functioning of SCM in public health institutions within Kisumu Central Sub-County					
5	The institution has well developed ICT infrastructure that supports Supply Chain activities					
6	Uncertainty in environmental factors has very serious negative impact on proper functioning of Supply Chain					
7	Inadequate information flows to and from suppliers affect supply chain activities					
8	Lack of cooperation from supply chain members has negative impact on supply chain efficiency					
9	Poor management support and lack of compliance to supply chain guidelines impact negatively on supply					

	chain performance					
10	Inadequate funding to the facility leads to ineffective supply chain operations					
11	Market price fluctuation affect proper forecasting of supply chain operations					
12	Properly aligned/ synchronized value-added processes help in improving functioning of SCM					
13	There is flexible bureaucratic System that facilitates efficient functioning of the SCM in Public Health Institutions within Kisumu Central Sub-County					

Thanks

Appendix three: Interview Guide for Health Institutions’ Administrators

Dear Respondent,

My name is Monica Auma Odeny and I am an MBA student at the University of Nairobi. I am carrying out study on factors affecting Supply Chain performance in Government Health Institutions within Kisumu Central Sub-County. The information you provide will be confidential and used strictly for the purposes of this study.

Do not write your name on this questionnaire.

PART A: General Information

1. Name of the Institution where you are working.....
2. How many years have you held this position? (a) 1-5 years (b) 5-10 years
(c) Over 10 years
3. How important would an ICT infrastructure resource be to your supply chain system?
4. Do you think the institution has well developed ICT infrastructure that supports supply chain activities
5. How would you describe level of ICT development in your institution?
6. How would you describe the relationship this institution has with other stakeholders and partners in regard to supply chain performance?
7. How do environmental uncertainties impact on supply chain performance?
8. Do you have supply chain manual that guides operations in supply chain department and how elaborate is the manual?
9. Can you comment on the level of compliance to these guidelines among your staff?
10. Briefly comment on the general management system in your institution.

Thanks